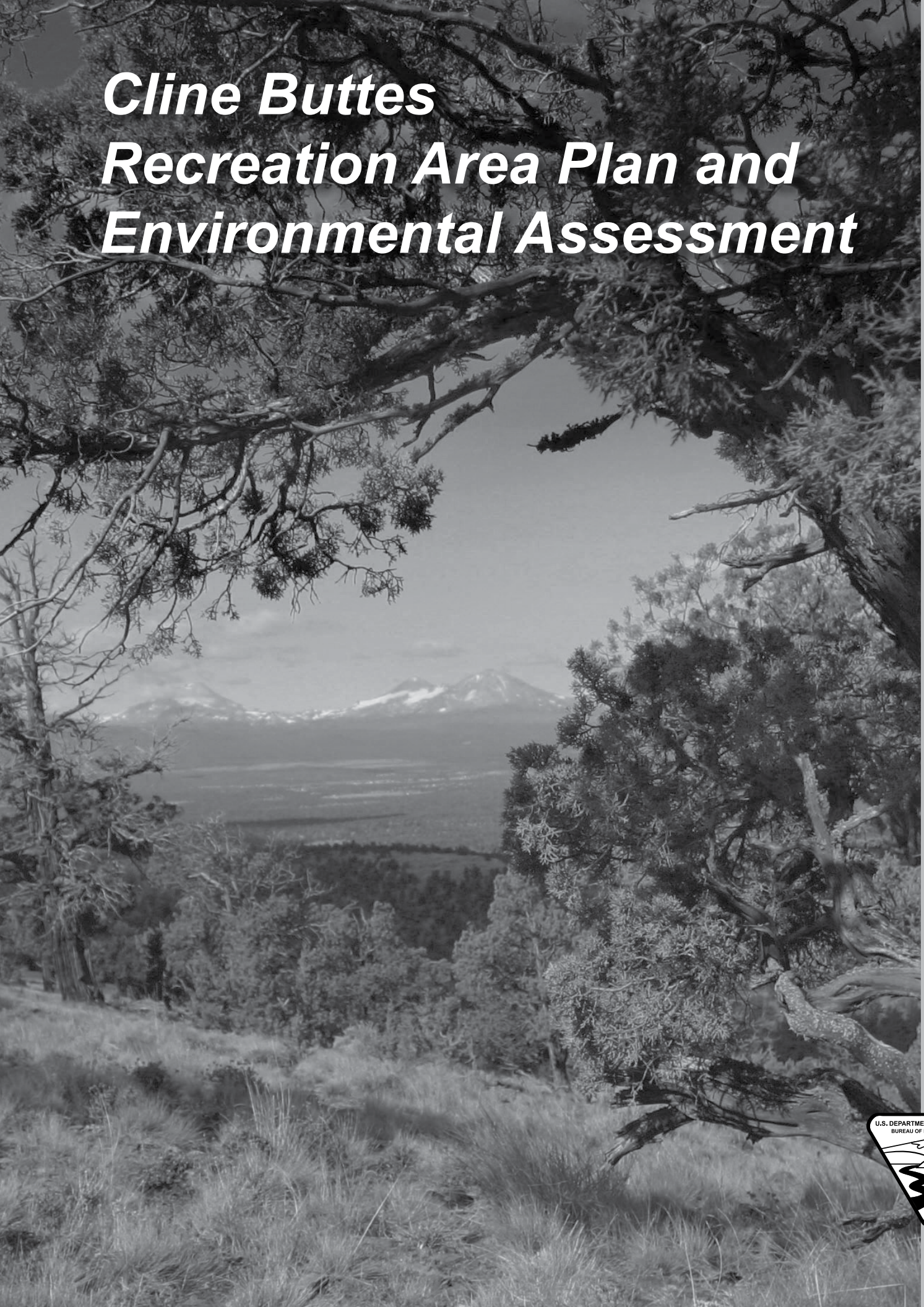

Cline Buttes Recreation Area Plan and Environmental Assessment

BLM

Prineville District

September 2009

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

U.S. Bureau of Land Management
Cline Buttes Recreation Area Plan
3050 NE 3rd Street
Prineville, OR 97754

541-416-6700
email: clinebuttes@blm.gov
website: http://www.blm.gov/or/districts/prineville

Privacy

Comments, including names and street addresses of respondents, will be retained on file in the Prineville District Office as part of the public record for this planning effort. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public inspection, or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

Cline Buttes Recreation Area Plan and Environmental Assessment

September, 2009

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Prineville Districe Office
3050 N.E. 3rd Street
Prineville, Oregon 97754

IN REPLY REFER TO:
1610 (OR060)

Dear Interested Public:

We are pleased to present to you the Cline Buttes Recreation Area (CBRA) Plan and Environmental Assessment (EA). This document describes the area's existing environment and four alternatives for travel/recreation management, rights of way, and vegetation management; and it analyzes the effects of each alternative. The CBRA is located between the communities of Redmond, Bend and Sisters, and provides an easily accessible, 50 square mile parcel of public lands in the heart of Central Oregon.

We began working on the CBRA plan in 2006, with public meetings, public field tours and design workshops to help us solicit input. We also encouraged public comment at several stages during the creation of alternatives. This plan was prepared to create and maintain opportunities for quality recreation opportunities while minimizing conflicts and protecting resource values. The plan also addresses wildland fire concerns and declining vegetative conditions. It is consistent with our 2005 Upper Deschutes Record of Decision and Resource Management Plan.

There is a 45-day public comment period for this EA. You can contact us by any of the methods listed on the inside cover of the EA. The document and a summary of public comments made during the planning process are available on the BLM Prineville District Website by accessing:

http:www.blm.gov/or/districts/Prineville

Key features of this plan include actions to resolve safety and user conflict issues, improve ecological condition of plant communities and reduce hazardous fuels, accommodate needed access to private lands, and provide for recreation opportunities through trail and trailhead development.

We appreciate the help of so many individuals in this effort, and encourage your continued participation to meet the challenges and opportunities of public land management on BLM-administered lands in the CBRA.

Sincerely,

Molly M. Brown
Field Manager, Deschutes Resource Area

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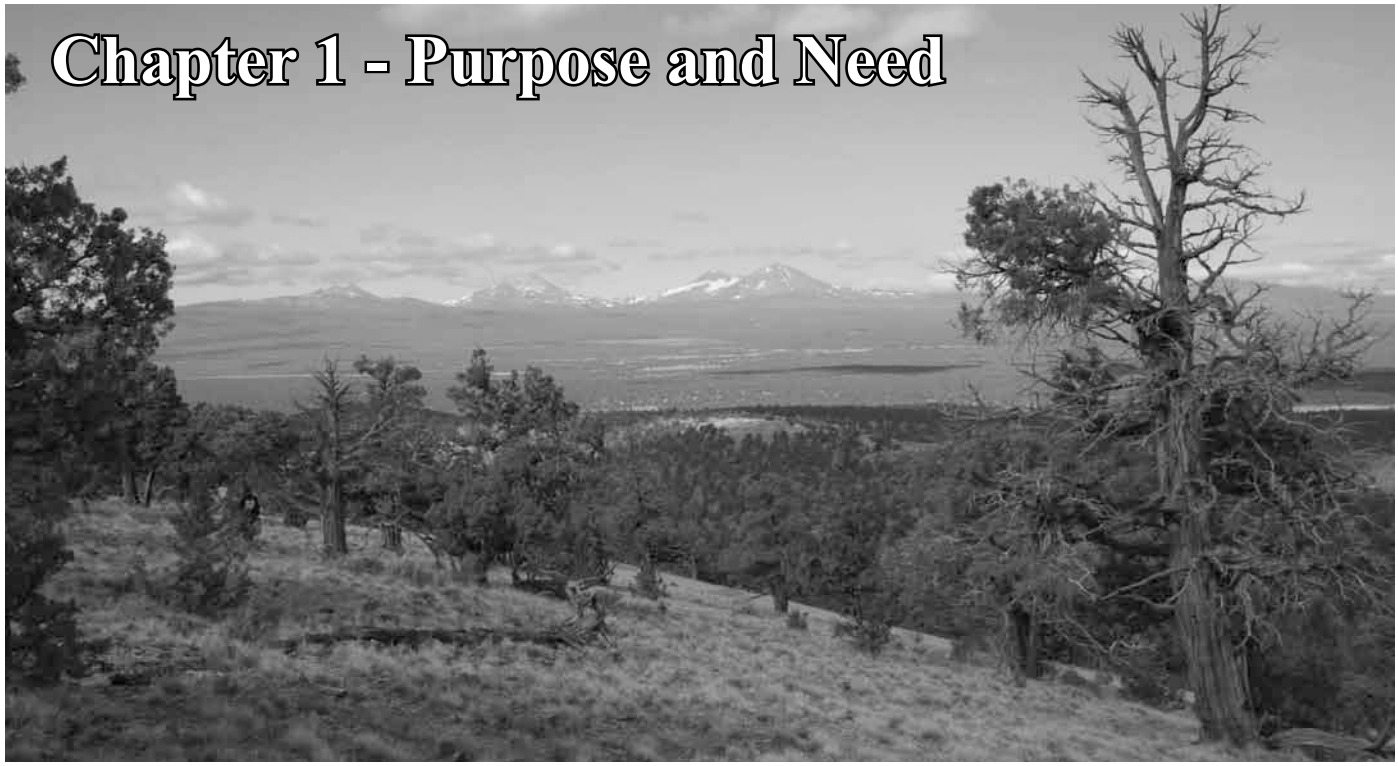
Acronyms

Ac	Acre
ACEC	Area of Critical Environmental Concern
ADT	Average Daily Traffic
Agg	Aggregate
ALT	Alternative
AMS	Analysis of the Management Situation
ASI	All-terrain Vehicle Safety Institute
ATV	All terrain vehicle
AUM	Animal unit month
BLM	Bureau of Land Management
BMP	Best Management Practices
BPTA	Bend Paddle Trail Alliance
CAR	Community at risk
CBRA	Cline Buttes Recreation Area
C	Celsius
CC	Canopy Cover or Condition Class
CEC	Central Electric Cooperative
CFR	Code of Federal Regulations
CFS	Cubic feet per second
COFMS	Central Oregon Fire Management Service
COTA	Central Oregon Trails Alliance
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
db	Decibel
DBH	Diameter at breast height
DFC	Desired future condition
DOI	Department of Interior
DR	Decision Record
DSL	Division of State Lands
EA	Environmental Assessment
EO	Executive Order
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESI	Ecological Site Inventory
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAMS	Facility Asset Management System
FLPMA	Federal Land Policy and Management Act
FM	Fuel Model
FONSI	Finding of No Significant Impact
FRCC	Fire Regime Condition Class
GHG	Greenhouse Gas
GPS	Geographic Positioning System
HDSRMA	High Desert Special Recreation Management Area
HE	Habitat Effectiveness

HFRA	Healthy Forest Restoration Act
IGCC	Intergovernmental Panel on Climate Change
MP	Milepost
MSF	Motorcycle Safety Foundation
Mtn	Mountain
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OET	Oregon Equestrian Trails
OGJ	Old Growth Juniper
OHV	Off-Highway Vehicle
OPRD	Oregon Parks and Recreation Department
PDF	Project Design Feature
pH	power of Hydrogen
PIF	Partners in Flight
PM	Particulate Matter
PNC	Potential Natural Community
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right of Way
SCORP	State Comprehensive Outdoor Recreation Plan
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SOF	Species of Focus
SOPA	Schedule of Proposed Actions
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
SV	Single Vehicle
T&E	Threatened and Endangered Species
TMDL	Total Maximum Daily Loads
TPA	Trees Per Acre
TR	Trailer
TSP	Total Suspended Particulate
TTF	Technical Trail Feature
UDRMP	Upper Deschutes Resource Management Plan
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management
WEPP	Water Erosion Prediction Analysis
WUI	Wildland Urban Interface



Chapter 1 - Purpose and Need

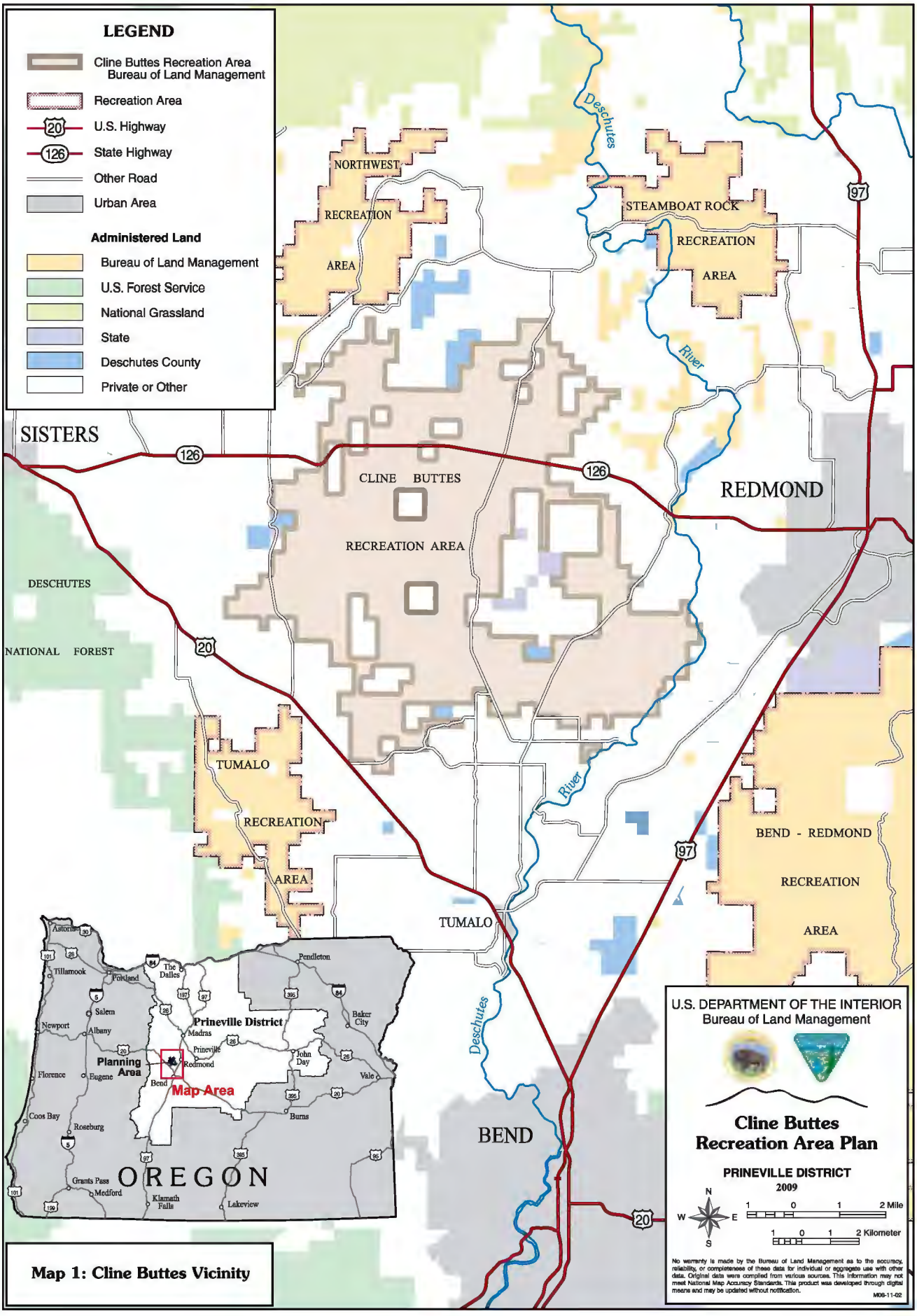
1.1 Introduction

This Environmental Assessment (EA) provides a site-specific analysis of the potential impacts that could result from implementation of the proposed action. An Interdisciplinary Team of specialists from the Prineville District Bureau of Land Management conducted the environmental analysis. This EA will provide the decision-maker, the Deschutes Field Manager, with current information to aid in the decision-making process in compliance with the National Environmental Policy Act (NEPA). The EA will help BLM determine if there are significant impacts not already analyzed in the Environmental Impact Statement for the Prineville District's Upper Deschutes Resource Management Plan (UDRMP/FEIS) (USDI BLM, January 2005). If it is determined that there are significant impacts, then the Deschutes Field Manager will determine whether a supplement to the UDRMP/FEIS is needed or a new EIS should be developed. If the EA shows that there are no significant impacts beyond those already analyzed in the UDRMP/EIS, then a Finding of No Significant Impact (FONSI) is appropriate. A decision record may be signed following public comment on the EA to document the Deschutes Field Manager's decision.

1.2 Proposed Action

The Deschutes Resource Area, Prineville District Bureau of Land Management proposes a Transportation, Recreation, and Vegetation Management Plan within the geographic boundary of the Cline Buttes Recreation Area (CBRA). This area is under the direction of the Upper Deschutes Resource Management Plan Record of Decision (UDRMP) (USDI BLM, September 2005). The UDRMP provided specific goals and objectives for Cline Buttes (UDRMP, pages 115-119). This EA analyzes the effects of implementing the UDRMP within the CBRA. The 32,000-acre CBRA represents approximately 8% of the total BLM administered lands covered by the UDRMP.

The CBRA is located in Deschutes County, Oregon. This area is approximately five miles west of Redmond, five miles east of Sisters, and nine miles north of Bend (see Map 1).


LEGEND
Cline Buttes Recreation Area
Bureau of Land Management
Recreation Area
U.S. Highway
State Highway
Other Road
Urban Area
Administered Land
Bureau of Land Management
U.S. Forest Service
National Grassland
State
Deschutes County
Private or Other
SISTERS
NORTHWEST
RECREATION
AREA
STEAMBOAT ROCK
RECREATION
AREA
Deschutes
River
CLINE BUTTES
RECREATION AREA
REDMOND
DESCHUTES
NATIONAL FOREST
TUMALO
RECREATION
AREA
BEND - REDMOND
RECREATION
AREA
TUMALO
BEND
Deschutes
River
Prineville District
Planning Area
Map Area
OREGON
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Cline Buttes
Recreation Area Plan
PRINEVILLE DISTRICT
2009
2 Mile
2 Kilometer
Map 1: Cline Buttes Vicinity

The following activities are proposed:

- Designate a transportation system to provide quality recreational opportunities and serve the needs of local communities.
- Grant specific road right of way (ROW) grants.
- Designate road and utility corridors to serve current and anticipated ROW needs.
- Close (by signing, physical barriers, and/or obliteration) some existing routes and access points.
- Designate recreation facilities (e.g., trailheads, campgrounds)
- Construct, relocate or remove fences to manage recreation and transportation uses; and
- Treat vegetation to maintain or improve plant communities and wildlife habitat, and address wildfire concerns.

These definitions will be used throughout this document:

- **Transportation system –** The sum of BLM's recognized inventory of linear features (roads, primitive roads, and trails) formally recognized and approved as part of the BLM's transportation system.
- **Road –** A linear feature designated by the BLM, State or County and used by the public for motorized and non-motorized uses, and by the BLM and right-of-way holders for administrative or access uses. Some roads are primitive, managed for use by four-wheel drive or high clearance vehicles, but do not normally meet BLM road design standards.
- **Trail –** A linear feature designated by the BLM and managed for human powered (e.g., bicycle, hiking), pack stock, or motor vehicle travel, or for historical and heritage values.
- **Routes –** Linear transportation features that are not part of the designated transportation system.

1.3 Need for Action

Centrally located within the fastest growing urban area in the State of Oregon, the CBRA is an increasingly attractive destination for local and regional visitors in search of recreational opportunities including, but not limited to, off-highway vehicles (OHV), mountain bike riding, horseback riding, hiking, hunting, fishing and wildlife viewing. The rapidly growing local population has resulted in new developments of homes, ranches, and resorts on private property adjacent to and within the CBRA. While the UDRMP designated an interim motorized transportation system, the UDRMP recognized the need for a comprehensive site specific transportation plan for the CBRA that would address both motorized and non-motorized uses.

The lack of a transportation system combined with increased use of the area has resulted in increasing conflict between various users as well as among public land visitors and adjacent landowners. Visitors have developed and maintained new routes in search of their desired trail condition, including single-track routes for motorcycles, downhill routes for mountain bikes, and secluded routes for hiking or horseback riding. Historic public use of the routes in the CBRA has created a pattern of public use (including trespass) on undeveloped private property. As private parcels are developed, the owners sometimes close routes through their private property to public use. They sometimes request that these routes be left open to provide the owner access to and from the public and private land. Many properties lack legal rights-of-way and depend on existing, undesignated routes for access.

The lack of a site specific transportation system and the increased use of the area have also contributed to a trend of declining ecosystem health, decreased wildlife diversity, and fragmented wildlife habitat. While the CBRA contains many old growth western juniper trees, fire suppression and other factors have resulted in increased numbers of younger juniper. These younger trees are able to compete more successfully 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, including cheatgrass. Dense stands of juniper provide less habitat diversity than the more open old growth juniper stands. Human developments (homes, ranches, and resorts) and activities (road and trail use) have fragmented large blocks of vegetation into smaller patches causing areas to become less suitable wildlife habitat.

The change in vegetative conditions combined with increasing visitors to public land and increased numbers of homes adjacent to BLM administered lands has increased the potential for high intensity wildfire in the CBRA. The wildfire concerns are evidenced by most of the CBRA being included in the Greater Redmond and Greater Sisters Community Wildfire Protection Plans. Young juniper trees and cheatgrass are extremely flammable. The change in fuel condition has changed potential fire behavior from low intensity fire to crown fires, which are higher intensity and more difficult to control. Firefighter and public safety are compromised when there are areas of dense vegetation that contribute to extreme fire behavior (UDRMP, pages 60 to 61).

1.4 Purpose of Action (Objectives)

The Prineville District BLM proposes to designate roads and trails using new, modified, or existing trails, roads and ROWs that will integrate the transportation and recreation needs expected in the CBRA as described in the Upper Deschutes Resource Management Plan (UDRMP, pages 135-140). This decision will require making choices that balance public, private, and administrative needs for access against the manageability of the road and trail systems while minimizing conflict among the various users. Any action alternative for integrating the transportation and recreation systems must therefore be designed to achieve the following objectives, paraphrased from pages 116, 135, and 136 of the UDRMP:

- Enhance the safety and quality of the recreational experience for all visitors and users.
- Minimize conflicts among public land visitors and adjacent land owners.
- Provide a transportation system that reduces conflicts between recreational users as well as between public land visitors and adjacent land owners.
- Provide for administrative operations access and ROW for private property access as appropriate
- Designate access points and transportation/utility corridors to meet expected demands and minimize environmental impacts.

The proposed action must also achieve wildlife, vegetation, and fire safety objectives (UDRMP pages 27, 31, 51, 61 and 62:

- Support healthy, productive and diverse populations and communities of native plants and animals.
- Maintain, promote, and restore the health and integrity of old growth juniper woodlands.
- Restore and maintain ecosystems consistent with land uses and historic fire regimes.
- Manage vegetation in the wildland urban interface (WUI) so wildland fire conditions allow firefighter safety and successful fire suppression.

1.5 Scoping and Issue Identification

The BLM solicited public input on issues to consider for this project. Public involvement was accomplished through meetings, mailings, website postings, and field tours. The BLM initiated the CBRA plan in 2006 with a public meeting, followed by eight field tours of the area and a two-day design workshop. BLM sent out four informal newsletters and posted the public comments and summary maps from the design workshop on the BLM website. Preliminary concepts for recreation trail design were posted on the website, which were used to develop further input. The BLM invited participation of recreational groups, private landowners, environmental organizations, and individuals, as well as local and State government agencies, other federal agencies, and tribal governments. A detailed summary of public involvement can be found in Chapter 5, Consultation and Coordination.

Based on input from the public and the Prineville BLM Interdisciplinary Team and UDRMP direction, the issues listed below were identified. These issues provide a basis for comparing environmental effects of the proposed action to the alternatives and aids in the decision-making process.

Issue: To what degree will the transportation plan reduce conflicts between users, and enhance the amount, diversity, and quality of recreational experiences?

The UDRMP provided a framework for the separation of trail uses and general allocation of areas where shared use trails would be emphasized, versus areas where separate trails may be provided for different user groups.

Many comments stated the need to separate motorized and non-motorized uses by area or by trail. Comments included the desire to separate out different types of motorized use, as well as have separate trails for horses and mountain bikes. Concerns have been expressed that separate trails may be difficult to enforce, and will limit the total mileage of trails for any one user group. Some user groups have expressed the opinion they will not help maintain trails that are designated for multiple uses.

Measured by: The number of miles of roads/ trails provided for each user group. The number of miles of roads/trails for each user group where potential for identified conflicts (e.g., noise or safety) is low.

Issue: How could private landowners be affected by the designated transportation system, access points, and recreation management and development?

There are about 20 parcels of private land inholdings in the CBRA, which total about 4,650 acres or 15 percent of the CBRA. Many of these private parcels are not signed, fenced or gated and are indistinguishable from public lands. Other parcels recently have been developed, and have new fences and gates blocking routes that have been historically used by area visitors. As a result, many visitors have inadvertently or deliberately committed trespass, fostering a climate of uncertainty and conflict among visitors, private landowners, and BLM. As recreational use of the CBRA has increased, conflicts between local landowners and public land visitors (who often have competing desires and values) has increased. The designation of ROW roads for specific public uses (such as trailhead access) may increase maintenance costs or require significant improvements to these roads. The closure of ROW roads to minimize social conflicts and resource impacts may conflict with private landowners who do not wish to open and close gates continually.

Measured by: The proximity/density of roads and trails to private property boundaries.

Issue: How would recreation activities affect wildlife?

The UDRMP interim transportation system of designated roads and trails has resulted in a dense travel network and fragmented wildlife habitat. Some undesignated routes continue to be used. Commenters were concerned that the new transportation system should eliminate some popular routes including ones adjacent to raptor nest sites within dry canyons or along the Deschutes River Canyon rim. The UDRMP identified a need to reduce road densities to protect wildlife.

Measured by: Road, trail and route density (overall and in proximity to raptor nest sites), habitat effectiveness, route influence, unfragmented patch size, the ratio of cover to forage for particular species.

Issue: How will transportation, recreation, and access management affect public health and safety?

Some recreational activities create safety hazards for other visitors, private property owners, and BLM personnel. Examples include trash dumping, improper disposal of human and animal waste, unattended campfires, and high speed vehicle use on designated roads or trails shared by a variety of recreational uses. In addition, OHV use on rights-of-way shared by street legal vehicles was identified as a safety concern. Concerns have been expressed that higher numbers of public land visitors may increase fire risk.

Measured by: The percent of shared use roads or trails, the number and type of full size vehicle access points.

Issue: How will vegetation treatments address fire hazards and risks while protecting the environment and natural setting in Cline Buttes?

The density of fuels, coupled with the number of public roads and adjacent residential development, has created hazard and risk for wildlife – putting the safety of residents, recreationists, and firefighters at risk as well as potentially affecting the viability of private property and natural resources. Concerns have been raised over what types of fuels treatments would be done in order to

achieve objectives in the UDRMP. Comments have included the desire to emphasize hand thinning to break up the continuity of fuels rather than large scale mechanical treatments.

Measured by: Acres treated

1.6 Consistency with Other Plans

Upper Deschutes Resource Management Plan (2005)

The UDRMP identified an interim designated system for motorized use, with the expectation that this system may change in response to further site- or area-specific planning. This system includes approximately 164 miles of roads/trails (RMP Map 13). Specific direction includes:

- The Maston Area is closed to motor vehicles.
- Upper elevation areas of the buttes would be managed to emphasize non-motorized trail use.
- The majority of the planning area is designated for motorized trail development, with an emphasis on locating this use in the center and northern portions of the planning area.
- Limit the number of access points to the minimum necessary.
- Provide designated trails for non-motorized uses such as hiking, mountain biking and horseback riding. Consider ways to minimize conflicts between these uses at a site or area specific level of planning.
- Separate motorized trail use from non-motorized trail use to the extent feasible
- Develop a motorized trail system that provides year round opportunities in a variety of terrain. Locate trails to minimize conflicts with adjacent landowners to the extent feasible.

1.7 Decisions to be made

In accordance with Council of Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) and federal case law, two levels of decision making area allowed and encouraged to help establish the scope of a proposed action and promote efficient resolution of issues at the appropriate scales. The first is planning level decisions, which were made in the UDRMP. The second level of decision is implementation level decisions, which will be made in this plan. Planning level decisions generally involve setting goals and objectives, such as those listed in the section above titled Purpose of Action.

Implementation level decisions to be made through this EA will include:

1. Vegetation Treatments – Identify the treatment methods and adaptive management process for fuels reduction and ecosystem health vegetation treatments.
2. Transportation System – Identify the location, allowed uses, and standards/maintenance categories for the designated road and trail systems on BLM administered lands. Identify types of access points (parking provided or not, size of parking area, etc.) and measures to control access, including barriers, boulders, gates, signs and fences. Identify roads and trails to be closed and rehabilitation measures that may be used.

3. Right of Way Grants – Identify where and how ROWs will be granted.

In choosing among the alternatives that achieve the identified objectives for the proposed action, we will consider the extent to which each alternative would:

- Reduce conflicts among the users of the road and trail systems and public lands.
- Provide for a range of recreation activities as identified in the UDRMP.
- Reduce fire behavior intensities.
- Improve vegetative and wildlife habitat conditions.
- Provide efficient and safe access.
- Impact the environment.

Chapter 2 - Alternatives

Introduction

This chapter provides a description of the Alternatives developed for the CBRA plan, which includes a No Action Alternative, a Proposed Action Alternative for Vegetation Management, and three action alternatives (2, 3, and 4) reflecting different options for transportation (roads and trails) and ROW development in the CBRA. Alternative 2 is the Proposed Action for Recreation, Transportation and ROWs.

The No Action Alternative represents a baseline for the comparison of the alternatives. It describes the existing condition and trends anticipated in the absence of the proposal but with the implementation of other reasonably foreseeable Federal and private projects. The No Action Alternative would manage motorized use consistent with the UDRMP system of designated roads/trails (RMP Map 13).

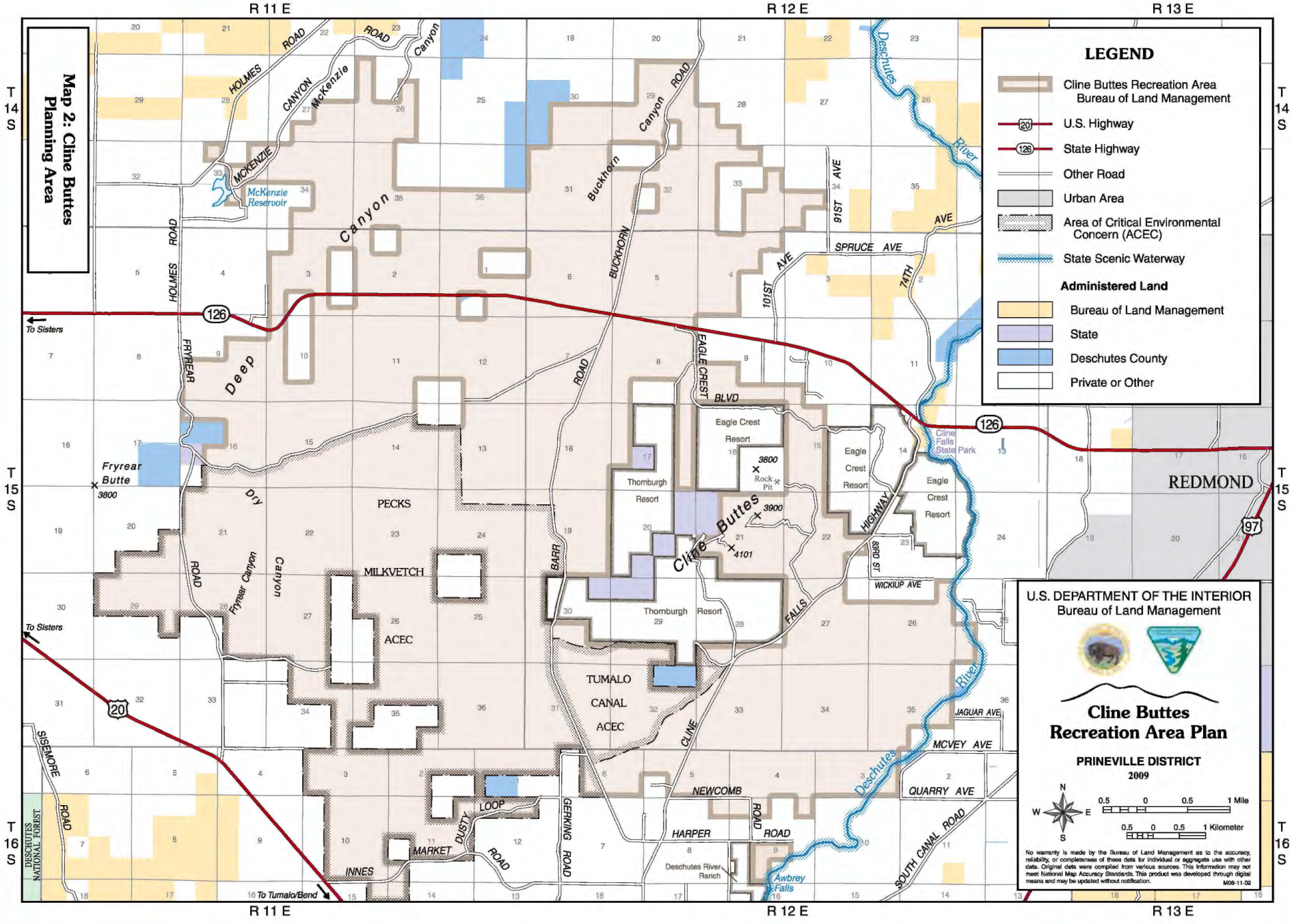
After completion of the NEPA process, BLM anticipates issuing two separate decisions, one for vegetation management and transportation/recreation management decisions, and another for the issuance of specific ROW grants.

Guide to Maps

Various maps are referenced in the description of Alternatives. The CBRA project area, major public roads, and Areas of Critical Environmental Concern are shown on Map 2: Cline Buttes Planning Area. For Transportation, Recreation and ROWs the following Maps are used:

CBRA Transportation Maps (Maps 3, 6 - 8)

These maps show the designated trail system, difficulty levels, and trail user types proposed for each action alternative. They also show trailhead locations, existing and proposed fences and gates, and administrative roads. For the No-Action Alternative, this map shows the motorized/ shared use trail system and existing, undesignated routes.


Map 2: Cline Buttes Planning Area
R 11 E
R 12 E
R 13 E
T 14 S
T 15 S
T 16 S
LEGEND
Cline Buttes Recreation Area Bureau of Land Management
U.S. Highway
State Highway
Other Road
Urban Area
Area of Critical Environmental Concern (ACEC)
State Scenic Waterway
Administered Land
Bureau of Land Management
State
Deschutes County
Private or Other
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Cline Buttes Recreation Area Plan
PRINEVILLE DISTRICT
2009
McKenzie Reservoir
Fryrear Butte
3800
Cline Buttes
3900
4101
Rock Pit
Eagle Crest Resort
Thornburgh Resort
PECKS
MILKVETCH
ACEC
TUMALO CANAL ACEC
REDMOND
Cline Falls State Park
Deschutes River Ranch
Awbrey Falls
DESCHUTES NATIONAL FOREST
To Sisters
To Tumalo/Bend
Deschutes River
Canyon
Deep
Dry
Fryrear Canyon
McKenzie Canyon
Buckhorn Canyon
HOLMES ROAD
MCKENZIE CANYON ROAD
FRYREAR ROAD
BUCKHORN ROAD
EAGLE CREST BLVD
91ST AVE
101ST AVE
74TH AVE
SPRUCE AVE
HIGHWAY 126
BARR ROAD
CLINE FALLS HIGHWAY
WICKIUP AVE
JAGUAR AVE
MCVEY AVE
QUARRY AVE
NEWCOMB ROAD
HARPER ROAD
SOUTH CANAL ROAD
GERKING ROAD
DUSTY LOOP ROAD
MARKET ROAD
INNES ROAD
SISEMORE ROAD
126
20
97
0.5 0 0.5 1 Mile
0.5 0 0.5 1 Kilometer
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. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
M08-11-02

CBRA Taxlots and Rights of Way (Map 5)

This map shows the location and type of *existing* ROWs (e.g., roads, utility lines, material sites) in the CBRA. Road and material site ROWs are identified with a Map Identification number, which is referenced in the EA text. The various private parcels that are identified in the EA are also given a Map dentification number which is referenced in the EA text.

CBRA Rights of Way Grants, Corridors, and Amendments (Map 9)

This map shows ROW Grants, Amended ROWs, and ROW corridors that are generally common to all Action Alternatives. It also shows ROW maintenance responsibility decisions proposed per Alternative.

CBRA Rights of Way for Specific Parcels (Maps 10 – 12)

These maps display proposed ROWs that vary by alternative for road and utility access to specific private parcels.

2.1 Description of Alternatives for Vegetation Management

This section describes the basic features of the No Action Alternative and the Proposed Action Alternative for vegetation management.

Alternative 1: No Action

Vegetation management activities would not occur under this alternative. The No Action Alternative would retain all young juniper trees within old growth juniper woodlands and would retain the amount and distribution of young juniper woodlands that are growing in shrub-steppe and riparian habitats. Areas that have been heavily disturbed such as old roads, trails and user-created parking areas would not receive any restoration treatments. The vegetation objectives stated in the purpose and need would not be achieved under the No Action Alternative.

Alternative 2: Proposed Action

Objectives

The proposed action is focused on achieving the overall vegetation objectives identified in Chapter 1 to reduce the possibility of fire in the WUI; restore old-growth juniper woodlands; restore shrub-steppe plant communities; and restore heavily disturbed areas. Additionally, the proposed action would enhance riparian areas and ponderosa pine trees by selective removal of young juniper. The vegetation management portion of the proposed action was developed as an adaptive management process based on public comments and interdisciplinary team input.

The proposed action would reduce the chance for canopy fires, increase plant diversity, increase the amount of water and nutrients available for the older trees, grass, forbs and shrubs, and rejuvenate decadent shrubs (e.g., bitterbrush). On heavily disturbed areas the proposed action would decrease the abundance of cheatgrass and rabbitbrush by creating suitable conditions for native plant occupation by reducing compacted soils, and adding woody material to contribute nitrogen and nutrients to the soil and shade new developing plants.

To state the objectives in terms of vegetative composition, we would manage old growth juniper woodlands (areas where there are more than five old growth trees per acre (TPA), see Glossary) for an average of:

- 11 old growth trees per acre (TPA),
- 1 or fewer young juniper trees,
- 5-25 percent foliar (see Glossary) cover of shrubs,
- 50 percent or more foliar cover of native grasses and forbs,
- 5 percent or less foliar cover cheatgrass, and
- 2 percent or less foliar cover rabbitbrush.

Shrub-steppe (areas where there are five or fewer old growth TPA) would be managed for the same vegetative composition as old growth juniper woodlands described above, except old growth juniper woodlands would retain at least one young tree per acre average. These desired plant densities are based on Natural Resource Conservation Service (NRCS) Ecological Site Descriptions. These descriptions and the current vegetation composition in the CBRA are described in Chapter 3.

The objectives are also related to desired fire behavior within the WUI bands (see additional information on WUI in Glossary):

- Prevent crown fire and keep surface fuel flame lengths in the one to two foot range (by managing fuel continuity, density and height) in WUI Band 1 (BLM administered lands within 600 feet of private property).
- Reduce the occurrence, size, and intensity of fires, and keep surface fires with flame lengths in the three to four foot range in WUI Band 2 (600 feet to ½ mile from private property).
- Reduce the occurrence, size, and intensity of crown fires, and emphasize wildlife habitat in Band 3 (½ mile or more from private property).

Actions

Specifically, the following types of actions would be implemented in order to reach the above objectives:

- Cut young juniper.
- Cut, crush or mow shrubs and trees.
- Pile and burn cut juniper and shrubs on site.
- Prescribed broadcast burn.
- Remove cut trees from the site (via firewood cutting permits or commercial sales).
- Seed with native or non-native seed, or a combination.

A description of a variety of treatment methods for implementing each of these actions is contained in Table 1. The method selected would depend on the objectives for the site, the existing ecological condition, monitoring information from previous treatments, and input from partners and the public (see "Process for selecting a vegetation treatment method," below). Project Design Features (PDFs) would be applied to all actions. These supplement existing management direction from the UDRMP and can be found in Appendix 4.

In order to reduce the number of young junipers in an area, thinning treatments could be implemented:

- In a single treatment entry, where all trees identified for thinning are cut and managed at one time, or
- In two or more successive entries where only a portion of the trees identified for thinning would be cut and managed at each entry. The amount of time between thinning treatments would depend on a number of conditions such as: the amount of trees; the time for slash to decompose;

the amount of time for burn and disturbed areas to recover; the level of wildfire concern and the proximity to development.

The "multiple entries" approach could be used to reduce negative effects from ground disturbing activities related to removing thinned trees with heavy equipment, or by burning large quantities of slash on site. Thinning only a portion of the trees at one time limits the amount of fuel loads and reduces the amount and intensity of ground disturbance at any one time, therefore reducing the amount of impacts on plants and soils. Thinning a portion of trees at any one time also allows for subsequent monitoring and adjustment of treatments through adaptive management. Additional reasons for thinning under a "multiple entries" approach include:

- Reducing the need to improve roads or trails beyond their long-term need, or improve routes identified for decommissioning/removal, or create temporary travel routes;
- Reducing the amount of ground disturbing effects during any one period;
- Leaving a low density of trees on the ground to not impede desired grass growth;
- Increasing site recovery by leaving low densities of trees (slash) on the ground to provide shade, nutrients and nitrogen for young plants and seed development of new plants, and
- Helping maintain or improve the ecological health of a site so the site does not decline in health and thereby increase the amount of effort required to return it to a desired condition later.

Process for Selecting Vegetation Treatment Methods

A variety of treatment methods would be used in the CBRA, as shown in Table 1. The site-specific vegetation treatment methods for each unit would be selected based on several decision factors: site objectives, ecological condition of the particular site, results from monitoring of previous treatments and input from partners, local residents, and adjacent communities (see Figure 1).

Step 1 – Plant Community Type

The decision process would begin by determining the plant community type as either old growth juniper woodland or shrub-steppe, measuring the current density of trees, grasses, and shrubs, and comparing these to the objectives described above for vegetative composition and fire behavior. If the current densities are higher than desired, the treatment method will likely involve cutting, mowing, or otherwise removing the plant type that exceeds the desired density.

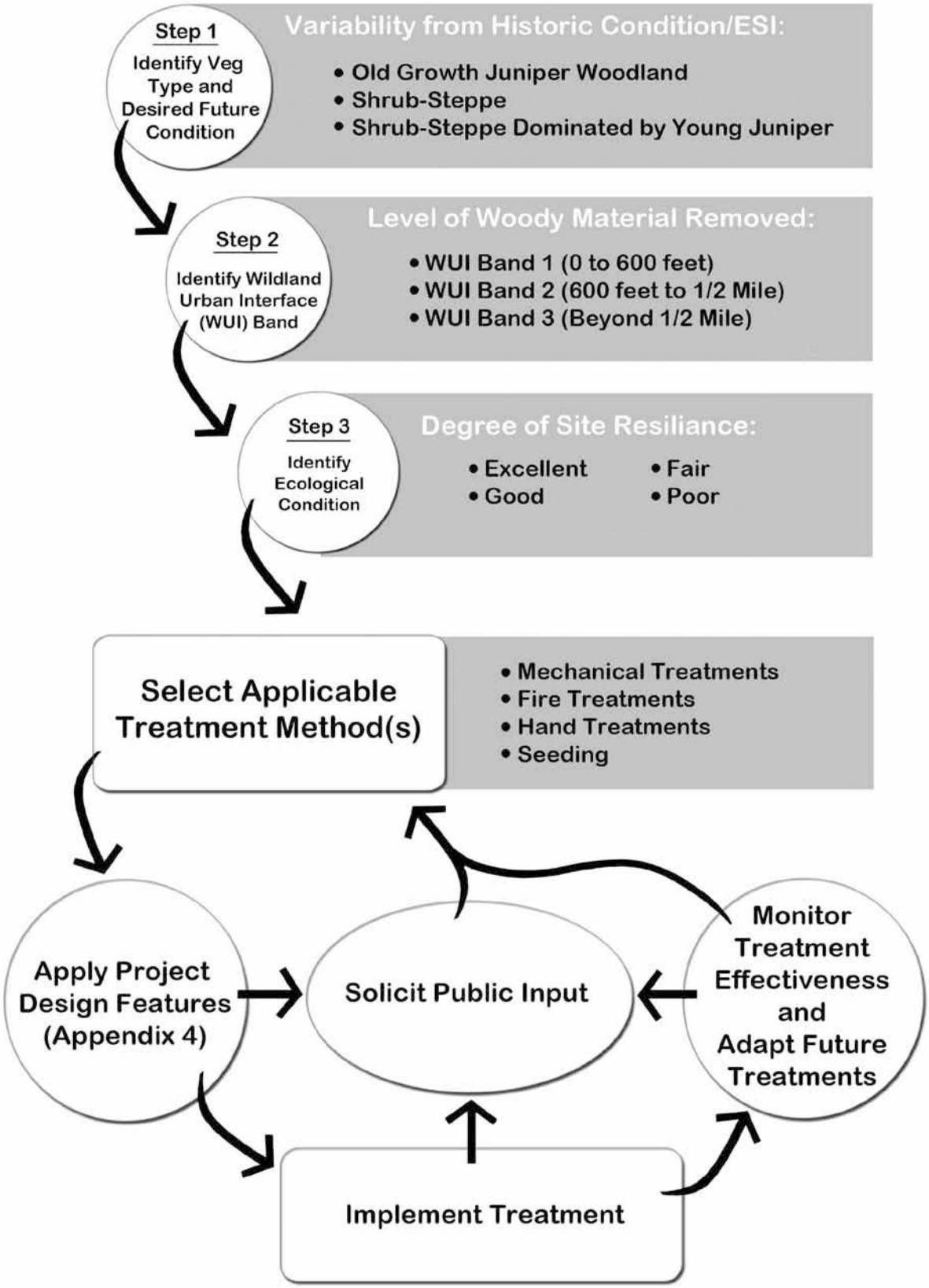
Step 2 – WUI Band

Next, consider the objective for the WUI band in which the site is located. In areas closest to private land (WUI Bands 1 & 2) the amount of woody debris left on site needs to be low. In these areas we would choose a treatment method where post-treatment fuels would be physically removed or burned on-site. Combined WUI bands 1 and 2 are shown on Map 4.

Step 3 – Ecological Condition

The ecological condition of the site is another consideration. The ecological condition of each site would direct the level of ground disturbance allowed. The ecological condition of a site would be determined using BLM's Ecological Site Inventory procedures (Habich, 2001). Using this procedure, sites are classified from Poor to Excellent condition. Methods used would minimize the negative effects of management activities and aid site recovery. Table 2 shows the initial treatment approach; however this could be modified as described under "Step 5," below. The amount of weeds present would be a factor in this step.

Figure 1 : Adaptive Management Process for Vegetation Treatments



Step 4 –Adaptive Management and Monitoring Plan

Adaptive Management

The treatment method selected will also vary depending on results of monitoring previous treatments. This is called Adaptive Management, defined in the BLM's Land Use Planning Handbook (H-1601-1) and in 43 CFR 46.145 as:

A system of management practices based on clearly identified outcomes, monitoring to determine if management actions are meeting outcomes, and, if not, facilitating management changes that will best ensure that outcomes are met or to re-evaluate the outcomes.

An adaptive approach to vegetation management in the CBRA is appropriate because the potential for high intensity wildfire in the CBRA continuously increases, but in some situations insufficient information is available to assist in accurately predicting the response of the existing plant communities to different types and levels of ground disturbing activities related to the methods used to thin woody plants and reducing fuel loading. The uncertainty of long-term effects is especially true in areas of poor to fair ecological condition.

Table 2 provides a summary of the approach the BLM planning team developed for the proposed action. This approach takes the level of uncertainty into account. This Table could be modified in the future if monitoring results indicate changes are warranted. Future monitoring is necessary to make adjustments in subsequent implementation treatments. This EA provides the range of management options that shall be taken in response to the results of monitoring.

Because there are likely few CBRA sites in Good/Excellent or Excellent ecological condition (see Step 3 and Table 2) it is prudent to mainly use methods that would result in a low level of ground disturbance to ensure that these site conditions are maintained. However, a few moderate disturbance level methods are included because the impacts can be mitigated. Even though these sites would likely be the most resilient to disturbance and could withstand higher levels of disturbance and still respond positively, the team decided to manage them first with a light touch until a later time when, through the adaptive management process, more is learned about how these areas will respond to different levels of disturbance.

Due to the lower resilience of these sites, in Good/Fair and Good ecological condition categories (see Step 3, above); the team recommended using a wider range of methods, while excluding some of the higher ground disturbance methods. Most of the public lands in the CBRA are in either Good or Good/Fair ecological condition, which provides the greatest opportunity to apply methods and learn how the plant communities respond.

In the Fair and Fair/poor ecological sites, only methods from the low disturbance group are recommended because these sites may not be resilient enough to recover from much ground disturbance. These sites could be at a point where if impacted too much they could decline into a condition that would require great effort to bring them back to a functioning level.

Most areas in poor ecological health are parking areas, roads, material sites, OHV plays areas or old homestead sites that have passed an abiotic threshold and will not recover intensive management. On these sites, any method available and necessary could be applied to remove unwanted vegetation and prepare the site for restoration efforts, such as ripping unwanted roads or parking areas and seeding or planting root stock.

The proposed action recommends allowing a site to seed in naturally or using native seed or root stock. However, some situations may require the use of non-native plants to help the site begin to recover before weeds (e.g., cheatgrass) dominate, making restoration of native plants or desirable ecological functions possible. The proposed action recommends beginning the adaptive management process using only native plants until it is determined that natives are not working. However, sites in poor ecological condition require a lot of work to restore even using non-native plants. Therefore, the use of non-native plants is appropriate or desirable in order to begin improving the ecological condition of some sites.

Some methods identified in Table 1 have been listed in two different disturbance levels (e.g., forwarder which is a track based logging equipment) was placed in both low and moderate) because the tool could be used at different intensities resulting in different disturbance levels. When the proposed action recommends using a method under a low disturbance level, and that method is also listed under a higher disturbance level, the use of that method must be done in a manner that results in a low level of disturbance.

Treatment methods with two different disturbance levels would be applied to result in the level of disturbance identified by ecological condition (see Table 1). For methods listed in the low disturbance level, equipment use would result in seven percent or less undesirable ground disturbance effects by area (e.g., soil compaction, soil movement and collateral plant mortality). Treatment methods applied under the moderate disturbance level would result in 12 percent or less undesirable ground disturbance. Treatment methods applied under the high disturbance level would result in less than 20 percent undesirable ground disturbance, except for areas in poor ecological condition. Areas in poor ecological condition could require full restoration efforts where more than 20 percent of the surface area may initially be disturbed, but follow-up treatments, such as site prep and seeding would be used to rehabilitate the site. In order to achieve low and moderate disturbance levels specific limits may be applied depending on site conditions. For example, limiting:

- The number of passes equipment may cross the same piece of ground, and/or
- Equipment travel to primarily be located on top of vegetation (e.g., thinned young juniper) as it works across a project unit, and/or
- Excessive maneuvering and sharp turns, particularly with tracked equipment.

Public Involvement

Public input would be solicited periodically from partners, local residents, adjacent communities, and through the Community Wildfire Protection Plans (see www.projectwildfire.org for the complete CWPP documents for Central Oregon). Generally the outreach method will be via posting on the BLM's public website, http://www.blm.gov/or/districts/prineville/plans/index.php. In some instances the BLM may solicit input by other means, such as by letter, phone call, email, press release, or notice posted on the site. Interested parties may then contact the BLM regarding projects they would like to be involved in. Input may modify treatment methods, boundaries, timing, or other factors within the context of this Plan/EA.

Monitoring Plan for Vegetation Management

The purpose of the proposed monitoring is to determine if the action implemented meets the goals and objectives (effectiveness monitoring) described in this EA. Monitoring of treatments shall be an integral part of the process to determine both the effectiveness of the initial vegetation treatments and to evaluate the recovery of the site. Results of the monitoring efforts shall be used to help direct future management treatments and evaluate the use of treatment methods and project design features. Monitoring will be based on two time frames: short-term ($\leq$ 5 yrs) and long term ($\geq 6^{+}$ yrs).

Monitoring would address three objectives: 1) ecological conditions, 2) fuel conditions, and 3) visual resources. To meet the objectives in the CBRA Plan, monitoring would include an initial inventory

and assessment of the existing condition for treatment areas related to the three objectives to establish baseline pre-treatment conditions for later comparisons.

The BLM has an established inventory and assessment protocol for conducting Ecological Site Inventories (Habich, 2001). This procedure would be the basis for determining the ecological condition of treatment areas pre and post-treatment. All areas except for highly disturbed sites (such as user created parking or staging areas) would be inventoried prior to vegetation treatments. Ecological condition assessments would focus on plant species composition on site and proportion of each species within the community as compared to the appropriate Potential Natural Community (PNC) described in the NRCS ecological site description. Presence or absence of expected plant species, presence of weeds, and the number of trees per acre and age class of juniper on site all contribute to the condition rating of a site (e.g., poor, fair, good, excellent).

Central Oregon Fire Management Services (COFMS), the Service First organization of the Prineville District BLM, and the Deschutes and Ochoco National Forests for wildfire and fuels management, has an established monitoring protocol (Joslin, et. al., 2008) that would be incorporated into the monitoring needs for the objectives. The fuels monitoring plan focuses on permanently installed treatment and control plot protocols for: 1) shrub / grasslands, 2) woodlands, and 3) forestlands, with visits to control and treatment plots pre-treatment, during treatment (if possible), immediately post-treatment, and one year post-treatment, with allowance for more post-treatment visits if necessary.

The BLM has standard procedures for evaluating projects to protect visual resources (BLM Manual Handbook 8431-1). Methodologies from these procedures have been incorporated into project design features for proposed action for the vegetation management and would be the basis for monitoring. As stated in the project design features/mitigation measures, photo monitoring points would be established when vegetation treatments are done in VRM Class 2 areas. Visual resource assessments would focus on color and texture contrasts across the landscape, as well as screening built features (e.g., roads, structures, utility lines) from view.

All vegetation treatments would begin with cultural resource surveys to locate and fully record sites. Avoidance is typically used to protect sites from unnecessary impacts. However, more in-depth recording or testing could be applied in some cases where warranted. Changing the season of implementation could be used to minimize impacts to sites. For example, vegetation management activities may be conducted when soils are frozen or over snow. In some cases, hand work may be the most appropriate method to avoid impacts.

Any cultural and/or paleontological resource (historic or prehistoric site or object, or fossil) discovered during project implementation on public or Federal land shall be immediately reported to the authorized officer. All operations shall be suspended in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The BLM Authorized Officer will determine avoidance, protection or mitigation measures in consultation with Oregon SHPO, and affected Tribes.

The intensity and complexity of monitoring activities would vary according to the issues at hand and with the purpose of the monitoring. For example, compliance monitoring to determine if an action is being implemented as described in the decision document may be relatively simple. However, determining whether implementation of an action is achieving complex ecological objectives, would involve more complex monitoring techniques and analysis. Finally, monitoring efforts would be adapted to meet specific project objectives, to suit the ecological condition of the site being treated and monitored.

Table 1: Treatment Method Descriptions

Treatment method	Reference Letter	Disturbance Level	Description
ATV w/ arch	AA	Moderate	4 x 4 ATV that pulls a wheeled arch for front-end suspension.
ATV-broadcast seed	AB	Low	ATV with mounted seeder to spread seed.
Bundler	B	Low	Machine designed to gather slash and small trees, compress material into a bundle, wrap with twine, and produce a composite log approximately 24 inches in diameter.
Chainsaw	C	Low	Portable, hand operated equipment for cutting trees.
Crushing	CR	Moderate/High	Uses a tracked machine, usually a crawler-tractor (sometimes with tomahawk attachment), that travels over cured slash or severed trees to break up material and reduce to a coarse mulch that is flat to the ground. Typically consists of one pass.
Drill & Harrow	D	Moderate	A tractor attachment designed for preparing the site and sowing seed at a predetermined depth in one operation.
Forwarder	F	Low/Moderate	A machine designed for loading and transporting logs from the woods to a landing site or roadside. Has large rubber tires – does not need constructed roads/trails.
Feller-Buncher	FB	Moderate/High	Machines that cut and bunch trees for removal. Can be rubber-tired or track mounted. Some have swing boom cutting head.
Helicopter	H	Low	Heavy-lift helicopter designed for moving logs from inaccessible or sensitive areas.
Hydro-axe	HA	Moderate/High	A type of masticator. Masticating head is mounted on the front of a loader or tractor type vehicle. Midway in capability between mower and slashbuster.
Hand Brush Cutter	HB	Low	Portable, hand operated with rotary disk blade.
Hand Pile & Burn	HP	Low	Cut trees, slash, or brush into manageable pieces, place in piles – usually 6-10 feet in diameter for later burning.
Hydro-seed	HS	Low	Application of seed/mulch slurry to disturbed sites for site protection and revegetation.
Harvester	HV	Moderate	Integrated machine designed to cut trees, delimb, cut to log length, and stack for removal by forwarder or skidder.
Lop & Scatter	LS	Low	A method of modifying the fuel profile to reduce fire behavior. Slash and small trees are cut in short lengths and spread in openings to reduce fuel height and disperse fuel concentrations.
Mower	M	Moderate/High	Heavy duty commercial deck mower attachment pulled behind a tractor.
Machine Pile & Burn	MP	Moderate/High	Wheeled or tracked machines with brush rake or grapples that place slash/trees in piles, usually 10-20 feet in diameter for later burning.
Prescribed Broadcast Burn	PB	Moderate	Low-intensity burning of surface fuels in designated areas with control lines.
Portable Chipper	PC	Low	Many different sizes, ranging from small hand fed machines towed by a pick-up, to a large chipper or grinder operated at landings and capable of loading large highway chip vans.
Skyline	S	Low	Cable-based yarding system capable of full suspension.
Slash-buster	SB	Low/Moderate	Tracked machine with swing mounted boom and masticator head. Reduces trees, brush and slash to a coarse mulch layer. Can reach ~25 feet on either side.
Skidder	SK	High	A wheeled machine with grapples. Lifts butt end and drags top end of log/tree.
Subsoiler	Sub	High	A restoration method used to loosen compacted soils in order to prepare the site for seeding and plant growth. A winged subsoiler is attached to a vehicle and pulled through the ground to roll or lift surface soil, fracturing compacted soil layers.
Swamper Burn	SW	Low	Small pile burns in designated areas that are fed concurrent with burning to limit both burn area and number of burn piles.
Wood Cutter (Commercial)	WCC	Low	Woodcutting and/or removal with contractor. May use small equipment and include stewardship work.
Wood Cutter (personal)	WCP	Moderate	Firewood cutting available to the public by permit in designated areas. Gather available wood near roads with chainsaws and pick-up.

Table 2. Treatment Methods and Seeding Prescriptions Based on Ecological Condition, WUI Band, and Treatment Disturbance Levels

Ecological Condition	WUI Band	Allowable treatment method*, according to associated disturbance level			Allowable seeding prescription**
		Low	Moderate	High	
Excellent	1	All methods	All except CR, FB, MP, SB	None	S1 or S2
	2	All	All except D, FB, M, MP	None	S1 or S2
	3	All	All except FB, MP, WCP.	None	S1 or S2
Excellent / Good	1	All	All except CR, FB, MP, SB	None	S1, S2, S3
	2	All	All except D, FB, M, MP	None	S1, S2, S3
	3	All	All except FB, MP, WCP	None	S1, S2, S3
Good	1	All	All except CR, FB, SB	All except FB and SK	S1, S2, S3
	2	All	All except FB	All except FB and SK	S1, S2, S3
	3	All	All except FB, WCP	All except FB and SK	S1, S2, S3
Good / Fair	1	All	All except CR, MP, PB, SB	All except CR, MP, SK	S1, S2, S3, S4
	2	All	All except CR, MP, PB, SB	All except CR, MP, SK	S1, S2, S3, S4
	3	All except HP	All except CR, MP, PB, SB	All except CR, MP, SK	S1, S2, S3, S4
Fair	1	All except HP	None	None	S1, S2, S3, S4
	2	All except HP	None	None	S1, S2, S3, S4
	3	All except HP	None	None	S1, S2, S3, S4
Fair / Poor	1	All except HP	None	None	S1, S2, S3, S4, S5
	2	All except HP	None	None	S1, S2, S3, S4, S5
	3	All except HP	None	None	S1, S2, S3, S4, S5
Poor	1	All	All	All	S1, S2, S3, S4, S5
	2	All	All	All	S1, S2, S3, S4, S5
	3	All	All	All	S1, S2, S3, S4, S5

*Treatment method abbreviations are in Table 1.
**Seeding prescription abbreviations are in Table 3.

Table 3: Seeding Mixtures Reference

Seeding mixtures: Native versus Non-native
S= Seeding mixture
1= no seeding
2= 100% native plants
3= More than 50% of seed will be native, and the rest could be non-native
4= Less than 50% of seed will be native the rest will be non-native
5= 100% of seed will be non-native

2.2 Description of Alternatives for Recreation Management

Alternative 1: No Action

Alternative 1 is based on the UDRMP Interim Motorized Use Trails (see Map 3), and includes the following elements:

- There is no separation of motorized trail users. None of the trails would be designated for a particular use (i.e., motorcycle, quad, or full size vehicle/jeep)
- Most ROW roads are open to OHV use (RMP Map 13)
- The ODOT material site (cinder pit ROW 40/41, Map 5) located west of Barr Road would be used as an OHV play area, in a manner consistent with UDRMP direction and compatible with ODOT's existing permits.
- The approximately 175 miles of routes not included in the UDRMP motorized system would be available for non-motorized use. In addition, pedestrian, equestrian and mountain bike use could occur on any motorized/shared use road or trail and also cross-country (not on existing routes).

Under Alternative 1 there would be approximately 365 miles of roads, trails and undesignated routes on BLM administered lands in the CBRA, at an overall density of 7.4 miles per square mile. The density would be greatest in the Buttes area, followed by the Maston area (see Table 4). Route density would be concentrated heavily at the north and south ends of Barr Road and in Deep Canyon, on both sides of State Highway 126. Of the total known routes, 45 percent (164 miles) would be available as motorized use trails, based on UDRMP direction. This motorized trail system would be located throughout the CBRA, except for the Maston Area, which was closed to public motorized vehicle use in the UDRMP. The existing 365 miles of routes would be available for non-motorized uses. The 175 miles of existing BLM routes not included in the UDRMP motorized use trail system would be available as separate non-motorized (hiking, equestrian, mountain biking, etc.) routes. However, the majority of these non-motorized use routes would be intermingled with (adjacent to or crossing) the motorized trail system.

Camping would be allowed throughout the CBRA.

Table 4: CBRA Existing Route Miles and Densities per Area

Area	Miles	Miles/Square Mile
Buttes	81.5	10.2
Maston	56.4	8.8
North of State Highway 126	82.8	6.9
South of State Highway 126	151.9	6.8
West of Fryrear Road	4.7	5.2
Total BLM Routes	339.6	6.9
County Roads	20.7	0.4
State Highways	4.4	0.1
Total Routes	364.5	7.4

All Routes mapped on public lands, including State and County roads. Mileage does not include routes on private lands.

Motorized Trail System

The mileage and density of the motorized trail system for the general public is shown on Table 5. Key elements of the motorized system for the No Action Alternative are listed below:

- 164 miles of trails, all shared by all types of vehicles
- The Maston area is closed to motor vehicle use by the general public, except for ROW road 21 (aka Red Cinder Road), which provides an access route to the Deschutes River Canyon
- CBRA lands on the east side of the Deschutes River are closed to motor vehicles
- Approximately 54 dead-end roads/trails at private property
- Approximately 80 public access points
- No designated trailheads
- Motorized use allowed in Dry Canyon, but not in Fryrear Canyon (the Canyon located nearest to Fryrear Road)
- Use allowed on designated routes year-round
- No motorized vehicle access into CBRA at A.J. Warrin Road/State of Oregon property
- Majority of trail in Deep Canyon north of State Highway 126 is inaccessible to motorized use (due to intervening private property – parcel 41, Map 5)
- Use of ROW roads on public lands by OHV's is allowed (except for the portion of the ROW road (ROW 24/38, Map 5) that parallels the Deschutes River)
- One OHV play area at the existing Barr Road Cinder Pit
- No technical, rock crawling routes for Class II OHVs
- High degree of shared routes between motorized and non-motorized uses
- High density of motorized routes adjacent to private property (see Table 6)
- Noise standard of 99 db for OHV use

Alternative 1 would continue the present trend of use on a dense network of trails at both the north and south end of Barr Road. Many trails would be available to motorized use on the buttes themselves, particularly on the eastern slope between Eagle Crest Phases 2 and 3.

Table 5: Miles and Density of UDRMP (Motorized Use) System per Area

Area	Miles	Miles/Square Mile
Maston	1.2	0.45
Buttes	27.9	4.1
North of State Highway 126	44.7	3.9
South of State Highway 126	88.1	4.1
West of Fryrear Road	1.7	1.9
Total CBRA	163.9	3.6

Mileage and density calculated by excluding routes and acreage within private parcels.
Mileage and density does not include State or County Roads

Table 6: Density of Motorized Use Trails in Proximity to Private Land (miles/square mile)

	Within ¼ mile of private	Within 1/8 mile of private
All known/mapped routes	6.65	7.0
UDRMP Motorized System Trails	3.2	2.9

Route miles do not include ROW roads required for property access.

The motorized trail system includes one route to the top of the middle butte (using the Communication Site ROW road 13). Deschutes River access would be provided by retaining the existing public access along the entire length of the red cinder ROW road 21, which leads to the edge of the river canyon in the Maston area. The portion of the Newcomb Road ROW 24/38 that parallels the Deschutes River Canyon at the south end of the Maston area would not be open to motor vehicle use by the general public.

The motorized system would include a variety of route widths, with about ¼ of the routes being single-track (less than 2 feet in width), and the majority of the remaining routes being from 4 to 18 feet wide. No designations or controls would exist for what types of vehicles could use these varying width routes.

Noise Limits

The No Action alternative would use the existing State limit of 99 decibel (db) for OHV use. This is the current limit throughout BLM administered lands in Central Oregon.

Accessing the System

Unlike all action alternatives, the motorized trail system in the No Action Alternative would have a multitude of public access points. Approximately 80 points would be available to motorized vehicles as legal public access to the CBRA. Another seven would serve as popularly used access through undeveloped private property. The greatest concentration of these access points would occur along Barr Road and the Cline Buttes Rock Pit Road, although they are widely scattered along the 107 miles of CBRA exterior boundary and along the 25 miles of State or County roads that bisect the area. No additional fence construction or access controls are proposed in the No Action alternative, although existing fences could be reconstructed or replaced under the guidelines of an existing Prineville District Programmatic EA for removal, replacement, reconstruction of existing fences (BLM, 2006).

Non-Motorized Routes

The No Action alternative lacks a designated system for non-motorized trail use, and provides no separation of these uses by trail or by area. Horses, mountain bikers, hikers and runners would all share routes, although all would be able to travel cross-country. If the motorized use routes identified in the UDRMP are subtracted from the total known and mapped routes in the CBRA, this leaves approximately 175 miles of routes available as the non-motorized route system, although much of this is intermingled (adjacent or crossing) with the motorized use trails as shown in Map 3. However, there would be some areas that offer a degree of separation between motorized and non-motorized trail uses. Of these, the 4,099-acre (6.4 Sq. Mile) Maston area provides this opportunity because it is currently designated as closed to motor vehicles. The other separated use areas include the Tumalo Canal ACEC, public lands along Fryrear Road, a similarly sized area between McKenzie Canyon and Deep Canyon, and the Dusty Dirt Road area north of Innes Market Road. Using these areas for a general estimate, there are about 92 miles of existing routes that offer some separated, trail opportunities for non-motorized uses (see Table 7). These areas are described below and shown on Map 3.

Maston Area

The Maston area would provide approximately 50 miles of routes for non-motorized use. A large portion of the routes (45%) would be single-track (less than 2' width) with an equal portion being narrow roads (4 to 8' wide). The existing routes currently being used include several roads and single-track trails located along the Deschutes Canyon Rim.

Tumalo Canal ACEC

No specific trail routes would be designated in the ACEC for non-motorized use. The approximately 11 miles of existing routes include several native surface roads and the relic canal system. Public lands south of the ACEC and adjacent to private property (Black Horse Lane/McConnell Road areas) would be available to motorized use, as would the road that forms the southern boundary of the ACEC.

Fryrear Canyon Area

Several square miles of the CBRA located south of the existing Fryrear Canyon trailhead (on State owned land), north of Sage Ranch Road (ROW 34), and west of Dry Canyon would provide some opportunities for separated, non-motorized use. This includes about 14 miles of existing routes, although access to these would generally require travel on the motorized use system as well. The existing routes available for non-motorized use include the bottom of Fryrear Canyon, as well as routes on the plateau between Fryrear Canyon and Fryrear Road.

Deep Canyon/McKenzie Canyon Plateau

Approximately 13 miles of existing routes in this area would be available for non-motorized use.

Dusty Dirt Road Area

This area consists of BLM administered lands adjacent to and extending north (for 1 ½ miles) from Innes Market Road. There are relatively few mapped or inventoried routes in this area. The routes that do exist in this area include approximately one mile of relic canal, part of which is signed as a trail by local landowners. Several other signed trail routes occur in the area, as well as a regularly used road that bisects the area over a distance of two miles before it dead-ends at private property (parcel 28, Map 5).

Table 7: Non-motorized Route Summary for Alternative 1

Area	Approximate Route miles[1]	Approximate Acres
Total CBRA	176	32,000 acres (50 mi^2)
Maston Area	50	4,099 acres (6.4 mi^2)
Fryrear Canyon Area	14	1,918 acres (3.0 mi^2)
Deep Canyon/McKenzie Canyon Plateau	13	2,114 acres (3.5 mi^2)
Tumalo Canal ACEC	11	2,403 acres (1.6 mi^2)
Dusty Dirt Road Area	4	1,055 acres (3.7 mi^2)
Total existing route mileage that offers a degree of separation	92	9,689 acres (15 $mi^{2)}$

[1]Does not include miles of motorized use routes, which are also open to non-motorized uses.

Elements Common to All Action Alternatives

Introduction

For all Action alternatives CBRA trails are designed to provide the recreating public with a wide spectrum of motorized and non-motorized opportunities as required in the UDRMP. The range of alternatives provides the decision-maker with a distribution of recreation opportunities based in various areas in the CBRA while ensuring opportunities for all trail users. All trails in Cline Buttes would be designated, maintained, mapped, and signed. Motorized use trails would be part of a numbered trail system, while non-motorized use trails would have trail names. Specific details on trail standards, construction and maintenance are found in Table 8, Appendix 1. All trail users (except for pedestrians) would be limited to designated trails. Motor vehicle access to the trail system would be limited to a few designated trailheads. Access for non-motorized trail uses would occur from both designated trailheads and a number of subdivision or community level access points.

Camping would be allowed throughout the CBRA in all action alternatives. Overnight use (i.e., parking of vehicles at trailheads) would be allowed, but actual camping within the trailheads may not, depending on the alternative.

Road and trail construction/decommissioning, and fence construction would be done following site specific surveys. Should Threatened, Endangered or other Special Status Plant or Animal species be found by BLM personnel or the public prior to or during project implementation, the project would be either be implemented as proposed, modified or dropped based on the level of importance of the species involved. Individual sites would be identified on the ground with flagging and/or paint and would be excluded from the project area or the season of implementation would be modified to eliminate adverse impacts to the identified species.

Any human remains, cultural and/or paleontological resources (historic or prehistoric or vertebrate fossil site or object) that are discovered as a result of project implementation shall immediately be reported by telephone to the authorized officer. For ROW grants, ROW holders shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. For ROW grants, the ROW holder will be responsible for the cost of evaluation and mitigation, and any decision as to proper avoidance, protection or mitigation measures will be made by the authorized officer after consulting with the ROW holder (if applicable) and others (including affected tribes) under Section 106 of the National Historic Preservation Act.

Specific to ROW grants, ROW holders must immediately notify the authorized officer, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the holder must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer. The BLM Authorized Officer will determine avoidance, protection or mitigation measures in consultation with the Holder, Oregon SHPO, and affected Tribes. Costs associated with the discovery, evaluation, protection or mitigation of the discovery shall be the responsibility of the holder.

The holder shall notify the Authorized Officer at least 90 days prior to any non-emergency activities that would cause surface disturbance in the ROW. The Authorized Officer will determine if a cultural resource inventory, treatment or mitigation is required for the activity. The holder will be responsible

for the cost of inventory, avoidance, treatment or mitigation; including any maintenance-caused damage. The Authorized Officer will determine avoidance, treatment and mitigation measures that are necessary after consulting with the holder and under Section 106 of the National Historic Preservation Act.

Access Controls
All action alternatives incorporate proposals for approximately 50 miles of fence construction to control access. Each alternative varies by minor amounts of fence construction due to differences in trailhead numbers or locations, and by including various options for short sections of ghost fence or gates to help separate different trail uses. BLM identified high priority fencing based on the following criteria:

- Fencing required to enact the motorized vehicle closure of the Maston Area, as identified in the UDRMP
- Locations where the greatest number of non-designated public access points currently exist (i.e., Barr Road and Cline Buttes Rock Pit Road)
- Areas that receive the greatest amount of use pressure and/or have specific resource concerns (e.g., raptor nest sites)

Proposed fencing that did not meet the above criteria is identified as low priority.
Proposed fence construction and removal is shown on Maps 6 – 8. Design details for fencing are shown in Appendix 1. Proposed fencing common to all action alternatives includes:

- Fencing along both sides of Barr Road
- Fencing along both sides of the Cline Buttes Rock Pit Road
- Fencing along the north side of Newcomb Road
- A portion of the fencing along the south boundary of Thornburgh Resort will be relocated to allow for public access to the canal raceway on both BLM and Thornburgh Resort property
- New fence construction (2 miles) within Tumalo Canal ACEC to enclose the interpretive trail use area
- Removal/relocation of existing pasture fence in northern portion of the Tumalo Canal ACEC.
- Relocation of existing pasture fence located east of Barr Road and south of State Highway 126 to east edge of Barr Road
- New fence construction along west side of Cline Falls Highway
- New fence construction along northern boundary of Buttes area
- Reconstruction of existing fence along east side of Cline Falls Highway
- New fence construction along boundaries of the Jaguar Road parcel

Motorized Trail System (Common to all Action Alternatives)
All action alternatives provide at least 80 miles of trails for different classes of OHVs in the areas north of State Highway 126 and south of State Highway 126 between Barr Road and Fryrear Road. All action alternatives include OHV trails routed as far south as the large Central Electric Cooperative (CEC) power line (ORE 012676), which bisects the CBRA east to west.

Following UDRMP direction, all action alternatives provide for a variety of routes that are designed to suit the different types of OHVs: Class I (Quads), Class II (full size vehicles/jeeps), and Class III (motorcycles). A more specific definition of these vehicle types is found in the glossary.

For all action alternatives, the trail system for motorized use includes the following types of trails, at a variety of specified difficulty levels. Details on trail standards can be found in Table 8, Appendix 1.

- "All-motor" trails (Class I, II, and III allowed);

- Motorcycle and quad trails (Class I and III allowed); and
- Motorcycle only trails (Class III allowed).

A limited number of short, challenging All-motor routes are provided for low speed rock crawling/trials riding. The red cinder pit and two adjacent areas located west of Barr Road near the CEC powerline (ORE 12676) would provide the only OHV play areas and challenging All-motor routes common to all action alternatives (see Maps 6 - 8):

A) Existing Cinder Pit – all OHV types allowed. The CEC power line is located to the south, Barr Road to the east, and the north and south boundaries would be posted with signs. A trail would be built just west of the Red cinder pit that would serve as the western boundary of the area.

B) Rock crawl south – Routes located south of CEC power line and open to all classes of OHVs. The power line and a u-shaped existing BLM road define the outside boundaries of this area. This area would have a small parking area with an information kiosk at the base of the slope. Routes in this location would be "moderate" but still challenging.

C) Rock crawl north – This location is along the rocky slopes north of the CEC power line. These are the longest, highest, more difficult routes in the CBRA. This area would be open to all classes of OHVs. Routes closest to the power line corridor would be the most technical. Routes to the north would be more moderate. Fencing would be used to restrict vehicles from the sandy, low angle areas to the north and east of these routes. A trail route at the top of the ridge would form the western boundary of this area.

In all action alternatives, at least two OHV trailheads/staging areas would be provided, one just northwest and one southwest of the State Highway 126/Barr Road/Buckhorn Road intersection (See Table 9). The Buckhorn staging area (northwest) would be of moderate size, with a restroom and information kiosks. The North Barr Road Staging Area would serve as the primary CBRA motorized trailhead. It would be larger and include multiple lobes for parking. This staging area would include a dedicated ASI/MSF training area where certified safety classes could be taught. Three difficulty levels of short, interconnected, one-way, warm-up loops would be provided just west of the North Barr staging area, along with a "tot lot."

Noise Limits

For all action alternatives, all classes of OHVs would be limited to a 96 decibel (db) sound limit, which is lower than the current state limit of 99 db. The decibel scale is algorithmic, not linear. This means that for every 3 decibels you move up or down the scale, you are adding or dropping 50% of the remaining sound pressure levels to your exposure.

Accessing the motorized trail system

The CBRA motorized trail system would be managed as a "closed system." For all action alternatives, motorized vehicle users would be required to enter and exit the OHV trail system at a maximum of three designated staging areas only (see Table 9 and Table 10, Allowed Use of Trailheads). Other designated trail connections from public roads or private property will be available for motor vehicle administrative use or public non-motorized use only.

Table 9: Trailheads Common to All Action Alternatives

Trailhead	Intended/Allowed Use	Capacity[2]	Restroom	Picnic/Group Use Area	Area Served/Other Features
Barr North	OHV[1]	4 parking pods (approximately 40-50 vehicles)	Yes	Yes	Central Area, area north of State Hwy 126. Includes training area, trail loop inside trailhead area.
Buckhorn	OHV[1]	2 parking pods (approximately 20 vehicles)	Yes	No	Area North of State Hwy 126 and Central Area
Buttes	Varies by Alternative	30 SV 2 Parallel	Yes	Yes	Buttes
Cascade View	Equestrian Mountain Bike Pedestrian	25 SV 12 TR	Yes	Yes	Buttes, Separate Equestrian and Pedestrian parking pods
Fryrear	Equestrian Mountain Bike Pedestrian	25 SV 12 TR	Yes	Yes	Central Area, Fryrear and Dry Canyons, Southern portion of CBRA
Jaguar Road	Pedestrian	5 SV	No	No	Seasonal Closure from Feb 1 to August 31
Juniper	Mountain Bike Pedestrian	15 SV	No	No	No trailer spaces, relocated entry point on Cline Falls Highway also used by landowners/ROW holders
Maston	Equestrian Mountain Bike Pedestrian	25 SV 16 to 18 TR	Yes	Yes	Maston Area and Deschutes River, Separate Equestrian and Pedestrian parking pods
Riverview	Pedestrian	10 SV	No	No	Deschutes River/Maston Area access at Quarry/McVey
Tumalo Canal	Varies by Alternative	20 SV 16 – 18 TR	Yes	Yes	Tumalo Canal ACEC, Buttes and southern portion of Central Area. Separate overflow parking may be provided for school bus parking

[1]All non-motorized trail users can utilize the OHV Trailheads.
[2]SV (Single Vehicle), TR (Trailer), Parallel (parking turnouts along side of parking area roads that are capable of handling trailers, buses and administrative vehicles).

Table 10: Allowed Use of Trailheads, Alternatives 2-4

Trailhead	Alternative 2	Alternative 3	Alternative 4
Buttes Trailhead	Pedestrian Mountain Bicycle	Pedestrian Mountain Bicycle	Pedestrian Mountain Bicycle Motorized (Class I and III)
Tumalo Canal Trailhead	Pedestrian Equestrian Mountain Bicycle	Pedestrian Equestrian Mountain Bicycle Motorized (Class I, II, and III)	Pedestrian Equestrian Mountain Bicycle

Access to the motorized route system would be limited to vehicles 102 inches (8'6") wide or narrower. Poles, rocks, and other barriers may be utilized at the entrances to the motorized trail system to implement width restrictions. Access to the All-motor (Class I, II, and III) trails would also be limited by an obstacle course. The course would be designed to allow the average driver in a medium-sized stock pickup truck with 16" tires to traverse the course. Advanced drivers may be able to traverse the course with lower clearance, and/or smaller tires. Access to the Class I and III (quad and motorcycle) trail system would be limited to vehicles 50" wide or narrower. Access to the Class III (motorcycle only) trail system would be limited at 36". Control points would be used in the trail system to limit vehicle types to certain trails. Control points are geographic features that discourage trail use (e.g. a cliff, area of deep sand, fences, or natural obstructions).

Equestrians, mountain bikers and pedestrians would be able to use the entire OHV trail system. Basic access for non-motorized users would be provided at CBRA trailheads. If the BLM land surrounding the staging areas is grazed, cattle guards would be required, and at least one spring-loaded light metal horse gate would be provided. In addition, equestrians and pedestrians would be provided additional non-motorized-only access points to the motorized system (to facilitate longer rides and passage across the width of the CBRA). These would occur just south of the North Barr Staging Area and just west of the Tumalo Canal ACEC. Horse gates would be installed at these trail connections to allow horses to pass, but would restrict/prohibit travel by motorized users. Equestrian use of all sections of the motorcycle only trails would be legal, but depending upon the width of the horse, access may be difficult.

Motorized Trails – Vehicle Type and Difficulty Levels

All-motor Trails (Class I, II, and III)

Easy All-motor - All-motor and Class I/III trails with an Easy difficulty rating would be used for administrative access as well as recreation routes. Administrative access includes use by the BLM and grazing permitees, power companies, mine operators, and others. These easy trails are the main loops of the OHV trail system and would provide the least difficult OHV trail opportunities for all classes of motorized users.

Intermediate All-motor - These trails would be used by OHV enthusiasts and for administrative use. These trails complete loops, and may also lead to destinations. These All-motor trails provide moderately difficult OHV trail opportunities for all classes of motorized users. This class of trails provides additional technical challenge and a rougher tread.

Difficult All-motor - The difficult All-motor trails would provide some of the most advanced, rocky, obstacle-filled trails in the CBRA. All-motor trails with a difficult rating would primarily be used by OHV enthusiasts, with little administrative use. These trails would be primarily designed for Class II vehicles, but would be open to all vehicles. Unlike any other trail type, the Difficult All-motor trails would allow up to six bypasses per mile. These technical bypasses would provide a moderate option consistent with the average trail difficulty, and more difficult, technical option meant to challenge the trail user. These technical options would generally be no more than 100 feet in length. In addition, turnouts (providing parking for up to six Class II vehicles) may be provided near the technical bypasses to allow Class II groups to pull off the trail, allowing other users to pass without incident. Most of the Difficult All-motor trails would require new construction, emphasizing numerous horizontal and vertical alignment changes. The Difficult All-motor trails would provide the narrowest Class II trails in the CBRA.

Technical All-motor - All-motor trails with a Technical rating are short sections of trail primarily designed for rock crawling and motorcycle trials opportunities (although all classes of OHVs would be allowed). These trails would not be limited by tread steepness, and are explicitly meant to provide the steepest tread grades of any trails in the CBRA. These trails are few in number and mileage, and are only located in defined areas, on steep slopes comprised of solid or broken rock. These trails are limited to 300 feet in length, but most would be considerably shorter. These trails are designed for a tread width of 80 to 240 inches, providing the flexibility to develop multiple "lines" within a single trail tread. Boundaries of these routes would be clearly marked with signs and/or juniper rail barriers. Minimal clearing would be completed on these Technical All-motor routes, leaving as many trees as possible to increase challenge and difficulty.

Class I and III Trails (Quad and motorcycle)

Easy Class I and III - The limited mileage of easy Class I and III trails generally occurs adjacent to the staging areas where these trail types would be utilized by beginners and as warm-up loops for more experienced riders.

These trails are meant to allow riders to acclimate to the area without the additional challenge provided on more difficult trails. Much of the Easy Class I and III mileage is located on existing routes, where only moderate changes to the alignment would be made, except to correct maintenance issues.

Intermediate Class I and III - A majority of the CBRA Class I and III mileage would be provided at the intermediate level, as it is useful for all types of riders. The Intermediate Class I and III trails would include numerous alignment changes, especially on newly constructed sections.

Difficult Class I and III - Class I and III trails with a Difficult rating would provide challenging, technical trail opportunities. These trails primarily would consist of multiple options off of the Easy All-motor loops. Because of the steep, technical nature of these trails, often on sidehills, up to 6 turnouts may be provided per mile.

Motorcycle Only (Class III) - No easy motorcycle-only trails are in included in the CBRA trail system. The easy and Class I and III trails would provide that opportunity.

Intermediate Class III - Class III trails with an Intermediate rating are the easiest motorcycle trails provided in the CBRA. These trails would be narrow, moderately rocky, would have substantial exposure, and would include numerous alignment changes.

Advanced Class III - Class III trails with an Advanced rating would provide the narrowest, most technical, rocky and twisting OHV trails in the CBRA. Provided in relatively short optional sections, these trails would provide a technical and strenuous challenge.

Non-Motorized Trail System (Common to all Action Alternatives)

The CBRA would offer a variety of pedestrian, equestrian, and mountain bike trail opportunities that are separate from the motorized trail system. Based on direction in the UDRMP, all action alternatives manage the Maston Area trails solely for non-motorized use and the Buttes area trails emphasizes this use over motorized trail use (i.e., non-motorized use trails are the predominate feature and the amount and dispersal of non-motorized trails is greater than motorized use trails, especially at higher elevations). Pedestrian-only trails are concentrated along the Deschutes River, and in a portion of the Tumalo Canal ACEC that would be dedicated to interpretation of the historic canals. Pedestrians can use all trails,

while there are different degrees and types of trail sharing for mountain bikes and pack stock use. In all action alternatives, equestrian trails are spread throughout the recreation area, occurring in the Maston and Buttes areas, and in the southern and western portions of the CBRA. Alternatives vary in the amount of shared use between equestrians and OHVs and/or mountain bicyclists. Mountain bike trails in the Maston and Buttes areas are common to all action alternatives. For shared routes, trail maps and signs would emphasize that motorized uses would yield to non-motorized trail users, and mechanized use would yield to equestrian and pedestrian use and pedestrians would yield to equestrian use. Routes that use wide roads may be managed for use by different user types on each side of the road.

All action alternatives include non-motorized use trails at specific difficulty levels. Existing roads were used as trail routes in some cases, which accounts for the majority of the "easy" category trails. In order to provide a diverse trail experience, other trails were designed at a moderate or difficult skill level. The different types of non-motorized trails are listed below and shown in Maps 6 - 8. Specific trail design standards are provided in Table 8, Appendix 1.

Horse - Trails designated, designed and maintained for equestrian use (also available for other pack stock use and pedestrian use).

Bike – Trails designated, designed and maintained for mountain bicycle use (also available for hiking use).

Pedestrian Only – Trails designated, designed and maintained for pedestrian use only.

Parallel – Trails located within an approximately 200 foot wide corridor that parallel each other and offer one route for mountain bike use and the other for equestrian use (hikers can use both trails).

Non-motor – A shared use route for all non-motorized uses (pedestrian, equestrian and mountain bicycles). These routes may have a stated design and maintenance intent for one type of use, although all uses would be allowed on the route. These routes typically use existing roads, and may have signs posted along them directing horse use to one side, pedestrian and mountain bike use to the other.

Public road – A public road, generally unimproved, that serves as a connector link in the proposed trail system. For example, portions of Barr Road are used in some instances as a mountain bike or equestrian route. In all cases, BLM would seek to provide a separate trail within the road ROW if possible.

Accessing the non-motorized trail system

Most CBRA equestrians and mountain bikers would access the non-motorized trail system at developed trailheads provided specifically for this use. The two OHV trailheads (Barr North and Buckhorn) also would be available for non-motorized trail users. Not including the OHV trailheads, those available to equestrians that are common to all Action Alternatives are:

- Maston (at Newcomb Road);
- Cascade View (access to the Buttes Area via Eagle Crest Boulevard);
- Tumalo Canal (access to the southern and southwestern portion of the CBRA via Barr Road/ Gerking Market Road); and
- Fryrear (access to the western portion of the CBRA from Fryrear Road).

Trailheads available for mountain bicyclists common to all Action Alternatives are:

- Maston
- Buttes East (access to the Buttes Area via the Cline Buttes Rock Pit Road),
- Juniper (access to the Maston Area via Cline Falls Highway)

For all action alternatives, no equestrian or mountain bike access would be allowed from the canyon rim into the Deschutes River Canyon. While equestrian and mountain bike trails would be provided in the Maston and Harper Road areas, equestrian and mountain bike access to the small parcels of the CBRA on the east side of the river (at the Jaguar Road, Riverview Trailheads and adjacent to 63rd Street) would be closed.

Most trailheads would have separated parking areas for hikers/mountain bicyclist versus equestrians. For the trail system on the buttes, trailer parking for equestrians would be provided at the Cascade View trailhead (off Eagle Blvd.), while the Buttes East trailhead (off Cline Buttes Rock Pit Road) would have parking for single vehicles only. This separation of access is provided to help maintain separate trail systems for each user type on the buttes. Many trailheads would have vault toilets (See Table 9). The trailheads provided solely for non-motorized use that are common to all Action Alternatives are:

- Maston Trailhead (located off Newcomb Road)
- Juniper Trailhead (located off Cline Falls Highway)
- Fryrear Trailhead (located off Fryrear Road)
- Buttes East Trailhead (located off Eagle Boulevard)
- Riverview Trailhead (Located off Quarry/McVey Avenue)
- Jaguar Road (at west end of Jaguar Road)

Specific details for these trailheads are listed in Tables 13 and 14.

In addition to the major trailheads, numerous “neighborhood access” points would be provided to allow pedestrian access, and depending on the trail type, horse and/or mountain bike access. Most of these are proposed at or near existing access points into the CBRA. These points are intended to serve locals accessing the CBRA by foot, horse, or bicycle from relatively short distances. These access points would consist of a sign and entry gate, with few, if any developed parking spaces. Most of these entry points are publicly accessible; however, some are from subdivisions and/or private roads. Those that provide legal access only to homeowners associations or other entities would not have directional signs to them from public roads and would be marked as “limited” or “private access” on CBRA maps. Neighborhood access points common to all action alternatives are identified in Table 11.

For all action alternatives, regularly used access points that rely on trespass across private property would be closed at the public land boundary, unless easements can be obtained for continued use. Closure could be accomplished by fencing, signs, boulders or other means. This access includes the following locations:

- Antler Avenue
- West side of Cline Falls Highway opposite Salmon Drive
- Kingwood Avenue (non-County portion within the CBRA)
- FAA Road
- Sage Ranch Road (closure of route would be for general public use, not for landowner access on the ROW road)

Table 11: Neighborhood Access Points Common to All Action Alternatives

Access Point	Area	Uses	Private	ROW Road	Admin Access (Vehicle Gate)
Miscellaneous access from residences along Wickiup Drive	Maston	Pedestrian Equestrian	Y	N	Non-motorized trail parallels north boundary to allow access from residences along Wickiup Avenue
Harper Road	Maston (Harper Road Parcel)	Pedestrian Equestrian	N	Y	Y
Deschutes River Ranch	Maston (Harper Road Parcel)	Pedestrian Equestrian	Y	N	Access to Harper Road parcel from Deschutes River Ranch, provides trail link to Maston Area
Eagle Crest River Trail	Maston	Pedestrian	Y	N	No Admin Access or vehicle gate
McConnell Road	Buttes	Pedestrian Equestrian	N	Y	Y
South entry Tumalo Canal ACEC	Buttes	Pedestrian Equestrian Mtn Bike	N	N	Y
103rd Street	Buttes	Pedestrian	N	N	N
Approximately 12 access points from Thornburgh Resort	Buttes	Pedestrian Mtn Bike	Y	Y	Combination of vehicle gates with adjacent trail gates at many existing powerline ROWs and separate trail gates at other locations.
Approximately 10 access points from Eagle Crest Resort	Buttes	Pedestrian Mtn Bike Equestrian	Y	Y	Combination of vehicle gates with adjacent trail gates at many existing powerline ROWs and separate trail gates at other locations.
Dusty Loop Road	S of Hwy 126	Varies by Alternative	N		Y
Plainview Road	S of Hwy 126	Varies by Alternative	N	Varies by Alternative	N
Fryrear Ranch Road	S of Hwy 126	Varies by Alternative	Yes	N	N
Sage Ranch Road	S of Hwy 126	No access without easement	Yes	Y	No access without easement
Jordan Road	S of Hwy 126	Pedestrian	State	N	Walkover
Sabrina	N of Hwy 126		N	N	N
Quail Tree Road	N of Hwy 126	Equestrian Pedestrian	Yes	N	N
Maple Drive	N of Hwy 126	Equestrian Pedestrian	N	N	N
Cascade Estates Drive	W of Fryrear Road	Varies by alternative	N	N	N

Non-motorized Trail Use Common to All Action Alternatives

Maston Area and Harper Road Parcel

All Action alternatives would utilize the existing power line roads in the Maston Area as shared trails for pedestrian, bicycle, and horse use. All action alternatives would use a portion of the existing single-track routes and relic canals as the basis for the trail system. Further details for the Maston area common to all action alternatives include:

- Mix of equestrian, mountain bike and pedestrian trail designations/separations but all types use the Maston Trailhead at Newcomb Road. All alternatives would provide:
  - Minimum of 13 miles of trail available to equestrian use
  - Minimum of 12 miles of trail available to mountain bike use
  - Minimum of 30 miles of trail available to pedestrian use
  - Minimum of 5 miles of pedestrian only trails
- Shared trails for all non-motorized use at the Harper Road parcel. No designated trails (i.e., equestrian or mountain bike access) would be provided to the river at this location.
- Trail crossings of County Roads:
  - One crossing of Newcomb Road
  - Two crossings of Cline Falls Highway
- No designated trails would be located along the rim or within the Deschutes River canyon between parcel 13 and parcel 15 (Map 5) on the west side of the river (opposite the Jaguar Road access point).
- River access trails would be improved to provide a more stable, non-eroding trail alignment.
- A river trail would be located along the top of the existing rock wall on the west side of the river canyon opposite the Riverview trailhead.
- All action alternatives route a non-motorized use collector trail along the north boundary of the Maston area, to collect local use from the adjacent subdivision while reducing trail density.

Access for non-motorized trail use in the Maston Area would include the following elements common to all Action Alternatives:

- Jaguar Road parcel would be seasonally closed to all visitors from February 1 to August 31. A parking area with lockable gate would be installed to facilitate the seasonal closure.
- Secondary trailhead for hikers/mountain bicyclists would be provided at the red cinder ROW road/Cline Falls Highway intersection (includes relocating a portion of the ROW road – see Transportation/ROW Section).
- Trails into and within river canyon would be designated for pedestrian/hiking use only

Buttes Area (including Tumalo Canal ACEC)

All Action Alternatives provide for the following trail use in the Buttes area:

- Mix of equestrian, mountain bike and pedestrian trail designations/separations in the Buttes
  - Minimum of 13 miles of trail would be available to equestrian use
  - Minimum of 24 miles of trail would be available to mountain bike use
  - Minimum of 50 miles of trail would be available to pedestrian use
  - Approximately 6 miles of pedestrian only trails would be located in the Tumalo Canal ACEC

- Communication site ROW road would be used as shared trail for equestrians, mountain bikes and pedestrians
- Trail loop for equestrians/hikers would be located on the middle butte
- Trail loop for mountain bikes/hikers would be located on the south butte
- Separate equestrian and mountain bike trail loops would be located around Section 16 (Eagle Crest Phase 3)
- A portion of the existing downhill mountain bike routes on the South Butte would be retained, but no designated trails of any kind would be within FAA clear zone
- Shared pedestrian/equestrian and mountain bike trail corridor through State land on an existing road would complete loop around north butte
- Trail Crossings would cross the following roads:
  - Cline Buttes Rock Pit Road
  - Eagle Crest Boulevard
  - Thornburgh ROW Road (aka Willet Way)
  - Barr Road
  - Cline Falls Highway
- Multiple trail loops using relic canals, hilltops, and existing roads in ACEC would be designated for pedestrian use only (approximately 6 miles of pedestrian trail in all alternatives)
- Southern boundary road for Tumalo Canal ACEC would be used as shared equestrian/pedestrian/mountain bike trail
- Area south of Tumalo Canal ACEC would be used for equestrian and pedestrian trails, and for a trail link for equestrian, mountain bike and pedestrians to access the Maston Area via a Cline Falls Highway Crossing
- Links would be designated between BLM trails and trails on Eagle Crest Resort and proposed trails on Thornburgh Resort

<u>Area West of Barr Road and East of Fryrear Road</u>

Non-motorized trail use common to all Action Alternatives in the Area west of Barr Road and East of Fryrear Road includes:

- To a varying degree, all action alternatives use the southern and western portions of this area for non-motorized trail use, although the degree of shared trails between equestrians and mountain bicyclists varies.
- Fryrear Canyon is managed as a non-motorized trail
- Trails are provided as bypass routes to maintain trail loops if canyons at west edge of CBRA are closed seasonally due to wildlife needs.
- Pedestrian only trail from Tumalo Canal Trailhead to canal feature along Gerking Market Road
- Seasonal closure February 1 to August 31) of non-motorized use trail located south of CEC power line (ORE 012676)
- Trail crossings of the following roads:
  - Barr Road (5 locations)
  - Fryrear Road (1 location)
  - State Highway 126 (1 location)

Access for non-motorized trail use in this area would include the following elements common to all Action Alternatives:

- Barr North Trailhead designed for OHV use
- Pasture fence west of Barr Road relocated adjacent to road, both sides of Barr Road fenced to manage access
- Jordan Road access limited to pedestrian use
- Fryrear Trailhead relocated from State owned parcel to BLM administered lands approximately 1 mile south of Jordan Road.
- No parking or trailhead on either side of State Highway 126 at Deep Canyon
- Sage Ranch Road used as community access for non-motorized trail use, if easement is obtained from private landowner
- Fryrear Ranch Road used as community access for non-motorized trail use
- Plainview Road used as community access for non-motorized trail use
- Dusty Dirt Road at Dusty Loop used as community access for non-motorized trail use
- Dusty Dirt Road at Innes Market Road used as community access for non-motorized trail use

Area North of State Highway 126

Non-motorized trail Use common to all Action Alternatives north of State Highway 126 includes:

- The plateau north of Deep Canyon would be managed for equestrian and hiking use in all Action Alternatives, although use of the canyon bottom and trails immediately southeast vary by alternative.
- The area between Deep Canyon and Buckhorn Road would be managed for multiple use on shared trails
- The area east of Buckhorn Road would be managed for multiple use on shared trails, although alternatives do vary in trail use at the far east end adjacent to residential development (101st Street area)
- Trails crossings of the following roads:
  - One crossing of State Highway 126
  - Two trail crossings of Buckhorn Road

Access for non-motorized trail use in this area includes the following elements common to All Action Alternatives:

- Pedestrian only access at Maple Drive
- No trailhead or parking would be provided on either side of State Highway 126 at Deep Canyon
- Small trailhead would be provided either at Sabrina Drive or McKenzie Canyon Road
- Community access point would be provided off Quail Tree Drive

Area west of Fryrear Road

- All action alternatives provide for a single trail loop and a designated trail crossing of Fryrear Road. All action alternatives provide for at least pedestrian and equestrian use of these trails.
- One access point from Cascade Estates Drive, but use varies by alternative
- One access point from Fryrear Road, with equestrians and pedestrians starting at the Fryrear Trailhead, then crossing Fryrear Road to use the loop to the west of the road.

Alternative 2

The proposed action (Alternative 2) provides a mix of motorized and non-motorized trail opportunities. The non-motorized use trails rely on a shared trail system for mountain bikes, equestrians and pedestrians in the southern and western portions of the CBRA. Like all other action alternatives, mountain bike and equestrian uses are provided separate trails in the Buttes and Maston areas. The spread and extent of the motorized use trail system is the mid-range of the action alternatives. Motorized use trails are concentrated in the center and north portions of the CBRA, with a limited amount of trails in Deep Canyon and Dry Canyon between State Highway 126 and the CEC powerline near the north boundary of the Peck's Milkvetch ACEC. No motorized use trails are provided in Deep Canyon north of State Highway 126 or the plateau between Deep Canyon and McKenzie Canyon. The smaller dry canyons located south of the CEC powerline are reserved for non-motorized trail use. No access is provided to motorized use trails at the south end of Barr Road, and no motor vehicle access is available to the top of the buttes. The overall trail miles for this alternative are shown in Tables 16 and 17 (See also Map 6).

Key recreation elements of this alternative include:

- No motorized trails or motorized access to the top of the buttes
- The Tumalo Canal Trailhead would be designated for equestrian, mountain bike, and pedestrian use only.
- One OHV loop trail would occur in the southern third of the CBRA
- The southern and western edges of the CBRA are managed for shared non-motorized trail use, with an emphasis on trail design and maintenance for equestrian use.
- No mountain bike or equestrian trails would be located within the central core area of the Tumalo Canal ACEC
- The Maston area would have a system of separate, but parallel equestrian and mountain bike trails
- Deep Canyon north of State Highway 126 would be managed for equestrian and hiking use, with a small trailhead provided on the north side of the highway approximately 1 ½ miles east of Deep Canyon
- Technical jeep trails would be provided west and south of the existing Barr Road Cinder pit, as well as in a portion of Deep Canyon south of State Highway 126 and north of the Deschutes County Transfer Station
- Mountain bike and equestrian trails would be routed east of, instead of directly through the center of the Tumalo Canal ACEC.
- No public trail access would be allowed from the State land located along Fryrear Road (parcel 38, Map 5).

Trailheads and Access

To support a larger equestrian and hiking trail system in the northwest corner of the CBRA, this alternative provides a relatively small trailhead located north of State Highway 126 and east of Deep Canyon (see Table 12). This provides a publicly accessible location for trail use, and avoids the trespass occurring at the bottom of Deep Canyon. While a small parking area would be provided off Sabrina Drive to access the same area, the trailhead off the State Highway would be the larger, more developed trailhead.

Under Alternative 2, the Tumalo Canal Trailhead at the south end of Barr Road would be managed for non-motorized trail use only. The trailhead would not be closed to camping (see Table 19).

The Maston Trailhead off the County managed Newcomb Road would be the main trailhead, although there would be a small parking area (Wildcat Canyon) near the Deschutes River rim for river access.

Table 12: Trailheads Specific to Alternative 2

Trailhead	Allowed Use	Capacity	Restroom	Surface Type	Overnight Use or Camping	Picnic or Group Use Area	Area Served or Other Features
Deep Canyon	Equestrian Pedestrian	10 SV 5 TR	N	Gravel	N	N	North of State Highway 126, Deep Canyon and McKenzie Canyon Area
Sabrina	Equestrian Hiking	5 SV 5 TR	N	Gravel	N	N	North of State Highway 126
Wildcat Canyon	Hiking	8 SV	N	Gravel	N	N	Maston, Deschutes River

Table 13: Camping Use of Trailheads, Alternatives 2-4

	Barr North	Buck-horn	Buttes East	Cascade View	Fryrear	Jaguar Road	Juniper	Maston	Riverview	Tumalo Canal
Alt. 2	**Y**	**Y**	N	N	N	N	N	N	N	**Y**
Alt. 3	**Y**	**Y**	N	N	N	N	N	N	N	N
Alt. 4	N	N	N	N	N	N	N	N	N	N

OHV Use

Alternative 2 would provide a moderately large OHV trail system, concentrated in the center and northern portions of the CBRA (see Table 14). No motorized access would be provided to the buttes in this alternative. The OHV system would avoid use of the Deep Canyon area north of State Highway 126, but would use a small portion of Deep Canyon immediately south of the highway. Most of the smaller canyons (Fryrear and Dry Canyons) would be managed for non-motorized use. OHV trail loops would not extend into the far southern portions of the CBRA in this alternative.

Approximately 1.4 miles of OHV trail located at the western edge of the CBRA would be seasonally closed to all uses from February 1 to August 31.

Table 14: Alternative 2 Motorized Use Trail Miles by Area

Trail Type	Maston Plateau	Buttes Area	North of Hwy 126	South of Hwy 126	West of Fryrear	Total CBRA
All Motor	0	0	13.4	28	0	41.4
Class I and III			17.6	18.7		36.2
Class III only			4.2	9.1		13.3
Class I Total			31	46.7		77.6
Class II Total			13.4	28		41.4
Class III Total			35.2	55.8		90.9
CBRA Total			35.2	55.8		90.9

Class I (quads), Class II (full width/jeeps), Class III (motorcycles)

Non-motorized Trail Use

Similar to all action alternatives, the Maston area would be managed for hiking/running, equestrian and mountain bike use. Alternative 2 would provide relatively high miles of both equestrian and mountain bike trails. In the Maston area, this would be accomplished by routing both types of trails parallel to each other within a corridor (approximately 200 feet wide). At some locations these two types of trails would be routed further away from each other. The existing powerline access roads that run north-south through the Maston area would be a shared corridor used by all non-motorized trail groups. Signs may be used to direct horse use on one side of the road and bike use on the other side. The red cinder ROW road would be closed to public motorized use. A trailhead would be provided at the beginning of this ROW road, which would be realigned during trailhead construction to connect to the Cline Falls Highway opposite the Cline Buttes Rock Pit Road.

Alternative 2 would provide for non-motorized trails in the southern and western edges of the CBRA. Unlike the other action alternatives, Alternative 2 would designate these trail routes as being available for all non-motorized trail uses (equestrians, pedestrians and mountain bicyclists). However, the design and maintenance intent for these trails would be for equestrian use.

Unlike all other alternatives, Alternative 2 includes three areas seasonally closed to cross-country pedestrian use (see Map 6). These include an area at the east edge of the Maston Area, another area adjacent to Fryrear Road and a portion of Deep Canyon north of State Highway 126. These areas are intended to limit disturbance to raptor nest sites.

Under Alternative 2, trail opportunities would be provided as shown in Table 15.

Approximately 1.8 miles of shared, non-motorized trail would be closed seasonally (February 1 to August 31) at the western edge of the CBRA. Approximately 1.8 miles of equestrian trail would be closed seasonally in Deep Canyon north of State Highway 126, but one access trail to the top of the plateau would be available year-round.

Table 15: Alternative 2 Non-Motorized Use Trail Miles by Area[1]

Trail Type	Maston Plateau[2]	Buttes Area	North of Hwy 126	South of Hwy 126	West of Fryrear	Total CBRA
Horse	8.4	21.5	15.4	1.2	0	46.5
Bike	4	21.9	0	2	0	27.9
Pedestrian	5.1	8.1		0.8	0	14
Parallel	9	0	0	0	0	9
Non-motor (shared)	4.4	3.2	0.6	32.3	3	43.5
Public Road	0.2	0.05	0.2	0	0	0.45
Horse Total	21.9	24.7	16	33.5	3	99
Bike Total	17.6	25.2	0.6	34.3	3	80.8
Pedestrian Total[3]	31.1	54.7	16	36.3	3	141

[1]Trails miles do not include any of the OHV trail system, which is open to all non-motorized use.
[2]Maston Plateau includes trail miles on Harper Road parcel.
[3]Pedestrian total includes all non-motorized use trail miles, although pedestrians can also travel cross country as well. Does not include developed trails on private property (i.e. Destination resorts) or regularly used routes on private land (e.g., Deschutes River Trail).

Sharing between motorized and non-motorized uses
For Alternative 2, the area designated as "Multiple Use Shared Facilities" (UDRMP, 2005) would have approximately 107 miles of non-motorized trail, and 91 miles of trail for motorized uses. This constitutes approximately 50% of the trails being shared routes available for both motorized and non-motorized uses.

Sharing among motorized uses
Approximately 45% of the motorized use trail system would be shared by Class I, II, and III vehicles. The majority of the remainder (40% of OHV trails) would be shared between motorcycles (Class III) and Quads (Class I). Fifteen percent of the system would be single-track trails for motorcycles.

Sharing among non-motorized uses
Approximately 44 percent of total trail miles for equestrians would be shared with mountain bikes. Approximately 54 percent of total trail miles for mountain bikes would be shared with equestrians. About 10 percent of the non-motorized system would pedestrian only, although pedestrians could use any trail and travel cross-country.

Alternative 3

Alternative 3 provides a mix of motorized and non-motorized trail opportunities. This alternative differs from the proposed action (Alternative 2) by managing most of the trails in the southern and western portions of the CBRA as equestrian trails, and limiting mountain bike trail opportunities to the Buttes and Maston areas. Alternative 3 also provides pedestrian trail loops in the northeastern portion of the CBRA. Like all other action alternatives, mountain bike and equestrian uses are provided separate trails in the Buttes and Maston areas. This alternative provides a greater spread and distribution of motorized use trails than all other action alternatives, and offers a third motorized use trailhead at the southern end of Barr Road, to better distribute riders and drivers throughout the trail system. Unlike the proposed action, motorized use trails are located in Deep Canyon north of State Highway 126; however, these routes would be seasonally closed. All of Deep Canyon south of the highway would be closed to motorized use; however, a motorcycle/quad trail would be located in Dry Canyon and would loop back to the CEC powerline. In contrast to these canyon areas, nearly all of Buckhorn Canyon would be closed to motorized trail use. The overall trail miles for this alternative are shown in Tables 21 and 22 (See also Map 7).

Key recreation elements of this alternative include:

- No motorized trails or motorized access to the top of the buttes
- The Tumalo Canal Trailhead would be designated for both OHV and non-motorized use, but closed to camping
- The Barr Road North and Buckhorn Trailheads would allow camping use
- Several OHV loop trails would occur in the southern third of the CBRA
- The southern and western edges of the CBRA are managed for equestrian and hiking use only
- Dry Canyon from Jordan Road south is managed as a multiple use, shared trail (OHVs allowed)
- Fryrear Canyon is managed as an equestrian/hiking route
- Deep Canyon and Fryrear Canyon south of State Highway 126 is part of larger equestrian/hiker trail system
- Deep Canyon north of State Highway 126 is part of the OHV trail system
- Technical, rock crawling routes limited to areas just west of Barr Road adjacent to the CEC power line

- The Maston Area has separate mountain bike and equestrian loop trails
- An equestrian trail would pass through the core area of the Tumalo Canal ACEC, on a north-south road.
- A pedestrian only trail would be located at the northeastern edge of the CBRA
- Access to equestrian trails on the plateau between Deep Canyon and McKenzie Canyon would occur at McKenzie Canyon Road and from Quail Tree Drive.

Trailheads and Access
For Alternative 3, the Tumalo Canal Trailhead would serve as a southern OHV access point, as well as an access for pedestrian use of the Tumalo Canal ACEC and equestrian use of trails in the southern and western portions of the CBRA. Under this alternative, the trailhead would be closed to camping (See Table 13).

In the Maston Area, access to the Deschutes River from the west would be accomplished on the non-motorized trail system via the Maston and Juniper Trailheads. Motor vehicle access on either the Red Cinder Road (ROW 21) or the non-County Newcomb Road ROW (ROW 24/38) would not be available to the general public. Access to the river would remain available from the east side of the river (See Common to All Action Alternatives Section).

OHV Use
Alternative 3 would provide about the same mileage of OHV trail as Alternative 2, but in general, would spread this use out over a larger area. OHV use would be dispersed to the south more than any other alternatives, in part due to additional trail loops, but also due to a third OHV trailhead located at the southern end of Barr Road. Variety and terrain for OHV trails would be provided by using Dry Canyon and Deep Canyons as OHV routes, although some of these routes would be seasonally closed to all uses. Technical 4-wheel drive routes would be limited to areas immediately west of Barr Road, near the CEC power line and Cinder Pit.

Non-motorized Trail Use
Alternative 3 retains the common theme of non-motorized trails in the southern and western edges of the CBRA. These trails would be designated for equestrian and hiking use only. This alternative would have one linking trail, and Dry Canyon would be designated as a multiple use, shared route. A north-south allotment fence is used to separate motorized and non-motorized trails in this area.

This alternative provides approximately 30 miles of equestrian only trails between Barr Road and Fryrear Road. Mountain bike use would be limited to the Maston and Buttes areas.

Under this alternative, there would be slightly fewer trail miles provided for equestrians only and mountain bicyclists only in the Maston Area, due to the creation of several separate trail loops for each user group.

Table 16: Trailheads Specific to Alternative 3

Trailhead	Allowed Use	Capacity	Restroom	Surface Type	Overnight Use or Camping	Picnic or Group Use Area	Area Served or Other Features
Buttes East	Pedestrian Mountain Bicyclist	30 SV 2 Parallel	Y	Gravel	N	Y	Buttes
McKenzie	Equestrian Pedestrian	5 SV 5 TR	N	Gravel	N	N	North of Hwy 126

Table 17: Alternative 3 Motorized Use Trail Miles by Area

Trail Type	Maston Plateau	Buttes Area	North of Hwy 126	South of Hwy 126	West of Fryrear	Total CBRA
All Motor			16.8	24.8		41.6
Class I and III			14.6	23.8		38.4
Class III only			6.4	6.26		12.7
Class I Total	0	0	31.4	48.6	0	80
Class II Total			16.8	24.8		41.6
Class III Total			37.8	54.9		92.7
CBRA Total			37.8	54.9		92.7
Class I (quads), Class II (full width/jeeps), Class III (motorcycles)						

Table 18: Alternative 3 Non-Motorized Use Trail Miles by Area[1]

Trail Type	Maston Plateau[2]	Buttes Area	North of Hwy 126	South of Hwy 126	West of Fryrear	Total CBRA
Horse	13.9	24.6	9	31.5	3	82
Bike	11.4	21	0	1.4	0	33.8
Pedestrian	5.1	5.6	3.7	0.7	0	15.1
Parallel	0	0	0	0	0	0
Non-motor (shared)	7.1	3.2	0.6	0.07	0	11
Public Road	0	0.04	0.29	0	0	0.34
Horse Total	21	27.8	9.9	31.6	3	93.3
Bike Total	18.5	24.2	0.9	1.5	0	45.1
Pedestrian Total[3]	37.5	54.4	13.6	33.7	3	142.2

[1] Trails miles do not include any of the OHV trail system, which is open to all non-motorized use
[2] Maston Plateau includes trail miles on Harper Road parcel
[3] Pedestrian total includes all non-motorized use trail miles, although pedestrians can also travel cross country as well. Does not include developed trails on private property (i.e. Destination resorts) or regularly used routes on private land (e.g., Deschutes River Trail)

Sharing between motorized and non-motorized uses

For Alternative 3, the area designated as "Multiple Use Shared Facilities" in the UDRMP would have approximately 66 miles of non-motorized trail, and 97 miles of motorized use trails. This constitutes approximately 59% of the trails being shared routes available for both motorized and non-motorized uses.

Sharing among motorized uses

About 45% of the motorized use trail system would be shared by Class I, II, and III vehicles. The majority of the remainder (41%) would be shared between motorcycles (Class III) and Quads (Class I). Fourteen percent of the system would be single-track trails for motorcycles.

Sharing among non-motorized uses

Approximately 12 percent of total trail miles for equestrians would be shared with mountain bikes. Approximately 25 percent of total trail miles for mountain bikes would be shared with equestrians. About 11 percent of the non-motorized system is pedestrian only, although pedestrians can use any trail and travel cross-country.

Alternative 4

Alternative 4 provides a mix of motorized and non-motorized trail opportunities. Like Alternative 3, this alternative manages most of the trails in the southern and western portions of the CBRA as equestrian trails, and limiting mountain bike trail opportunities to the Buttes and Maston areas. While a large amount of equestrian trails area provided in the south and western portions of the area, fewer equestrian trails area provided in the buttes, which has a much larger amount of pedestrian trails than in other alternatives. Alternative 4 provides the smallest spread and distribution of motorized use trails than all other action alternatives. The large CEC powerline would serve as the southern limit of the OHV trail system, with all of Dry Canyon and other smaller canyons south of State Highway 126 reserved for non-motorized use. Unlike the proposed action, motorized use trails are located in Deep Canyon north of State Highway 126; however, these routes would be seasonally closed. Unlike all other action alternatives, motorized access (quad and motorcycle) would be provided to the top of the middle butte. The overall trail miles for this alternative are shown in Tables 23 and 24 (see also Map 8).

Key recreation elements of this alternative include:

- One OHV route to the top of the middle butte, via the Communication Site ROW Road
- A pedestrian only trail loop on the east face of the Buttes.
- The Maston Area has separate mountain bike and equestrian loop trails
- Pedestrian trails in the Maston Area include those on the river as well as a pedestrian only loop in the northeast portion of the area
- The red cinder road (ROW 21) at the north end of the Maston Area would be open to general public motor vehicle use, with a small trailhead provided near the canyon rim
- The non-County portion of Newcomb Road would be closed to general public vehicle use
- A mountain bike trail would pass through the core area of the Tumalo Canal ACEC, on a newly developed single-track route through rocky areas
- No OHV use would be provided for south of the CEC power line
- Dry Canyon and Fryrear Canyon south of CEC power line would be for equestrian and hiking use only.
- The largest mileage of equestrian trails (equestrian and hiking only) would occur in this alternative, with many loops located south of CEC power line and west of Barr Road.
- Technical jeep trails would be provided west and south of the existing Barr Road Cinder pit, and in a portion of Deep Canyon south of State Highway 126 and north of the Deschutes County Transfer Station.
- OHV trails in Deep Canyon and along Jordan Road would be seasonally closed to all uses.
- A portion of the equestrian trail system near Jordan Road would be seasonally closed
- Deep Canyon north of State Highway 126 is part of the OHV trail system.
- All trailheads would be closed to camping use.

Trailheads and Access

In this alternative, all trailheads would be closed to camping. The Buttes East trailhead would provide access for OHVs using a trail route to the top of the middle butte. This alternative would have a small parking area/trailhead (Riverwest) located at the east end of the red cinder road (ROW 21), to provide nearby access to the Deschutes River trail on the west side of the river (see Table 19).

Table 19: Trailheads Specific to Alternative 4

Trailhead	Allowed Use	Capacity	Restroom	Surface Type	Overnight Use or Camping	Picnic or Group Use Area	Area Served or Other Features
Riverwest	Pedestrian	5 SV	N	Gravel	N	N	Maston, Deschutes River
Sabrina (McKenzie Canyon)	Equestrian Pedestrian	5 SV 5 TR	N	Gravel	N	N	North of State Highway 126

Table 20: Alternative 4 Motorized Use Trail Miles by Area

Trail Type	Maston Plateau	Buttes Area	North of Hwy 126	South of Hwy 126	West of Fryrear	Total CBRA
All Motor	0	0	20.5	29.4	0	49.9
Class I and III		1.07	15.1	10.6		26.8
Class III only		0	7.8	6.3		14.1
Class I Total		1.07	35.6	40		76.7
Class II Total		0	20.5	29.4		50
Class III Total		1.07	43.4	46.3		90.8
CBRA Total		1.07	43.4	46.3		90.8
Class I (quads), Class II (full width/jeeps), Class III (motorcycles)						

OHV Use

Alternative 4 provides slightly fewer OHV trail miles than the other action alternatives. This slight reduction in miles occurs in a system that is much more compact and less dispersed than the other action alternatives. OHV use is limited to the CBRA north of the large CEC powerline (ORE 012676). There is generally a greater amount of OHV use proposed in Deep Canyon than other action alternatives. Most of the deep canyon routes would be closed seasonally to all uses.

Non-motorized Trail Use

Like the other action alternatives, the Maston Area would provide separate equestrian and mountain bike trail loops. The equestrian trails rely mostly on existing roads and power line corridors in this alternative. Mountain bike trails would rely more on the existing relic canal system. Compared to other alternatives, there would be several additional miles of pedestrian only trail in the Maston Area. This trail would include a loop using new trail and existing single-track trail in the northeastern portion of the Maston area.

Alternative 4 has the largest mileage of equestrian trails of all action alternatives, with approximately 50 miles of equestrian only trails between Barr Road and Fryrear Road. Like Alternative 3, mountain bike use would be limited to the Maston and Buttes areas.

Unlike all other action alternatives, Alternative 4 would provide for pedestrian-only trails on the east face of the buttes and also along the eastern edge of the CBRA, north of State Highway 126. The pedestrian-only trails on the buttes are intended to provide moderately challenging terrain and views with little trail sharing between pedestrian and equestrians/mountain bikers. The pedestrian trails north of State Highway 126 are intended to serve as a collector trail for the various residents adjacent to the CBRA who may wish to access this trail and the multiple use, shared trail system further west.

Table 21: Alternative 4 Non-Motorized Use Trail Miles by Area[1]

Trail Type	Maston Plateau[2]	Buttes Area	North of Hwy 126	South of Hwy 126	West of Fryrear	Total CBRA
Horse	11.4	10.6	9.2	45.9	3	80.1
Bike	10.6	21.1	0	0.2	0	31.9
Pedestrian	7.8	15.6	2.3	0.7	0	26.4
Parallel	0	1.2	0	0	0	1.2
Non-motor	1.7	1.8	0.6	0.1	0	4.2
Public Road	0.19	0.05	0.05	0.15	0	0.44
Horse Total	13.3	13.6	9.8	46	3	85.7
Bike Total	12.5	24.1	0.6	0.4	0	37.6
Pedestrian Total[3]	31.7	50.3	12.1	47.1	3	144.2

[1]Trails miles do not include any of the OHV trail system, which is open to all non-motorized use.
[2]Maston Plateau includes trail miles on Harper Road parcel.
[3]Pedestrian total includes all non-motorized use trail miles, although pedestrians can also travel cross country as well. Does not include developed trails on private property (i.e. Destination resorts) or regularly used routes on private land (e.g., Deschutes River Trail).

Sharing between motorized and non-motorized uses
For Alternative 4, the area designated as "Multiple Use Shared Facilities" (UDRMP, 2005) would have approximately 100 miles (non-motorized trail total minus 6 miles of pedestrian trails in Tumalo Canal ACEC core area) of non-motorized trail, and 89.5 miles of motorized use trails. This constitutes approximately 47 percent of the trails being shared routes available for both motorized and non-motorized uses.

Sharing among motorized uses
Approximately 55% of the motorized use trail system would be shared by Class I, II, and III vehicles. Approximately 29% would be shared between motorcycles (Class III) and Quads (Class I). Fifteen percent of the system would be single-track trails for motorcycles.

Sharing among non-motorized uses
Approximately 7 percent of total trail miles for equestrians would be shared with mountain bikes. Approximately 15 percent of total trail miles for mountain bikes would be shared with equestrians. Approximately 18 percent of the non-motorized system would be for pedestrians.

2.3 Description of Alternatives for Transportation

The transportation system includes all designated road and trails in the CBRA. The specific locations, recreation uses and standards for trails are discussed in the Recreation section of this EA. The following section provides a description of the transportation system as it relates to roads used for administrative use and the overall character of the transportation system, including miles of new route construction, decommissioning of routes and maintenance levels. This section also includes a comparison of these alternatives.

Alternative 1: No Action

Alternative 1 provides no designated transportation system other than the 164 miles of OHV trails designated in the UDRMP and the various ROW roads in the CBRA. As described in Chapter 3 of this document, the majority of the ROW roads are open to public motorized use.

The combination of ROWs and UDRMP motorized trail system provides for the majority of administrative access needs in the CBRA. There are some additional non-ROW roads that have been identified by BLM as routes used for patrol or fire suppression purposes.

Routes identified in the UDRMP motorized trail system (that are not ROWs) have a maintenance intensity level 1 applied to them, meaning they are designated routes, but would receive low maintenance, only sufficient for resource protection. About the same amount of existing routes would have no maintenance standards, as they are not part of a designated system. Approximately 63 miles of routes are maintained by ROW Holders (see Figure 2).

Elements Common to All Action Alternatives

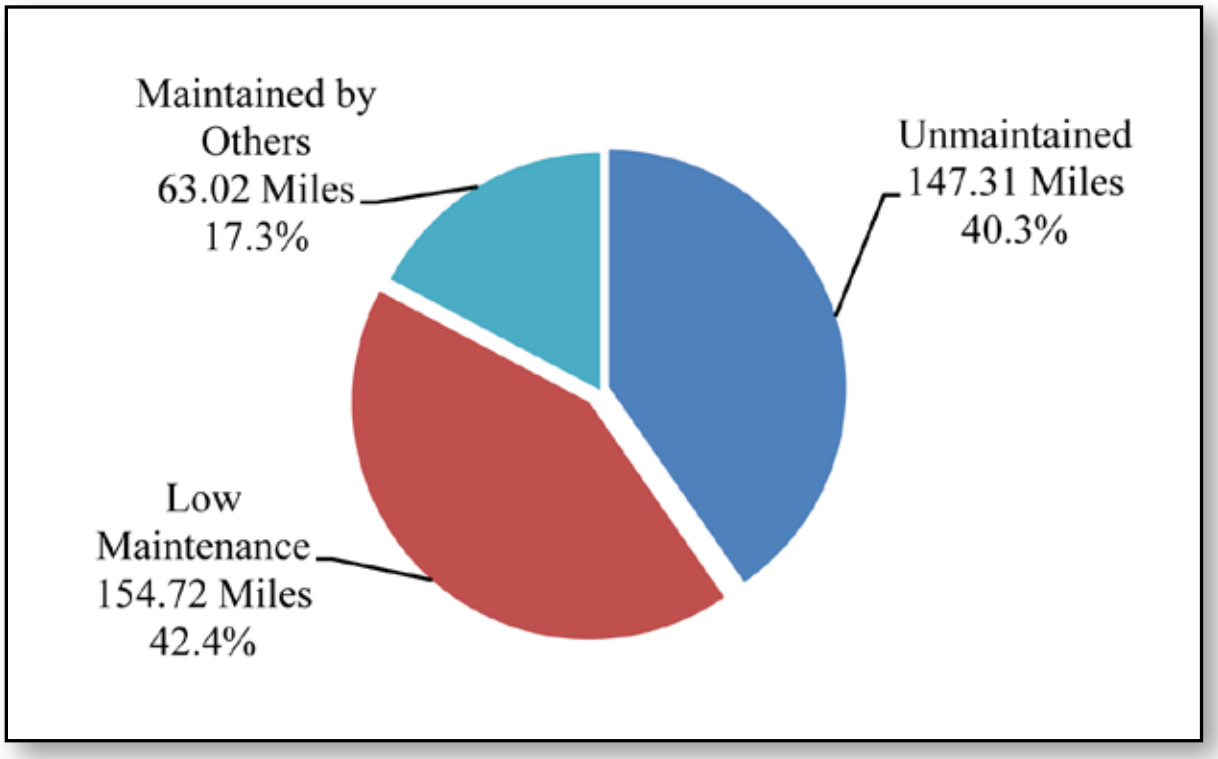
Administrative Access

All alternatives use a similar network of routes to meet administrative access needs. This system would be composed of All-motor OHV trails, all ROWs, and roads identified as limited use roads. In some cases, existing roads would be retained to provide for administrative access and would not be part of an OHV or non-motorized trail system.

All action alternatives would use a combination of ROW roads and power line ROWs as the administrative road network in the Maston Area.

All action alternatives would retain several existing unimproved roads for administrative use between Barr Road and Thornburgh Resort.

Figure 2: Maintenance Levels - Alternative 1



All action alternatives would provide an administrative access road and locked gate from the southernmost ROW road entrance into Thornburgh Resort (aka Bennett Road), to provide access into the Tumalo Canal ACEC from Cline Falls Highway.

New Administrative Route Construction
All alternatives identify a limited amount of new road construction to retain or create administrative access into areas where access is limited or blocked by private property. In all cases, BLM would seek easements that maintain access as a first option, before constructing any new roads. Parcels where acquisitions of easements are a priority includes Parcel 35 (Sage Ranch Road), Parcels 40 and 41 (Deep Canyon), Parcel 48 (Buckhorn Canyon), and Parcel 28. In addition, administrative access for trail maintenance and patrol may increasingly be done with the use of quads or similar vehicles. New administrative routes common to all action alternatives include:

- A road that provides access into Buckhorn Canyon. Alternative 2 and 4 provides for a short route (1,000 feet of new construction) from ROW 4 around the east side of Parcel 48). This route would provide access into Buckhorn Canyon for administrative use. Alternatives 3 provides for a similar route (3,000 feet of new construction) from the north end of the canyon, adjacent to parcel 51.
- A road that provides access into the CBRA from Fryrear Road. This short (1,300 feet) route would provide a connection from Fryrear Road to the existing CEC power line corridor and provide access into the Fryrear and Dry Canyon area.

Intersection Location/Approach Permits
All action alternatives have selected trailhead and new or amended ROW roads at locations that have been reviewed by ODOT and/or Deschutes County Road Department. These access points and road/trail systems are shown for each alternative on Maps 6 - 8. All Action alternatives reduce the number of motorized access points used by the general public from State Highway 126, and move intersections for ROW roads to the east, away from Deep Canyon and the passing lanes on State Highway 126.

Route Decommissioning
All action alternatives include similar levels of route decommissioning, at similar levels of intensity, as shown in Table 22.

Undesignated routes to be decommissioned in each alternative were identified as High, Medium or Low intensity decommissioning. The definitions of the decommissioning categories and how they were applied to CBRA routes are as follows.

High Decommissioning
High decommissioning may include ripping and recontouring, seeding, scattering slash, and use of berms, boulders, or fences and signs. Targeted routes would include:

- routes adjacent to, and within 1/8 mile of public roads (State Roads, County Roads, and ROW roads open to motorized use by the general public); and
- routes within sensitive wildlife areas (e.g., within ½ mile of raptor nest sites).

Moderate Decommissioning
Moderate decommissioning may include raking or light scarification, minimal recontouring, scattering slash, seeding and signs. Targeted routes would include:

- routes within the interior portions of the CBRA that have designated motorized/shared use trails in them (i.e., west of Barr Road, East of Cline Falls Highway, and north of State Highway 126).

Low Decommissioning

Low decommissioning may include scattering slash, signs, and possibly seeding. Targeted routes would include:

- routes within the non-motorized use areas which are not adjacent to public roads (as defined in "High," above).

Route Maintenance

Maintenance levels are similarly applied for all action alternatives. All action alternatives apply a High Maintenance level (5) only for trailhead access roads. Routes that provide both OHV use and administrative access receive a moderate maintenance level (3), while routes that receive non-motorized use only generally receive a low maintenance level, unless they occur on steep slopes. Maintenance levels are shown below for Alternative 2 (Figure 3). Alternative 4 includes greater mileage of roads maintained to a high level by BLM, a result of the use of several ROW roads for trailhead access (see discussion of ROWs in this Chapter).

Table 22: Route Decommissioning (Miles) by Intensity

	High	Medium	Low	Total Decommissioned	Existing Routes not Decommissioned[1]
Alternative 1	0	0	0	0	340
Alternative 2	33.3	9.3	158.3	200.9	138.3
Alternative 3	31.5	9.7	150.3	191.5	147.79
Alternative 4	31.4	7.8	148.2	187.2	152

[1]"Routes not decommissioned" does not include State or County Roads or new routes constructed in each Alternative.

Alternative 2

Differences in the transportation system for Alternative 2 include:

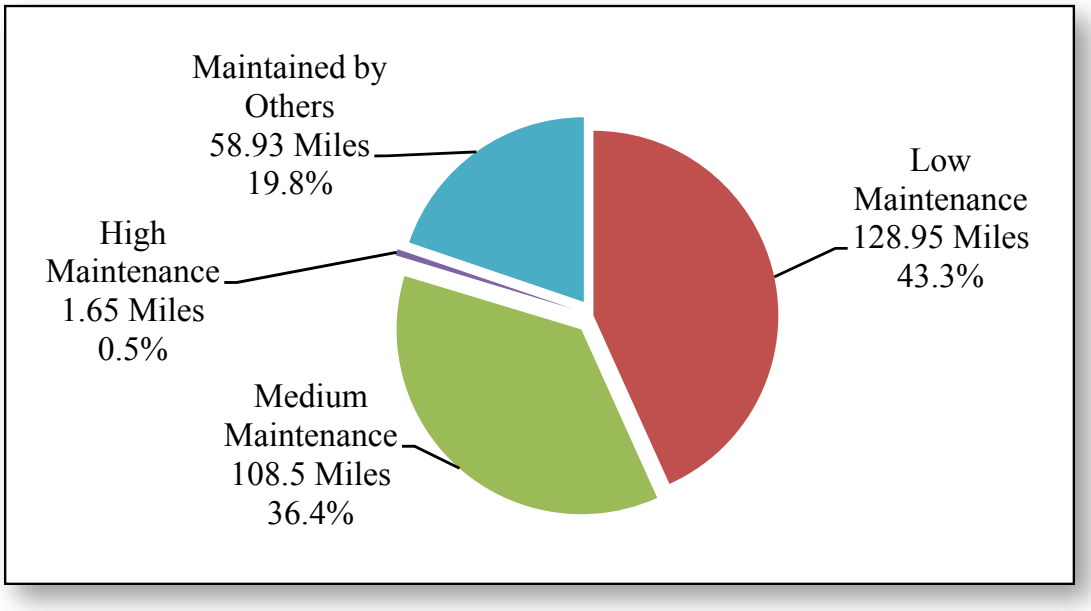
- Slightly fewer administrative road miles in the Maston area, due to decommissioning of one road that bisects the area north-south, beginning at the Newcomb Road ROW. This road is parallel to, and between, the two existing power line roads in the Maston area.
- Administrative access into the southwest portion of the CBRA would use the existing ROW roads 32 and 31 and a portion of the existing road that would be retained as a non-motorized trail.
- BLM would retain a portion of an existing unimproved road at the end of ROW road 7 at the northeast end of the CBRA, east of Buckhorn Road for administrative access.
- Fewer administrative roads into the Deep Canyon area north of State Highway 126. Access into this area with a full size vehicle would be dependent on travel through private property.
- A locked gate is provided on the north side of McConnell Road for administrative access into the Tumalo Canal ACEC area.
- ROW roads connect to State Highway 126 at Deep Canyon, dependent on authorization from ODOT.

Table 23: Alternative 2 Transportation System Construction, Use, and Decommissioning (Miles)

Area	Proposed Roads and Trails (Total)	New Construction	Existing Routes Retained[2]	Existing Routes Decommissioned
Maston	36.6	8.3 (23%)[1]	28.3 (77%)	24.8
Buttes	66.6	36.2 (54%)	30.4 (46%)	41.8
North of Hwy 126	64.6	34.1 (54%)	30.5 (47%)	43.8
South of Hwy 126, West of Barr Road	100	50 (50%)	50 (50%)	87.2
West of Fryrear Road	3	2.7 (90%)	0.3 (10%)	3.3
Total	271	131 (48%)	139 (51%)	201

[1]Percent of total proposed road and trail miles.
[2]Does not include State and County road miles.

Figure 3: Maintenance Levels - Alternative 2



Alternative 3

- Differences in the transportation system for Alternative 3 include:
- Greater amount of administrative roads in south end of the Maston Area.
- Greater amount of administrative road access into the southwestern portion of the CBRA using a newly granted ROW road, and an existing road converted to an equestrian trail (formerly ROW road 31).
- Administrative access into the northeastern portion of the CBRA would be limited to existing ROW roads.
- Greater administrative access into the area north of State Highway 126 through construction of a new ROW road that bisects the area east of Deep Canyon.
- ROW roads for private property access to State Highway 126 are located east of Deep Canyon.

Table 24: Alternative 3 Transportation System Construction, Use, and Decommissioning (Miles)

Area	Proposed Roads and Trails (Total)	New Construction	Existing Routes Retained[2]	Existing Routes Decommissioned
Maston	41	9.4 (23%)[1]	31.6 (77%)	21.4
Buttes	64.9	34.3 (53%)	30.6 (47%)	41.5
North of Hwy 126	63.4	34.3 (53%)	31.5 (50%)	42.7
South of Hwy 126, West of Barr Road	101.6	46.8 (46%)	54.8 (54%)	82.4
West of Fryrear Road	3	2.7 (90%)	0.3 (10%)	3.3
Total	273.9	125 (46%)	149 (54%)	191.3

[1]Percent of total proposed road and trail miles.
[2]Does not include State and County road miles.

Alternative 4

Differences in the transportation system for Alternative 4 include:

- Slightly less administrative road miles in the Maston area, due to decommissioning of one road that bisects the area north-south, beginning at the Newcomb Road ROW.
- Administrative access into the southwest portion of the CBRA would use a new ROW road from Plainview Road and the existing ROW Road 31 (see Map 10).
- Fewer administrative roads into the Deep Canyon area north of State Highway 126. Access into this area with a full size vehicle would be dependent on travel through private property.
- ROW roads connect to State Highway 126 at Deep Canyon, dependent on authorization from ODOT.

Table 25: Alternative 4 Transportation System Construction, Use, and Decommissioning (Miles)

Area	Proposed Roads and Trails (Total)	New Construction	Existing Routes Retained[2]	Existing Routes Decommissioned
Maston	39.5	8.2 (21%)	31.3 (79%)	21.8
Buttes	64.7	35 (54%)	29.7 (46%)	42.5
North of Hwy 126	68.4	36.7 (54%)	31.7 (46%)	42.6
South of Hwy 126, West of Barr Road	105.1	44.9 (43%)	60.2 (57%)	77
West of Fryrear Road	3	2.7 (90%)	0.3 (10%)	3.3
Total	280.8	127.7 (45%)	153.1 (54%)	187.2

[1]Percent of total proposed road and trail miles.
[2]Does not include State and County road miles.

2.4 Description of Alternatives for Right of Way Grants

Alternative 1: No Action

New right of way (ROW) grants would not be authorized in this alternative. Road and utility ROWs would remain in their present location and condition as shown in Map 5 and described in Chapter 3. New ROW requests would be considered on a case by case basis as requested over time. Key characteristics for ROWs in Alternative 1 include:

- 45.94 Miles of existing Road ROWs, including state and county roads
- 18.69 miles of road ROWs for private property access across the CBRA
  - 5.86 miles (31 percent) of these road ROWs are not open to motor vehicle use by the general public
- Approximately 16 parcels within or adjacent to CBRA that have unmet access needs
  - Approximately 7 of these parcels have improved roads without BLM ROW grants.

Elements Common to All Action Alternatives

Unless otherwise noted, all ROW roads (either specific grants or future ROW corridors) considered in this EA would have the following characteristics:

- ROW width: Maximum of 20 feet (this is the width of the corridor in which a road would be allowed).
- ROW Road surface type: Cinders, gravel or native surface.
- Utility Line pole structure: For ROW grants that include utilities as noted in this EA, all electrical distribution lines would be aboveground, with wood poles (typical pole height above ground of 50 feet).
- Buried utilities within road ROWs would be encouraged, but not required.
- All existing and proposed ROWs would be available for administrative use.
- All new ROW roads would be constructed to BLM specifications, at the applicants cost.
- Any ROWs identified for decommissioning would be done to BLM specifications.

Specific ROW Grants (new or amended)
The following ROW actions are common to all Action Alternatives and include the following categories:

- New ROW grants for road and utility access in cases where specific applications have been received by BLM from private landowners.
- Identification of proposed ROW corridors for parcels that are likely to need legal access through BLM administered lands, but whose owners have not made application for a ROW. This also includes the identification of proposed ROW corridors for parcels that have improved road access through BLM administered lands without prior ROW grants (if the subject properties have no other access outside of the CBRA).
- An amendment to existing ROW grants that change the road alignment, allowable road surface type or ROW width.

ROW decisions common to all alternatives are described below and shown Table 26, ROW Grant Actions Common to Alternatives 2-4 and on Map 9. Amendments to existing ROW grants are identified by ROW Serial Number. New ROW grants or proposed corridors are identified by the parcels that they serve. Specific tax lots can be identified on maps in this EA by referring to Table 27, Tax Lot and Parcel Map Numbers.

Table 26: ROW Grant Actions Common to Alternatives 2-4

Property Location (Map Number)	New (N) or Amended (A) ROW	Existing ROW Serial Number	ROW length	ROW width	Max. Road Width	Surface Type	Utilities Included	Public Motorized Use Allowed	Maintenance Responsibility	Property Location (Map Number)
48	T 15 S, R 11 E, SE ¼ of Section 1	N	Co-located with ROW OR 45930	20 feet	1,200 ft	20	Agg	Yes	Yes	Row Holder
56	T 15 S, R 12 E, SE ¼ of Section 16	A	OR-50410	40 feet	1.8 mile	30 feet	Paved	No	Yes	Row Holder
27	T 16 S, R 11 E, SW ¼ of Section 10	A	OR-52520	30 feet	Reroute of 600 ft	20	Agg	No	varies by alternative	Row Holder
7	T 15 S, R 12 E, N ½ Section 25	A	OR-45975	25	Reroute of 700 ft	25 feet	Agg	No	varies by alternative	First 700 ft is BLM, rest varies by alternative

Agg = Aggregate (Gravel or Cinders)

Table 27: Tax Lot and Parcel Map Numbers

Parcel Map Number	Tax Lot Number	Address	Parcel Size (acres) /Notes
1	1512220000301	2902 SW Cline Falls Road	4.98 ac
2	1512220000302	3008 SW Cline Falls Road	9.31 ac
3	Multiple lots		Multiple parcels
4	1512240000204		9.82
5	1512240000500		0.34
6	151223D001300	7107 SW Wickiup Avenue	10.08
7	1512250000400	67406 Cline Falls Road	13.10
8	1512250001400		1.48
9	1512250001700		1.58
10	1512250001800		1.50
11	151236B003800	4655 SW Loma Linda Drive	6.43
12	151236B003700	5071 SW Loma Linda Drive	38.13
13	151236B003600		8.85 (County)
14	151236B004000	4695 SW Loma Linda Drive	5.99
15	151235D000500	66800 Cline Falls Road	23.67
16	151236B004200	4853 SW Loma Linda Drive	0.07
17	161202C000300	21200 Newcomb Road	4.01
18	161202C000400	7397 SW McVey Avenue	1.25
19	1611010000300		63.25 (County)
20	1611000000601	19200 Dusty Loop	79.75
21	1611120000401	19317 Dusty Loop	20.43
22	1611120000400	19345 Dusty Loop	20.67
23	1611120000501	19225 Dusty Loop	9.48
24	1611120000700	19265 Dusty Loop	10.09
25	1611120000600	19275 Dusty Loop	10
26	1611120000500	19285 Dusty Loop	10

Parcel Map Number	Tax Lot Number	Address	Parcel Size (acres) /Notes
27	1611100000300	18485 Snow Creek Lane	105.8
28	1511000006500		39.9
29	1511000006200	66950 Dusty Dirt Rd	90.2
30	1511000006202	66990 Dusty Dirt Rd	9.9
31	1511000006203	66970 Dusty Dirt Road	39.8
32	1511000006201	66980 Dusty Dirt Road	60
33	1511000005900 1511000005901 1511000005902	67200 Sage Ranch Road 67300 Sage Ranch Road 67190 Sage Ranch Road	116.36 80.86 118.15
34	1511000006000		163.3
35	1511280001100	67288 Fryrear Road	6.74
36	1511170000700		157.14 (County)
37	1511000003000		8.53 / State
38	1511000002400	68200 Fryrear Road	10.39 (County) transfer station
39	1511000002600	19419 W Hwy 126	158.08
40	1511000001000	18525 Hwy 126	150.22 / parcel split by hwy 126
41	1511000000900		93.83 / parcel split by hwy 126
42	1511000000700	18700 Hwy 126	41.10
43	1411330000202	69580 Holmes Road	13.75
44	1411330000203	69550 Holmes Road	12.84
45	1511000000501		17.50
46	1511000000500		2.97 (County)
47	1511000000503		16.60
48	1511000000300	19580 W Hwy 126	80.66
49	1411000006302	19570 W Hwy 126	559.99
50	1412000003502 1412000003201 1411000006300 1411000006400		81.53 80.93 79.64 80.08
51	1412000003700 1412000003800	69515 Buckhorn Road	79.99
52	1512000001400	11900 Eagle Crest Blvd	79.24
53	Multiple lots		Thornburg Resort
54	Multiple lots - DSL		160
55	1512000005300		162.97 / State
56	1512000004701 1512000004700		167.54 / Cline Buttes Rock Pit 1.0
57	Multiple lots		Eagle Crest 3
58	Multiple lots		Eagle Crest 2
59	Multiple lots		Eagle Crest 1
60	151215A001600		4.7
61	1512000008200		77.76 (County)

New ROW Grants

Parcel 48

A new ROW grant would be issued for access to this 80 acre parcel, located north of State Highway 126, using the first 1,200 feet of the existing ROW road (ROW 4, Map 5) that provides access to parcel 49. No changes to the road alignment, width or ROW width would occur.

Amendment of Existing ROWs

ROW OR-50410 (Map ID No. 15)

The existing ROW 15 road that provides access to the Cline Buttes Rock Pit (Parcel 56) would be amended to allow asphalt paving by the ROW holder. This road also provides access to the Buttes Trailhead. The ROW would change from a 40 foot to 50 foot ROW width. The paved road width would be at the present width, up to 24 feet wide to allow for 2 direction traffic. A directional sign would also be permitted at the intersection of Cline Falls Highway and the ROW road. This sign may also include entry information for the Juniper Trailhead and Buttes Trailheads. Road design and construction would conform to AASHTO Guidelines for Geometric Design and AASHTO Guide for Design of Pavement Structures. As part of mitigation criteria for paving ROW road 15, surface erosion control measures would be incorporated into the road design to avoid increase in surface erosion damage to BLM administered lands. This may also include surface runoff control measures being installed at the boundary of the Cline Buttes Rock Pit and BLM administered lands. The road alignment would remain at the present location (See Map 9).

ROW OR-52520 (Map ID No. 32)

All action alternatives require rerouting of portion of ROW 32 at Innes Market Road and State Highway 20. This ROW provides legal access to parcel 27 and casual use access to Parcels 28-30. Approximately 300 feet of road would be decommissioned and 600 feet of new road constructed to provide a safer intersection at Innes Market Road. BLM is responsible for this work in Alternatives 2 and 4, while the new ROW holder is responsible for this work in Alternative 3.

ROW OR-45975 (Map ID No. 21)

All Action Alternatives require rerouting of portion of ROW 21 (red cinder road) at the intersection of Cline Falls Highway. This ROW road provides legal access to Parcels 7 and 12. For all Action Alternatives, the realignment of the ROW road adjacent to Cline Falls Highway would be the responsibility of BLM and done as part of the Juniper Trailhead development. This action would close a small portion (500 ft) of the existing ROW road once the trailhead is developed and reroute ROW traffic to the new intersection at Cline Falls Highway opposite the Cline Buttes Rock Pit Road.

ROW Corridors for Future Use

Alternatives 2-4 include approximately 4.4 miles of ROW corridors (routes that can serve as future ROWs if/when they are requested). The majority of these corridors are located on existing roads or ROWs. These corridors include existing improved roads that currently provide access to developed parcels. Locations that do not have existing roads, but may be authorized in the future to serve parcels as they are developed (if no other legal access is available). The ROW corridor serving a portion of 83rd Street (See Map 9, parcel 3) is designated for future paving, all other ROW corridors are identified for native surface, cinder or gravel surfacing. These actions are shown on Map 9 and described in Table 28. More information on ROW needs and existing conditions is found in Appendix 2.

Table 28: Future ROW Corridors Common to Alternatives 2 – 4

Parcel No.	Property Location	New (N) or Amended (A) ROW	Existing route condition	ROW Length (Feet)	ROW Width (Feet)	Max Road Width	Surface Type	Utilities Included	Public Motorized Use Allowed	Maintenance Responsibility
2	T 15 S, R 12 E, SE ¼ Sec 22 3008 SW Cline Falls Highway	N	Improved road	200	20	14	Agg	No	Yes	ROW Holder
1	T 15 S, R 12 E, SE ¼ Sec 22 2092 SW Cline Falls Highway	N	Improved road	125	20	14	Agg	No	Yes	ROW Holder
3	T 15 S, R 12 E, Sec 23 83rd	N	Improved road	500	50	24	Agg	No	Yes	ROW Holder
21	T 16 S, R 11 E, Sec 12 19317 Dusty Loop	N	Improved road	230	20	14	Agg	No	Yes	ROW Holder
26	T 16 S, R 11 E, Sec 12 19285 Dusty Loop	N	Improved road	200	20	14	Agg	No	Yes	ROW Holder
23 25	T 16 S, R 11 E, Sec 12 19225 Dusty Loop, 19275 Dusty Loop	N	Improved road	150	20	14	Agg	No	Yes	ROW Holder
24	T 16 S, R 11 E, Sec. 12 19265 Dusty Loop	N	Improved road	150	20		Agg	No	Yes	ROW Holder
43	T 14 S, R 11 E, Sec 33 69580 Holmes Road	N	Improved road	Decommission Road, legal access to property at Holmes Road – Maintenance Intensity Level 0 Access off Holmes Road using private land						
44	T 14 S, R 11 E, Sec 33 69550 Holmes Road	N	Improved road	Decommission Road, legal access to property from Holmes Road - Maintenance Intensity Level 0 Access off Holmes Road using private land						
34	T 15 S, R 11 E, Section 24 and 25	N	Un-improved route	2.5 mi.	20	14	Agg	No	No	ROW Holder
61	T 15 S, R 12 E, Sec. 32	N	No existing route	1,340 ft	20	14	Agg	No	No	ROW Holder
19	T 16 S, R 12 E, Sec. 1	N	No existing route	1,300 ft	20	14	Agg	No	No	ROW Holder
54	T 15 S, R 12 E, Sec. 17	N (co-located)	Un-improved route	4,750 ft	20	14	native surface	No	No	ROW Holder
13	T 15 S, R 12 E, Sec 25	N	No existing route	1,325 ft	20	14	Agg	No	No	ROW Holder

Alternative 2

The following ROW actions are specific to Alternative 2. These include new and amended ROW grants. Alternative 2 includes a total of 29.6 miles of existing and proposed road ROWs (not including state or county roads). Of this total, approximately 24 miles (83 percent) are not available for motorized use by the general public. Alternative 2 has approximately 0.6 miles of new road ROWs (see Table 29). All ROW grants, ROW corridors, and other ROW actions for this alternative are depicted on Maps 9 – 12.

Retain and Construct Existing ROW

ROW OR-45603 (Map ID No. 31)

In Alternative 2, the existing ROW 31 to parcels 28-32 is retained (see Map 10). However, the southern portion of this ROW road was never constructed. The casual use route used to access these parcels from State Highway 20/Innes Market Road would be closed at the north end of ROW road 32 with an administrative access gate.

The use of the existing ROW for property access would require the construction of approximately ½ mile of road that was previously authorized in the original ROW grant.

ROW OR 45930 (Map ID No. 4)

The existing ROW for access to parcel 49 would be retained; however, if continued access across the intervening private parcel 48 is denied, the ROW would be amended to allow use of an alternate route. This would include a short stretch of use on the existing, administrative route shown in Map 11, which connects to the existing ROW 4. The ROW amendment would be dependent on relinquishment of the remainder of ROW 4 between the new route and Parcel 48.

New ROW Grants

Parcels 42 and 41 (north of State Highway 126)

Alternative 2 grants a ROW for road and utility access for both these parcels at the existing intersection with State Highway 126 at M.P. 100.37 (See Map 11). The ROW grant for both parcels would be dependent on an approved approach permit from ODOT. The ROW grant for parcel 42 (40 acre) would be dependent on a permanent deeded easement through the intervening parcel 41 (91.66 acre).

ROW Corridors for Future Authorization

Parcel 39

Alternative 2 (and Alternative 3) identify the specific route and characteristics of a ROW corridor to provide legal access to the 160 acre parcel 39 (see Map 11). Approximately 85% of this one mile ROW is an existing gravel road. The approved ROW corridor would require new construction of approximately 700 – 800 feet of road, at its northern connection to State Highway 126.

Parcels 40 and 41 (south of State Highway 126)

For Alternatives 2 and 4, road ROWs to these parcels located at Deep Canyon south of State Highway 126 occur at or near the existing metal gate located at the bottom of Deep Canyon (see Map 11). The location of the existing metal gate would be shifted slightly (approximately 200 feet) to the east.

This access point would be gated to prohibit general public access of any kind. From this location, an existing road (the relic highway grade) that parallels the south side of the State Highway is used to access both parcels. The ROW road to parcel 40 would occur along 600 feet of existing road that would be improved. The ROW road to parcel 41 south of State Highway 126 would occur along 1,400 feet of existing route that would be improved.

Change in ROW Road Maintenance Responsibility

ROW OR-19460 (Map Id No. 24/38)

Under Alternative 2, BLM would assume maintenance responsibility for approximately 1.1 miles of this ROW, from the end of the County maintained Newcomb Road east to a small parking area and gate location near the Deschutes River Canyon (see Map 9). This is about 50% of the total mileage of this ROW road.

TABLE 29: ALTERNATIVE 2 ROW GRANTS

Property Location (Map Number)	New (N), Amended (A), or Existing (E) ROW	Existing ROW Serial Number	ROW length	ROW width	Max. Road Width	Surface Type	Utilities Included	Public Motorized Use Allowed	Maintenance Responsibility
28-32	E	OR 46053	2.7 mile	30 ft	20	Gravel	No	N	ROW Holders
41 (North of Hwy 126)	N	None	375 feet	30	20	Gravel	Yes	Yes	ROW Holder
42	N	None	4,250 feet (1,600 feet on private)	30	20	Gravel	Yes	No	ROW Holder

Alternative 3

In Alternative 3, BLM assumes no maintenance responsibility for ROW roads, because the following roads are closed to public motor vehicle use: 1) Newcomb Road ROW, Red Cinder Road ROW, and Communication Site Road ROW. Alternative 3 includes a total of 32 miles of existing and proposed road ROWs (not including state or county roads). Of this total, approximately 24 miles (75 percent) are not available for motorized use by the general public. Alternative 3 has approximately 5.6 miles of new road ROW (see Table 30), the greatest of all alternatives. This is mostly due to the road ROW identified for parcel 49. Much of the remaining miles of new road ROW in this alternative are based on existing roads. All ROW grants, ROW corridors, and other ROW actions for this alternative are depicted on Maps 9 - 12.

New ROW Grants

Parcels 28 - 32

Alternative 3 provides for a new road ROW from Innes Market Road to parcels 28-32. This new ROW would be granted upon relinquishment of the previously granted road ROW 31. The original ROW road would become an administrative road and non-motorized trail. The new ROW road would require improvement of 9,500 feet (1.8 miles) of existing road (see Map 10).

Due to the poor location of the existing road at the bottom of a small canyon/draw, the southern half (first mile) of the road would be gravel surface road, built to BLM specifications. The various property owners of parcels 27 – 32 are encouraged to form a homeowners association to share the costs of construction and/or maintenance of this ROW road.

Parcel 49

A new ROW would be granted for access to parcel 49 from State Highway 126, dependent upon relinquishment of the existing ROW OR 4 north of parcel 48. The new ROW road would involve construction of approximately 1.5 miles of new road between the proposed ROW to parcel 42 and parcel 49 (See Map 11) and decommissioning of approximately 0.8 miles of the original ROW road between parcels 48 and 49.

Parcels 42 and 41(portion of 41 north of State Highway 126)

Alternative 3 combines access for both these parcels north of State Highway 126, at a new intersection with State Highway 126 located about 1 ½ miles east of Deep Canyon. This intersection would be located directly north of the access point for parcel 39, and would be located east of the passing lanes and grades at Deep Canyon (see Map 12).

The ROW road would total approximately 8,270 feet, of which 4,673 feet would consist of improving existing routes and about 3,597 feet of new road construction. The ROW road would parallel State Highway 126 for approximately 2,241 feet, following the course of an existing unimproved road. The ROW would then include approximately 2,600 feet of new road construction, as the route heads north and descends a slope into Deep Canyon and connects to the southeast corner of parcel 42. From this point, approximately 900 feet of new road would be constructed along the southern property line of parcel 42 to connect with an existing unimproved road (2,500 feet) that links parcels 41 and 42. This road would be upgraded to serve as the legal access to parcel 41.

ROW Corridors for Future Authorization

Parcel 39

See the Alternative 2 description.

Parcels 40 and 41 (portion of 41 south of State Highway 126)

In Alternative 3, access to these parcels is accomplished by using the same access point on State Highway 126 used for access to parcel 39. For the portion of parcel 41 south of the State Highway, the ROW road would use an existing road and the relic highway grade that parallels the State Highway, for a distance of 4,600 feet. For parcel 40, the ROW road would include about 1,500 feet of new road construction, and then require improvements of about 1.2 miles of existing routes to connect with the new intersection approximately 1.3 miles east of Deep Canyon (see Map 12).

TABLE 30: ALTERNATIVE 3 ROW GRANTS

Property Location (Map Number)	New (N) or Amended (A) ROW	Existing ROW Serial Number	ROW length	ROW width	Max. Road Width	Surface Type	Utilities Included	Public Motorized Use Allowed	Maintenance Responsibility
28 - 32	N	A portion collocated with OR-46053	2.2 mi. (0.6 mi. shared with ROW 46053)	20	14 feet	Agg	No	N	ROW Holders
41 (North of Hwy 126)	N	None	8,270 ft	30	20	Agg	Yes	No	ROW Holders
42	N	None	4,848 ft	30	20	Agg	Yes	No	ROW Holders
49	N	OR 45930	1.5 miles	20	14	Agg	No	No	ROW Holders

Alternative 4

The following ROW actions are specific to Alternative 4. These include new ROW grants (in some cases dependent on relinquishment of existing, duplicate grants) and amended ROW grants. Alternative 4 includes a total of 29.1 miles of existing and proposed road ROWs (not including state or county roads). Of this total, approximately 22 miles (76 percent) are not available for motorized use by the general public. Alternative 4 has approximately 2 miles of new road ROW (see Table 31). All ROW grants, ROW corridors, and other ROW actions for this alternative are depicted on Maps 9 – 12.

ROW grants proposed for Alternative 4 are shown in Table 31. All ROW grants, ROW corridors, and other ROW actions for this alternative are depicted on Maps 9 – 12.

New ROW Grants

Parcels 28 - 32

Alternative 4 provides for a new road ROW (no utilities) from Plainview Road east to parcels 28-32. This new ROW would be granted upon relinquishment of the previously granted road ROW 31. The original ROW road would become an administrative road and non-motorized trail. The new ROW road would require construction of 3,050 feet (0.5 miles) of new road on BLM administered lands (see Map 10).

Parcels 41 and 42

The ROWs for these parcels north of State Highway 126 would be the same as Alternative 2

Parcel 49

The ROW grant would be amended to allow for construction of approximately 0.87 miles of new road directly adjacent to the south, west and north boundaries of parcel 48 to retain access to parcel 49 from State Highway 126. A ¼ mile section of the original road ROW immediately north of parcel 48 would be decommissioned as part of the ROW amendment (see Map 11).

ROW Corridors for Future Authorization

Parcel 39

Alternative 4 utilizes the same north-south route as Alternatives 2 and 3; however, it also uses a portion of the relic highway grade for approximately 2,300 feet east, then connects to the State Highway with a short segment (450 feet) of new road adjacent to the west side of parcel 45/46. This intersection location with State Highway 126 avoids the passing lanes and grades that occur east of Deep Canyon, and does not require travel through intervening private parcels to gain access to the State Highway (see Map 12).

Parcels 42 and 41 (north of State Highway 126)

The ROW roads for these parcels north of State Highway 126 would be the same as Alternative 2.

Parcels 40 and 41 (south of State Highway 126)

The ROW roads for these parcels south of State Highway 126 would be the same as Alternative 2.

Change in ROW Maintenance Responsibility

ROW 19460 (Map ID No. 24/38)

BLM would assume maintenance responsibility of a portion of this ROW road, as described in Alternative 2 (see Map 9).

ROW OR 45975/62871 (Map ID No. 21/22)

Under Alternative 4, BLM would assume maintenance responsibility for the majority of this ROW, which serves parcels 7 and 12. This responsibility would include the road (approximately 8,500 feet) from its intersection with Cline Falls Highway to the designated parking area near the Deschutes River Canyon (see Map 9).

ROW OR 50410 (Map ID No. 13)

Under Alternative 4, BLM would assume maintenance responsibility for the communications site ROW road. The portion maintained by BLM would consist of approximately 5,000 feet of road starting at the Cline Buttes Rock Pit Road up to the first turn-around located in a saddle approximately 300 feet south of the closest Communication facility (see Map 9).

TABLE 31: ROWS SPECIFIC TO ALTERNATIVE 4

Property Location (Map Number)	New (N) or Amended (A) ROW	Existing ROW Serial Number	ROW length	ROW width	Max. Road Width	Surface Type	Utilities Included	Public Motorized Use Allowed	Maintenance Responsibility
28 - 32	N	N/A	3,050 ft	20	14 feet	Agg	None	N	ROW Holders
49	A	OR 45930	0.87 miles	20	14 feet	Agg	None	N	ROW Holders
41 (North of Hwy 126)	N	Same as Alternative 2							
42	N	Same as Alternative 2							

2.5 Alternatives Considered but Eliminated from Detailed Study

Close the CBRA to Motorized Use

An issue was raised regarding the desire for a fully non-motorized recreation alternative. Travel management allocations regarding areas designated as Open, Closed, or Limited to motorized use were made in the UDRMP (ROD/RMP, Objective R-3, pg. 105, 106 and RMP Maps 3 and 13). Designating the CBRA as Closed to motorized use is therefore outside the scope of this implementation level EA. Providing no motorized trail opportunities in the CBRA would also be inconsistent with UDRMP direction for recreation management (ROD/RMP, Objective R-1, pg. 102-104, Allocation 2, Recreation Emphasis and Guideline 3; and Objective R-3, pg. 116, Allocations and Guidelines 1-4). Given this existing UDRMP direction, designating the CBRA closed to motorized travel was not considered by the team.

Eliminate Public Access to Mining Claim Areas

During the CBRA plan process, the mine owner for the Buckhorn mining operation requested that BLM close the entire 1,540 acre claim area to all motorized use or entry by the public, citing concerns regarding vandalism and contamination of the mineral source due to motor vehicle use (i.e., spilled oil, gas or antifreeze). Court decisions have upheld the BLM's ability to manage other surface resources (including recreational use) within unpatented mining claims, as long as those uses do not endanger or materially interfere with the miner's prospecting, mining, or processing operations or uses reasonably incident thereto within the claim.

This suggestion was not incorporated into any alternative, although alternatives do vary with regards to the number of trails and degree of access into the bottom of Buckhorn Canyon. These options were developed to address the mine operators concern over vandalism and to provide a reasonable range of alternatives for others who desired to have motor vehicle use eliminated from canyons CBRA wide.

In considering desires to close the 1,540 acre mine claim to motorized use, BLM recognized that the claims currently contain approximately 11 miles of publicly accessible motor vehicle routes, and are located in an area zoned for motorized trail use in the UDRMP (See Maps 3 and 13). All action alternatives provide for some level of motorized trail use in the area, and all limit motorized use to designated routes only, and from a limited number of trailheads. Based on an average route width of 8 feet for roads and 4 feet for trails, each alternative allows for motorized use on only 0.4 to 0.5% of the total mining claim area. The claimant has not identified how the potential use of 0.4 to 0.5% of the claim block will affect his ability to prospect, mine, or process the mineral deposits within the claim block. Within Buckhorn Canyon, all Action alternatives locate motorized/shared use trails at least ¾ of a mile or more away from the active 2 acre mine and processing site. Over the 21 year history of mining within the claim block the miner has never indicated an interest to expand his operation beyond the current 2 acre footprint.

Close Specific Areas to Motorized Use

A comment was made during the CBRA plan process to eliminate all motorized/shared use trails from the Peck's Milkvetch ACEC, from CBRA lands east of Barr Road, and from all Canyons located both north and south of State Highway 126. This proposal was not adopted as an alternative, because it did not meet the UDRMP direction for the motorized trail system to provide riding opportunities in a variety of terrain and take advantage of scenic opportunities (UDRMP pg. 116). The proposal would preclude motorized trails in all areas of high scenic quality as identified in the UDRMP visual resource inventory process, and in nearly all areas of challenging terrain (Deep Canyon, Dry Canyon, Buckhorn Canyon, the Buttes, and Fryrear Canyon). This comment was used in the development of alternatives, which vary considerably in the amount of motorized use in the southern portion of the CBRA (Pecks Milkvetch ACEC) and within the various canyons. Alternative 4 was developed specifically to preclude OHV trails from the majority of the Peck's Milkvetch ACEC; however, the prominent CEC powerline was chosen as the southernmost OHV trail route because it forms an easily noticeable and enforceable boundary as well as a continuous trail route back towards Barr Road and the major OHV trailhead while avoiding going near private property.

Chapter 3 - Affected Environment

This chapter details the baseline condition for each affected resource in the Cline Buttes planning area. It tells the public and decision maker what the present conditions are for each potentially affected resource.

3.0 Hydrology and Water Quality

The prominent feature within the project area is Cline Buttes, which rise more than 1,100 feet above the surrounding valley floor. Cline Buttes and the surrounding terrain are ryholitic lava flows with alluvial fan deposits around the base of the Butte (Oregon Department of Geology and Minerals, 2007).

The project area receives, on average, 8-12" of precipitation per year (Oregon Climate Service, 2007), with about 80% of that falling during the months of November through June. Due to the high infiltration rates of the soils and relatively low precipitation, all streams within the project area are ephemeral drainages, with the exception of the Deschutes River, which is perennial. The most prominent ephemeral drainages are Deep, Dry, and Buckhorn Canyons. McKenzie Canyon, which is an ephemeral stream in its natural state, is used for conveyance of irrigation water by Three Sisters Irrigation District during summer months. As a result, McKenzie Canyon now supports diverse riparian shrub species.

Stream miles on BLM administered lands within the project area include 2.0 miles of the Deschutes River, and 71 miles of ephemeral streams. In addition, there are approximately 14 miles of ditches and canals winding through the project area.

The Deschutes River is designated as a State Scenic Waterway within the project area. The classification for this stretch of river is Scenic River Area, and according to the river management plan (USDI, 1992) has a management goal to "preserve the area's scenic quality by ensuring that all new developments blend into the natural character of the surrounding landscape and preserve undeveloped character associated with agricultural use".

Water Quality

Section 303(d) of the Clean Water Act requires each State to identify rivers, streams, lakes, ponds, reservoirs, and wetlands for which existing required pollution controls are not stringent enough to achieve that State's water quality standards. These water bodies are considered "water quality limited" or "impaired." Once a water body is identified as being water quality limited, Section 303(d) requires the state to develop Total Maximum Daily Loads (TMDLs) for the impaired water body. TMDLs describe the amount of each pollutant a water body can receive and not violate water quality standards. The objective of the Clean Water Act (CWA) is to restore and maintain the physical, chemical and biological integrity of the Nation's waters (CWA 101(a)). To help implement these objectives, states develop and adopt water quality standards. Water quality standards include beneficial uses, narrative and numeric criteria, and antidegradation policies.

According to the Oregon Department of Environmental Quality (ODEQ), the Deschutes River within the project area does not meet water quality standards and is 303(d) listed on the 2004/2006 Integrated Report (ODEQ, 2007). This segment of the Deschutes River does not meet water quality standards for stream temperature, dissolved oxygen, and pH.

The Deschutes River within the project area does not meet water temperature criteria for two reasons. One is that wide, shallow storage reservoirs within the city of Bend have surface releases of warm water. The other condition resulting in the high water temperatures is the high width to depth ratios caused by removing 95% of the water volume for irrigation. These conditions promote water temperatures to be maintained near the ambient temperature. Since pH and dissolved oxygen are influenced by stream temperature, these two parameters are likely not meeting standards due to the high stream temperatures. (ODEQ, B. Lamb, pers. comm.).

Riparian Vegetation

The riparian areas adjacent to the Deschutes River within the project area represent only a small percentage of the total project area, but are important for the overall health of the system. A functioning riparian zone provides fish and wildlife habitat, protects water quality, stabilizes stream banks, aids groundwater recharge, assists in flood control, and provides visual esthetics and recreation opportunities. The existing shrubs and trees provide little shade for the 50-80 foot wide channel on the Middle Deschutes River within the project area. Low streamflow and the encroachment of western juniper (*Juniperus occidentalis*) reduce the amount and vigor of potential riparian vegetation adjacent to the Deschutes River on BLM administered lands. Over time encroachment of young western juniper on the river canyon sideslopes may result in reduced groundcover, more bare ground, reduced infiltration, and increased overland flow.

3.1 Special Status Plant Species & Peck's Milkvetch ACEC

At the present time, one special status plant is known to occur in the planning area: Peck's milkvetch (*Astragalus peckii*); it is a Bureau Sensitive species, endemic to Central Oregon and Klamath County.

An ongoing cooperative study between BLM, the Forest Service and Oregon Department of Agriculture is seeking to determine the effects of various disturbances on Peck's milkvetch. Results

are pending, but the species appears to tolerate some degree of disturbance. The greatest threats to this plant appear to include land development, major soil disturbance and lack of fire.

The Upper Deschutes RMP/ROD (2005) designated approximately 14,000 acres as Peck's Milkvetch Area of Critical Environmental Concern (ACEC), 10,000 acres of which is within the CBRA (see Map 2). Fourteen Peck's Milkvetch sites, totaling approximately 921 acres, are on BLM administered lands within this portion of the ACEC. The remaining three sites, totaling 46 acres, are on public lands within the CBRA but outside the ACEC. Repeated monitoring shows that the trend of all but one site is at least static. One small site, less than two acres in size, appears to be in a downward trend due to the increase of competing vegetation.

There are 706 acres of Peck's Milkvetch sites on BLM administered lands in the Tumalo Recreation Area, located southwest of the CBRA. The majority of these sites (617 acres) are within the non-CBRA portion of the ACEC. It is likely additional sites would be documented through implementation of this plan.

Pertinent allocations/allowable uses within the ACEC, as specified in the UDRMP/ROD, include:

- Fire Management – Unless life or property is threatened, vehicles are to stay on existing roads and fire lines are limited to hand lines. Prescribed fire is allowed.
- Vegetative Treatments – Treatments must be designed to maintain or enhance Peck's milkvetch habitat.
- Forest and Range Products – Generally not allowed unless in conjunction with restoration treatments or designed to enhance the ACEC's values.
- Recreation – Motorized, mechanized and pack stock (e.g., equestrian use) is limited to designated routes.
- Rights of way- New rights of way would be granted only if no other reasonable route is available.
- For administrative use, no motor vehicles are allowed off designated roads in the Pecks Milkvetch ACEC between March 1 and August 15.

3.2 Soils

Soils in the CBRA are formed over an olivine basalt flow of Miocene age covered with outwash alluvium overtopped with a sandy loam Mazama ash. Under the basalt cap flows are layers of semi- to well-consolidated sedimentary and tuffaceous rocks and tuff. These rock layers are visible in Deschutes, Deep and McKenzie canyons. Cline Buttes proper is a volcanic vent complex located in the center of the CBRA. The buttes and canyons provide the greatest topographic relief in the project area.

There are two soil moisture regimes for the CBRA, "aridic" and "xeric." Soil moisture primarily is a result of slope aspect, with north facing slopes having higher effective soil moisture than south facing slopes. The majority of the project area is aridic, which means dry effective moisture for growing vegetation. Xeric soil moisture regimes have higher effective soil moisture conditions and exist only on the north side of Cline Buttes. The soil temperature regime for the majority of the Cline Buttes project area is "mesic," which means warmer soil temperatures, with a longer growing season and soils in a dry condition for a longer period of time. In mesic areas snow cover is limited and exists for a shorter period of time than in "frigid" areas. North facing aspects have higher effective

moisture, which influences vegetation composition and production; and are generally more resilient to disturbance. South facing aspects and the flats surrounding the buttes have lower effective moisture content with dry soil moisture conditions and warmer soil temperatures, and are least resilient to disturbance. Surface organic matter content is low for the project area, generally below two percent. Surface textures are sandy loams south of Highway 126 and loams to the north. Loamy surface textures also occur on the plateau northwest of Deep Canyon and southeast of McKenzie Canyon. Loamy surface textures are more susceptible to rutting for native surface trails under moist and wet conditions. The coarsest sandy textures are on the north and northwest face of Cline Buttes. Soils with higher surface rock fragments, mostly cobbles and stones, are located in the canyons, the south aspects of Cline Buttes, and on flat shallow soil ridges surrounding the buttes.

Soil disturbance due to high road density is present in several areas surrounding Cline Buttes. These include areas adjacent to State Highway 126 and Barr Road, lands south of the buttes, and the eastern and northern side of the butte (see road density inset, Map 3).

3.3 Air Quality

The Clean Air Act requires the Environmental Protection Agency (EPA) to identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant.

The EPA identifies "non-attainment" areas where pollutants are above a threshold, and detrimental effects on human health and welfare could occur. Pollutants include sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, and particulate matter (PM). The air pollutant of most concern on BLM-administered land is PM, which may originate from fire (either natural or prescribed), road or windblown dust, and vehicle use. An area with PM greater than 10 microns in diameter is considered a non-attainment area. Over this threshold the pollutants are too small to be effectively filtered by the human respiratory system and much of it penetrates deep into the lungs. The major pollutant of concern in smoke from burning vegetation is fine particulate matter (Sandberg et al. 2002). Studies indicate that 90% of all smoke particles emitted during wildland burning are at least PM10 and that 90% of those particles are smaller than 2.5µ. The most recent human health studies on the effects of particulate matter indicate that fine particles, especially PM2.5, are largely responsible for health effects (Dockery et al. 1993). Pollution sources in non-attainment areas are subject to tighter restrictions. Eugene, Klamath Falls and La Grande, Oregon are federally designated non-attainment areas, because of an excess of PM 10. The nearest non-attainment area to the CBRA is Eugene, Oregon, 123 miles to the west.

The EPA classifies airsheds into one of three classes. The CBRA is located within a Class II airshed and lies within ODEQ's Central Oregon Air Quality Control Area, with good to excellent air quality.

> Class I – These areas include all international areas and National Parks greater than 6000 acres, and national wildernesses greater than 5000 acres, that existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional man-made air pollution, which can be added to these areas.
>
> Class II – These areas include all other areas of the country. These areas may be upgraded to

Class I, pending further legislation. A greater amount of additional man-made air pollution may be added to these areas, as opposed to Class I airsheds. All BLM lands that are not designated Class I are Class II airsheds.

Class III – These areas have the least amount of regulatory protection from added air pollution. To date, no Class III areas have been designated in the country.

Greenhouse gas emissions (GHG) and subsequent changes in biological carbon sequestration due to land management activities on global climate are another concern. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO2(e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPPC) recently concluded that "warming of the climate system is unequivocal" and observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change. In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict. The EPA has stated that, as with any field of scientific study, there are uncertainties associated with the science of climate change, but that several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires and activities using combustion engines.

It is difficult to discern whether global climate change is already affecting resources. In most cases there is more information about potential or projected effects of global climate change on resources. It is important to note that projected changes associated with climate change are likely to occur over several decades to a century and may not be measurable within the reasonably foreseeable future.

3.4 Fire Management

Figure 4 - Young Juniper (Typical Condition)

Figure 5 - Young Juniper (Typical Condition)

Across the planning area, wildfire has had a key role in developing the composition and dynamics of juniper woodland and shrub-steppe habitats. Since the arrival of European settlers into Central Oregon, fire's historical role of controlling juniper has been disrupted. As a result of this, the historical range of juniper that was once limited primarily to rock outcrops on slopes and ridges has now moved downhill, invading lower elevation plant communities (Burkhardt and Tisdale 1969). This has resulted in an increased number of young junipers dominating the shrub and grass component of the system (see Figures 4 and 5). Based on site inventories for Cline Buttes, the current density of young junipers is much higher (an average of 39 TPA in Old Growth Woodlands and 47 TPA in Shrub-Steppe), compared to the pre-European settlement averages of one to several young juniper trees per acre.

The western half of the CBRA falls into the Greater Sisters Community Wildfire Protection Plan (CWPP) boundaries, with the eastern half being in the Greater Redmond Community Wildfire Protection Plan boundaries. The WUI zones (as defined by the Healthy Forests Restoration Act) in the CBRA are shown on Map 4. Residential and resort development, as well as increased visitation to the CBRA has increased risks associated with wildland fire.

Fires that occurred historically burned with a lower intensity; however, today fires now burn with a higher intensity, creating running crown fires and downwind spotting. This fire behavior was most recently experience in the Crooked River Fire, which occurred north of the CBRA in 2007. This type of fire behavior is more dangerous for the public and firefighters and is extremely difficult and expensive to control. Fire Management Agencies have been recording wildfires within the planning area since the 1960s. The majority of fires are lightning caused, and the total number of fires has been consistent over the past 40 years, thus reinforcing the regular existence of fire and disturbance on the landscape.

Fire Regime & Condition Class

Fire Regime Condition Class (FRCC) is a classification process by which land management agencies evaluate the current vs. past role of environmental disturbances which may include fire, insect and disease mortality, grazing or drought. This process determines degree of departure, or how much of a change has occurred on the landscape. There are two components of the classification process. The role fire would play across the landscape in the absence of modern human intervention is defined as

the Fire Regime (Agee 1993). Fires ignited by lightning and aboriginal peoples are included in the classification. Fire regimes are also a reflection of past and current vegetation. During 2003, Central Oregon Fire Management Services (COFMS) embarked on analyzing the landscape across Central Oregon, which included the Cline Buttes planning area. Data was limited, so a coarse-scale FRCC estimate was developed using local vegetative plots, range site inventories, aerial photos and interviews (COFMS Fire Plan, 2002). Five historical fire regimes have been identified (Table 32) based on average number of years between fire events (fire frequency) and fire severity. The planning area has been classified into two Fire Regimes, 70% II and 30% IV.

Recent fire behavior and post wildfire effects have indicated many areas are not within their historical fire regimes. Wildfires have burned less frequently than in the past. Reduction in number of fires has allowed juniper, and to some extent sagebrush, to encroach into more productive plant communities. Shifting from shrub to tree dominated plant communities increases the amount of aboveground woody vegetation. The increase in above ground vegetation changes the character and effects of wildfires. Fire intensity is increased, due to the increase in density of trees, as evident in the shrub-steppe dominated by young juniper habitat. Condition Class (CC) indicates degree of departure from historical conditions (Table 33). The CC considers a number of biological, fire behavior and fire effect factors. Many factors can cause a shift in CC, including vegetation characteristics, fuel composition, fire frequency, fire severity, and fire pattern. In June of 2006, COFMS re-evaluated the CC of the planning area using LANDFIRE web based process. The new results show that within CBRA, 99% of the old growth juniper, shrub-steppe habitat and shrub-steppe dominated by young juniper habitat are currently a CC 3 (http://www.landfire.gov/).

Table 32: General Fire Regime Classification and Description

Fire Regime	Frequency (years)	Description
I	0 - 35	Dry forest types: ponderosa pine, interior Douglas fir, pine-oak woodlands and very dry grand fir. Large stand replacing events can occur under certain weather conditions but are extremely rare.
II*	0 - 35	Rangeland types: grasslands and savannahs, mesic sagebrush and mountain shrub. Frequent, high severity lethal fires. Stand replacing fires common.
III	35 – 100 +	Mixed conifer types: mesic Douglas, grand fir, western hemlock and cedar. Fire return is frequent to long term and has mixed severity.
IV*	35 – 100+	Lodgepole, dry shrub types. Fire return is frequent to long term and is stand replacing.
V	>200	Fires are infrequent and high severity; these can be stand replacing fires and rarely burns if ever.

* Fire regime present in the planning area

Table 33: Potential Risks of Fire based on Condition Class

Condition Class	Description	Potential Risks
1	Plant communities exist under historical conditions and fire is playing its historical role.	Fire behavior, effects, and other associated disturbances are the same as those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the wildfire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are the same as the historical regime. Risks of losing key ecosystem components are low.
2	Moderate departure from historical conditions.	Fire behavior, effects, and other associated disturbances are moderately different from historical conditions. Frequency and severity are either greater or less than historical conditions. Composition and structure of vegetation and fuels are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of losing key ecosystem components is moderate.
3	High departure from historical conditions.	Fire behavior, effects and associated disturbances are highly altered. Frequency and severity are either greater or less than historical conditions. Composition and structure of vegetation and fuels are highly altered. Uncharacteristic conditions range from moderate to high. Risks of losing key ecosystem components are high.

3.5 Visual Resources

Introduction

The 32,000-acre CBRA possesses a variety of landform, vegetation and water features that contributes to the area's scenic quality. The area's location between the communities of Bend, Redmond and Sisters, as well as its proximity to residential areas and destination resorts, contribute to the importance of the area's scenic quality. While the Cascade Mountains are the dominant landscape feature in the region, the CBRA, as with many other BLM administered lands in Central Oregon, is increasingly valued for providing an undeveloped, primarily natural backdrop to the rapidly developing and urbanizing landscape.

An evaluation of the area's scenic quality was done as part of the UDRMP planning process (UDRMP, ROD Appendix H), which led to the designation of Visual Resource Management (VRM) Classes. These VRM Classes provide the standards for managing scenic resources affected by public land management actions. The following sections will describe the existing setting and management direction for the CBRA.

Existing Scenic Quality

Portions of the CBRA were identified during the UDRMP planning process as key scenic features (AMS, pg. 111, UDRMP, pg. 253). These include the Deschutes River Canyon, the public lands on the buttes, and the canyons in the northern and western portions of the recreation area (e.g., Deep Canyon, Dry Canyon, Fryrear Canyon and Buckhorn Canyon). These features were deemed important due to high visibility, prominence and scale of the landform and/or the presence of water in an otherwise dry landscape. Although other features such as old growth juniper were identified as contributing to scenic quality on BLM administered lands, these features were deemed not significant at a regional landscape scale.

Deschutes River
Approximately 3.25 miles of the Deschutes River occur along the east edge of the Maston area. Of this total, approximately 2 miles occur on public lands managed by BLM, in several separate segments. Two small sections of river also occur on public lands at the Harper Road parcel, south of the Maston area. The river canyon contains a mixture of basalt cliffs at the canyon rim, and a combination of steep and vegetated slopes interspersed with rockslide areas (see Figure 6). Portions of the river canyon, generally on north facing

Figure 6: Deschutes River at CBRA

slopes, contain stands of juniper trees. Other portions of the canyon have scattered or very few juniper trees. A consistent band of light green riparian vegetation is a prominent feature in the river canyon due to its strong color contrast with the surroundings. Buildings are not dense along the rim of the canyon, in part due to the various tracts of BLM administered, undeveloped lands. While individual houses are occasionally seen along this stretch of river, in general the canyon is a natural appearing landscape, with only a few highly visible constructed features. Generally, the northern portions of the river canyon in the CBRA have a greater number of homes visible along the canyon rim. The southern portion of the river canyon includes two electrical power line crossings, near Quarry Road. These and all other power lines in the Maston area are relatively small lines, on single or H-frame wood pole structures.

Buttes

These lands are located between Barr Road and Cline Falls Highway. This area includes the buttes themselves, which are visible from Redmond, Tumalo, Powell Butte and many other areas of Central Oregon (see Figure 7). Viewers include residents and visitors at Eagle Crest Resort, other residents and visitors to the area, especially those traveling on Cline Falls Highway, and recreationists hiking or riding trails in the CBRA. There are three buttes; the southernmost of these includes portions of the Thornburgh property and BLM administered land. The BLM portion of the southern butte includes a fenced Federal Aviation Administration (FAA) facility. This facility is not highly visible from the surrounding area, although from certain portions of the Maston area, a portion of the light grey colored fill slope and white antenna structure on the FAA site is visible. The middle butte is BLM administered land and contains a communications site. These communication towers are visible from the eastern slope of the buttes and from certain portions of the Maston area, State Highway 126 and Eagle Crest Resort (see Figure 8). The northernmost butte is mostly private land and includes Eagle Crest Resort and the Cline Buttes Rock Pit. The light gray cut slopes surrounding the Cline Buttes Rock Pit are highly visible from many parts of Redmond and points further east (see Figure 9). Other built features visible on the buttes include houses in Eagle Crest Resort, particularly the largest of the homes built on the west slope of the buttes in Eagle Crest Phase 3. A major CEC power line bisects the northern butte, crossing through Eagle Crest Resort property, Thornburgh property, and BLM administered lands. This line tends to be more visible than the numerous other power lines on the buttes, due to its large metal mono-pole support structures. There are numerous smaller transmission lines on the buttes. Other built features include a water storage tank located near the entrance to the Cline Buttes Rock Pit.

Figure 7: Cline Buttes Viewed from Powell Butte Highway

Figure 8-a: Cline Buttes Viewed from Eagle Crest Resort

Figure 8-b: View of Middle Butte from South Butte

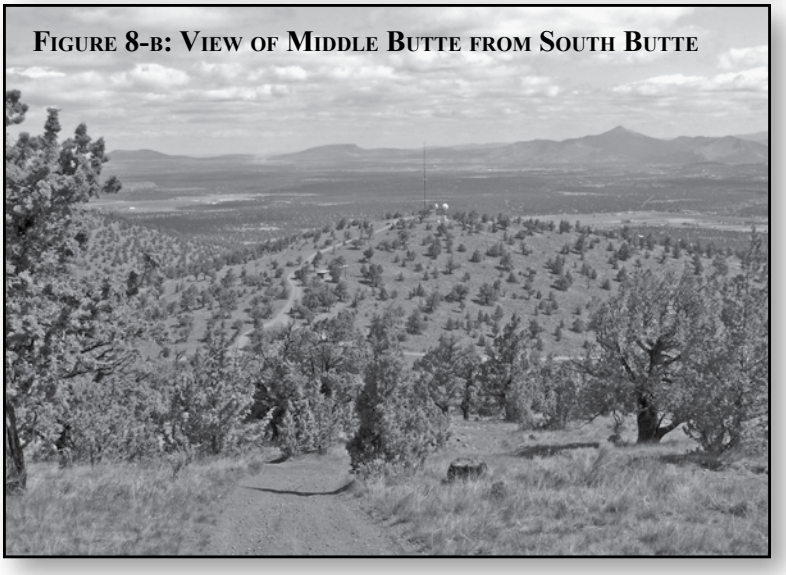
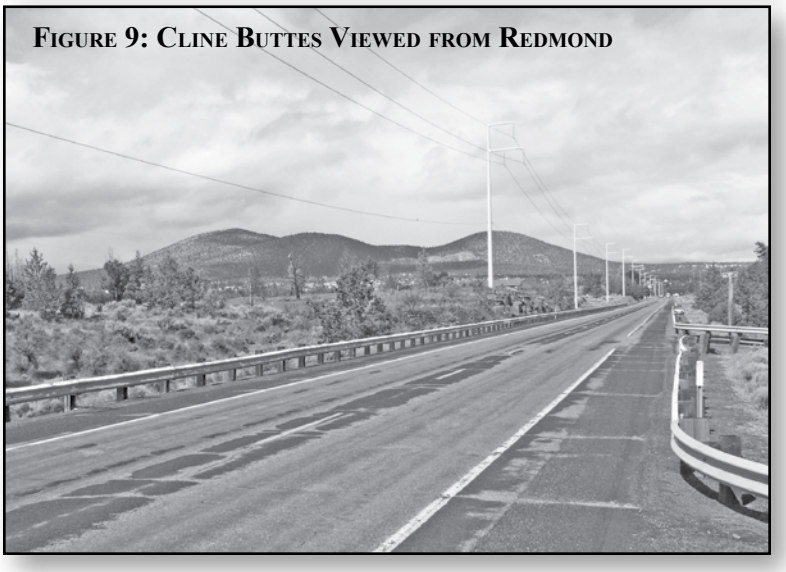


Figure 9: Cline Buttes Viewed from Redmond



Several roads provide access to the top of the buttes, including the FAA road, the Cline Buttes Rock Pit road and the unimproved road leading to the communication site on the middle butte. These roads are not highly visible features. However, there are several power lines and/or user-created hillclimbs, which have a linear form that creates a moderate degree of contrast with the surrounding landscape. The most prominent of these is a power line corridor on the southeast face of the south butte. With the exception of heavily used and braided OHV hillclimbs, existing trail routes on the buttes are not highly visible.

Vegetation on the buttes is a consistent, though not dense, stand of juniper. From the surrounding area, 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. Due to their lower, flatter orientation, the lower slopes of the buttes are a more consistent dark green color due to juniper cover than the upper elevation areas which are seen in greater relief. Cheatgrass is visible on the buttes as light yellow or green patches or circles at the base of individual juniper trees. At certain times of the year, this pattern is noticeable.

Canyons

The northern and western edges of the CBRA include many southwest to northeast trending canyons. North of State Highway 126, these landforms include occasional basalt rimrock as well as many opportunities for long range views of the high cascades and surrounding region (see Figure 10). Most of these canyons, particularly the larger Deep and Buckhorn Canyons, have sloping sides with sagebrush and scattered junipers. Although there are many homes on private inholdings and adjacent lands, these canyon areas generally appear natural and built features are the exception rather than the rule. Each of these canyons north of State Highway 126 have unimproved roads in the

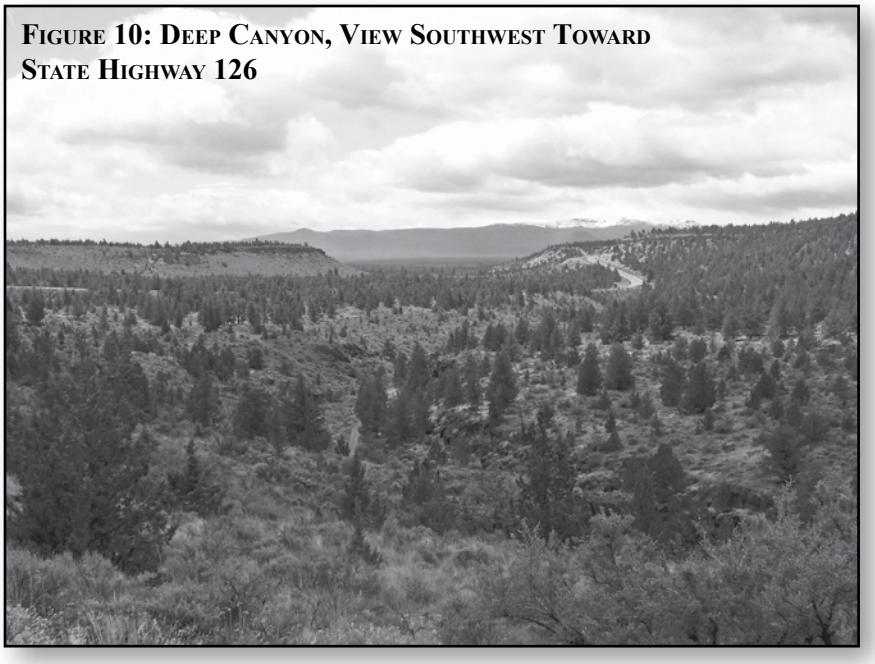


Figure 10: Deep Canyon, View Southwest Toward State Highway 126

Figure 11: Dry Canyon

bottom of them, including a County maintained gravel road in a portion of Buckhorn Canyon. The canyons on the west edge of the CBRA have scattered ponderosa pine trees in them. Although not a dominant visual feature, these large ponderosa trees are visible above the lower and denser juniper woodland.

The canyons to the south of State Highway 126 are generally smaller in width and depth than those to the north of the highway. These canyons are popular locations for trail use, in part due to their strong sense of enclosure, scenic quality, which includes rimrock cliffs, and a diversity of vegetation, which includes occasional large ponderosa pine trees and dense stands of great basin wild rye, and wax currant (see Figure 11).

Other existing and proposed Visual Features

Other visual features in the recreation area include the many miles of relic canals from the early 1900s-era Columbia Southern Irrigation system. These canals are not a dominant visual feature; most of this system consists of gentle berms and a canal bed that is partially filled in with soil. Many portions of the canal system are surrounded by dense stands of young juniper, making an overall view of these features difficult. Specific canal features are visible in select locations; in such cases, foreground views of canal raceways, flumes, cisterns, and minor wood structures provide historical interest. There are a few segments of functioning canals in the CBRA. A small canal runs along a portion of Dusty Loop Road at the southern edge of the CBRA, while a larger canal runs along the northern edge of the area, in McKenzie Canyon. There are other small scale features of interest in the CBRA, including rock walls, old structure foundations and old agricultural clearings. These clearings often offer diversity by providing large open areas with expansive views.

While most of the CBRA is not a highly rugged, dramatic landscape, there are many distinct rock ridges, basalt formations and hilltop locations. 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 cascades to the west. Conversely, many areas in Cline Buttes are covered in relatively dense stands of juniper trees, which often block views of the buttes or the Cascade Range.

Portions of the planning area have an extremely dense network of roads, trails and areas devoid of vegetation due to vehicle parking. This condition is most evident at the north and south ends of Barr Road and along the powerline corridor west of Buckhorn Canyon Road. These same areas receive the greatest amounts of dumping and abandoned vehicles. While this condition is not widespread throughout the recreation area, the presence of this condition at the major entrances to the area has the maximum negative impact on visitors.

The dominant built features in the area are the improved County or State Roads adjacent to, or bisecting the planning area. Many portions of the recreation area are adjacent to residential areas, and vacant parcels increasingly are being developed with large homes that are much more highly apparent than the existing, older residences that were typically built over the past several decades. In addition, future development of the Thornburgh Resort between Barr Road and Cline Falls Highway may create a much more developed setting for the area, since this private property occupies a large portion of the buttes.

Key Observation Points

Key observation points were identified as a basis for developing management standards in the UDRMP. For the Cline Buttes area, these include the Tumalo Canal ACEC, State Highway 126 and 20, and the Deschutes River.

Existing Management Direction

Management direction for visual resources is provided by the UDRMP, which applied different VRM Class designations for specific portions of the recreation area (UDRMP Map 10). VRM classes represent the relative value of visual resources, with Class I and 2 being the most valued, Class III representing a moderate value, and Class 4 being of least value. When considering management standards to protect scenic quality, it is important to recognize that BLM policy is to meet or exceed VRM Class requirements (i.e., provide better scenic quality than required) when conducting specific projects. The existing management direction in the CBRA includes the following VRM Class designations:

Class 2 (6,486 acres) – Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.

The Class 2 designation applies to BLM administered lands in the upper elevation portions of the buttes, the Deschutes River Canyon corridor, and the various dry canyons in the north and western portions of the recreation area, including portions of Buckhorn Canyon, Deep Canyon, Dry Canyon, and Fryrear Canyon.

Class 3 (1,113 acres) – Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape. The Class 3 designation applies to BLM administered lands immediately adjacent (1/4 mile on each side) to State Highway 126.

Class 4 (24,317 acres) – Any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color, and texture of the characteristic landscape.

The Class 4 designation applies to the majority of the CBRA, including most lands west of Barr Road, and most of the Maston area between Cline Falls Highway and the Deschutes River Canyon.

3.6 Wilderness Characteristics

The CBRA does not contain designated wilderness or Wilderness Study Areas (WSA).

None of the CBRA was identified as having wilderness characteristics or recommended for designation as a WSA in the BLM's wilderness review of public lands done between 1978 and 1980, followed by an EIS and record of decision in October 1991.

The Wilderness Act defines wilderness characteristics as lands which:

1. generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
2. has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
3. has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and
4. may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

These criteria are commonly referred to as naturalness, outstanding opportunities, size, and supplemental values. These criteria are described below.

The CBRA does not possess wilderness characteristics, due to the high level of existing built features (fences, roads, powerlines, materials sites, water tanks, etc.), management direction, and high levels of use in the area. There are no tracts of public land within the CBRA of 5,000 acres or larger that do not contain some of these man-made features.

Naturalness

Urban development and existing uses impacts the naturalness of the CBRA. The area's average of over 7 miles of routes per square mile, and the presence of 1.5 miles of road or utility ROWs per square mile, 25 miles of bisecting State or County roads, and numerous withdrawls for mineral sites, FAA navigation facilities and communication sites all contribute to the imprint of development. The many developed parcels within and adjacent to the CBRA also constitute a noticeable imprint on the landscape. The CBRA includes many miles of fences, both grazing fences, BLM installed fences to control vehicle use, and private property fences. Over 60 miles of fence have been identified in the CBRA, and this generally does not include fences along bordering private property. There are also many miles of relic irrigation canals located within the southern portion of the CBRA. These man-made features are a regular occurrence in the CBRA and are not natural in appearance.

Outstanding Opportunities

Solitude

The area's location between Bend, Redmond and Sisters has led to consistent levels of use and travel through the area on approximately 25 miles of public road. Areas that are difficult to access due to

steep terrain are generally limited to the Deschutes River Canyon. While some locations in the river canyon provide opportunities for a feeling of solitude, these opportunities are not outstanding due to the presence of houses on the canyon rim that are visible from most of the public portions of the canyon and from the number of visitors who access the canyon from both public and private entry points. The number of access points and adjacent development make it difficult to avoid other visitors to the canyon.

Primitive and Unconfined Recreation
Outstanding opportunities for primitive and unconfined recreation are not available due to the numerous existing roads, ROWs and motorized use trails existing in the CBRA. The level of use and conflicts between different user groups and between public land visitors and private land owners (both adjacent and within the CBRA) have made management of primitive and unconfined recreation pursuits difficult. Many of these activities have resulted in private land trespass. The management direction for the area (UDRMP, 2005) calls for designated trails and trailheads for both motorized and non-motorized uses to help separate and manage these uses.

Supplemental Values

The CBRA does possess scenic, cultural, and ecological values. Highly scenic portions of the CBRA include the Deschutes River Canyon, and the smaller dry canyons located in the west and north portions of the CBRA. The area includes two ACEC's – one for special status plant species and one for cultural resources.

3.7 Heritage

Through past and present surveys, approximately 20% of the project area has been inventoried. Through these inventories, 59 heritage resource sites have been located and recorded. A site is defined by having 10 or more artifacts or the presence of features such as a cave, rock art, fire pit remains, or a structure. Twenty-four of these sites are unevaluated for National Register of Historic Places eligibility and two have been evaluated as eligible. The remainder are evaluated as not eligible.

The project area is within lands ceded to the Federal Government by The Confederated Tribes of the Warm Springs Reservation of Oregon under treaty in 1855 and ratified by Congress in 1859. The Warm Springs, Paiute, and Wasco Tribes from The Confederated Tribes of the Warm Springs Reservation of Oregon are the known tribes with historic associations to this area. No areas of specific tribal interest are identified in the project area. No significant populations of tribal use plants or locations of tribal traditional use are known.

3.8 Old-Growth Juniper Woodlands

Of the 32,000 acres in the Cline Buttes planning area, approximately 62%, or 20,273 acres, are considered to be "old-growth" juniper woodlands. These are areas that contain at least 10% canopy cover of trees that have old-growth characteristics. Some of the physical characteristics of old juniper trees include: large diameter trunk and lower limbs (often twisted), rounded or irregular crown, deeply furrowed reddish bark, broken and dead branches, heart rot, and abundant lichen growth. The term "old-growth juniper woodland" is also a vegetative community type that encompasses the ecosystem in its entirety, including the associated understory plant and animal species that live there. Old-growth juniper is generally defined as juniper that was present before the migration of white European settlers into the region beginning in the mid- to late-1800s (Miller, 2000). This "pre-settlement" juniper occurs

in relatively large contiguous stands in the Cline Buttes area. Many of the dominant trees in these stands are much older than 150 years, some approaching 1,000 years of age (Miller et al. 1996). The oldest tree in Oregon, a western juniper tree located east of Bend, was recently documented to be over 1,600 years old. Old-growth stands are in an uneven-aged structure with younger trees occurring in disturbance areas and between the older trees. The distribution of old-growth juniper within the Cline Buttes area is shown on Map 15.

In Oregon, it is estimated that less than 3 percent of the current 5 million acres of western juniper woodlands are characterized by trees greater than 100 years old (USDI-BLM 1990). Because many of the old trees in the Cline Buttes area originated long before European settlement, they are considered to be an integral part of the native Central Oregon landscape compared to the post-settlement juniper type, which is more of a manifestation of recent human and climatic influences. The Central Oregon old-growth stands are unusual because they are relatively large and contiguous and contain a higher percentage of larger and older trees compared to other juniper woodlands in the Great Basin of the West.

Accelerating urban development in Central Oregon and associated human activities have fragmented and/or replaced old-growth juniper woodlands. Activities on public lands such as cutting trees for firewood, and clearing for ROW construction, and creation of other travel routes have also contributed to impacts on these old-growth ecosystems. These and other human activities are compromising the integrity of old-growth woodland ecosystems in Central Oregon.

3.9 Shrub-Steppe Communities

The Cline Buttes project area is located in the Mazama Ecological Province on the east side rain shadow of the Cascade Mountains. This is a cool, semi-arid environment that receives approximately 8 to 12 inches of rain per year and ranges from 2,700 ft to 4,100 ft. elevation. The project area consists mainly of old growth juniper woodlands and shrub-steppe habitats. A small amount of riparian habitat is located on the southeast side of the CBRA along the Deschutes River.

Plant communities in the project area include 20,370 acres of old growth juniper woodlands, 2,783 acres of shrub-steppe habitats and 8,582 acres of historic shrub-steppe habitat that is currently dominated by young juniper (see Table 34). The shrub-steppe habitats are often located in the canyon areas and are also mixed within the old growth juniper woodlands, which creates a mosaic pattern of woodland, with both small and large openings of shrub-steppe habitats. The increase in the number and distribution of young junipers creates a more continuous over-story of juniper in the project area as compared to historic conditions. The majority of woodlands are still in the early to mid phases of stand closure, which means they often support an understory of shrubs and herbaceous vegetation. This has implications for future changes that will occur within these woodlands in the next 30 to 50 years. In the absence of disturbance or management, the majority of these landscapes will become closed woodlands resulting in the loss of understory plant species and would create greater costs for restoration (Miller et al. 2008).

There are seven individual ecological sites in the project area (see Table 35). According to the Natural Resource Conservation Service (NRCS) ecological site descriptions, the characteristics of the old growth woodlands should include approximately 10 to 15 percent canopy cover of trees, 5 to 25 percent cover of shrubs and 25 to 50 percent cover of native grasses. The shrub-steppe communities would normally consist of about 0 to 5 percent cover of trees (likely occurring in rocky areas), 10 to 15 percent cover of shrubs and 40 to 50 percent cover of grass. The BLM inventoried the plant communities at 71 different locations distributed across the planning area to determine the existing conditions.

Table 34: Plant Density Within Plant Community Types in the CBRA

Plant or plant group within each plant community type	Units	Plant community type		
		Old growth juniper	**Shrub steppe**	**Shrub steppe with young juniper**
		Density average (and range)		
Old growth juniper	Trees per acre	11 (0 – 32)	1 (0-4)	1 (0-8)
Young juniper	Trees per acre	39 (0-96)	22 (0-56)	47 (9-104)
Shrubs	% of total foliar cover	21 (6-78)	33 (4-50)	29 (7-85)
Native grass and forbs	% of total foliar cover	50 (13-91)	31 (9-74)	42 (5-81)
Cheatgrass	% of total foliar cover	15 (2-45)	35 (8-64)	23 (1-64)
Rabbitbrush	% of total foliar cover	6 (0-42)	14 (0-30)	9 (0-66)

Table 35: NRCS Ecological Site Descriptions (Percent Canopy Cover)

Ecological Site	% Tree	% Shrub	% Grass	Total
Droughty 8-12	8	19	47	74
Droughty Pumice 9-12	0	13	57	70
Lava Blisters 8-10	15	6	30	51
Pumice Flat 10-12	23	19	58	100
Sandy North 9-12	23	31	46	100
South 10-12	15	13	48	76
Shallow North 10-12	23	13	59	95
Average	15	16	49	80

The ecological conditions of the plant communities in the project area were determined during the ecological site vegetative inventory (ESI). This inventory found that 14 percent (9) of plots rated in poor condition, 42 percent (27) were in fair condition, 42 percent (27) were in good condition and less than one percent (one plot) was in excellent condition. Idaho fescue (*Festuca idahoensis)* and bluebunch wheatgrass (*Pseudoroegneria spicata)* are the most common native bunchgrasses in the project area. Bluebunch wheatgrass is more abundant on the south facing slopes and Idaho fescue is more abundant on north facing slopes. On average there was 37 percent canopy cover of native bunchgrasses with a range of 8 to 72 percent.

Cheatgrass (*Bromus tectorum)* is the most common invasive plant species found in the project area and is often associated with ground disturbance and overgrazing of native herbaceous vegetation (Pellant 1996). On average there was 16 percent canopy cover of cheatgrass with a range of 2 to 45 percent.

The BLM has also conducted Rangeland Health Assessments in the project area using an approach that is similar to, but different than ESI. Not all of the grazing allotments in the Cline Buttes project area are currently grazed, so Rangeland Health Assessments were only done on actively grazed allotments. These assessments found that approximately 39 percent of the area was meeting standards and guidelines for rangeland health and 61 percent was not. The Rangeland Health Assessments for the different grazing allotments in the project area often noted similar concerns: increasing amounts of young juniper; un-managed off-road travel and increasing amounts of cheatgrass.

Additional information on the plant communities occurring in the project area can be found starting on page 215 in Volume 1 of the Proposed Upper Deschutes Resource Management Plan and Final Environmental Impact Statement (FEIS). The following sections do not include background information on the natural history and interrelationships of the plant communities in the project area as they can be found in the FEIS.

Shrub-steppe Communities

Mountain big sagebrush (*Artemisia tridentate*), rabbitbrush (*Ericameria teritifolia*), and antelope bitterbrush (*Purshia tridentate)* are the most common shrub species in the project area. On average there is approximately 21 percent cover of shrubs with a range of 6 to 78 percent in the old growth woodlands. The sage and bitterbrush shrubs often are older with little recruitment of younger shrubs. Rabbitbrush was often found dominating areas that have either been heavily disturbed or have had repeated disturbances.

Existing conditions for shrub-steppe habitats dominated by shrub-steppe include:

- Averaged one old growth tree with a range of zero to four TPA.
- Averaged 22 young trees with a range of zero to 56 TPA.
- Averaged 33 percent cover of shrubs with a range of four to 50 percent.
- Averaged 23 percent cover of native bunch grasses with a range of three to 65 percent.
- Averaged 35 percent cover of cheat grass with a range of nine to 64 percent.

Shrub-steppe Communities dominated by young juniper

These areas contain a high amount of young juniper. Juniper encroachment increases loss of moisture through evapotranspiration. As tree roots extract water from the ground, it is drawn up the trunk and evaporated out of the needles. At higher densities, junipers out-compete other native vegetation on some sites, depending on aspect and annual moisture. When too many junipers occupy such a site, the native shrubs are not able to extract enough soil moisture to survive.

In addition, cheatgrass has become established in this area; because it has shallow roots, cheatgrass does not cycle nutrients back into the soil as well as native grasses do. Cheatgrass grows in the natural bare interspaces between native vegetation and with the addition of summer die off, increases the chance of fire spread.

Existing conditions for shrub-steppe habitats dominated by young juniper trees are:

- Averaged 47 young trees per acre with a range of nine to 104 TPA. These habitats contained few old growth trees and when old trees were present they generally were located in rocky areas, and occurred singly or in low numbers.
- Averaged approximately 29 percent cover of shrubs with a range of 7 to 85 percent.
- Averaged 33 percent cover of native bunchgrasses with a range of 2 to 75 percent.
- Averaged 23 percent cover of cheatgrass with a range of one to 64 percent.

3.10 Recreation

Introduction

The CBRA is a popular destination for a variety of recreational activities, including, but not limited to, OHV use, horseback riding, mountain biking, fishing, hunting, and hiking. The CBRA is prominently located between the communities of Bend, Redmond and Sisters. Recreation use of all types is heaviest in the winter and early spring months, when soil conditions permit dust free trail use and when other trail use areas are under snow or too muddy for use. Recreation use in the area is predominantly day use. Some camping use occurs in the CBRA, mostly due to visits from out of area

OHV enthusiasts. Recreational use of the area is hindered by the lack of developed access points, trail signs, or other user information (maps or guidebooks). Many existing routes cross undeveloped private parcels, and considerable confusion exists as to what is public vs. private land. The lack of clearly designated road and trail systems leads to confusion, resource damage, private property trespass, posting of public lands as private property, and instances of visitors getting lost. Knowledge of the area is generally passed on by word of mouth, or through organized recreation groups.

Recreation Demand & Trends

Based on observations by BLM staff over the past decade, input received by the BLM during the development of the Upper Deschutes Resource Management Plan (UDRMP), as well as on comments received during the CBRA planning process, the CBRA has seen increasing levels of use from all types of recreationists. The increase in recreation use is partly due to the population growth in Central Oregon, as well as the increasing development within and adjacent to Cline Buttes. Over time, it is expected that many undeveloped private parcels within or adjacent to the CBRA, including the approximately 2,000-acre Thornburgh Resort property, will be developed or subdivided, further increasing the amount of local use. Factors such as an aging population and less disposable income for many residents has led to increased levels of outdoor recreation close to home, and desires for managed trail opportunities in these local areas (SCORP, 2003-2007).

Equestrian use has long been popular in the CBRA, and has mainly occurred from local Central Oregon residents. Mountain bike use has increased over the past decade, with much of the visitation occurring at user-created downhill trails on the buttes. The relative scarcity of these technical downhill trails and their season of use make these trails highly valued. In addition, the Maston area has been recognized by mountain bike groups due to the CBRA planning process, and mountain bike use has increased there. The popularity of this use has resulted in private map and guidebook authors requesting data to include the Maston Area in mountain bike guide books/maps (Rapp, 2008), which may further increase use. Walking and bicycling trails are in high demand regionally, with a deficit of these facilities in Redmond, the city located closest to the CBRA. The overall population growth, economic conditions and demographic changes in the region has increased the use of, and demand for, non-motorized trails in Cline Buttes.

Similar factors are responsible for the high demand for OHV trails in the area, although in contrast to non-motorized use, CBRA OHV users include a higher percentage of visitors from the western part of the state and from Washington.

The combination of seasonal closures of managed and maintained OHV trail systems and lack of designated trail systems elsewhere in the region has led to the BLM administered Millican Plateau area (located approximately 30 miles Southeast of the CBRA) being one of the few managed and maintained riding areas available regionally during the winter. The UDRMP recognized this trend by directing the North Millican OHV Area be opened for use year-round (pending a reduction in trail miles/density), and that several other areas be designed for OHV trails, including the CBRA. As shown in Table 36, approximately 45% of the BLM administered lands in Central Oregon are zoned for possible OHV trail development, with the majority of these acres in the Millican Valley, Cline Buttes, and Bend-Redmond Recreation Areas.

Another element of OHV demand in Central Oregon is the lack of diverse trail opportunities. Key issues identified in both the UDRMP and Cline Buttes planning efforts were the desire for Class III (motorcycle-only) trails and for technical Class II (jeep) trails. Neither of these trail opportunities is provided within the BLM's existing Millican Valley OHV trail system or elsewhere in Central Oregon to any great extent.

Table 36: UDRMP Travel Management and OHV Opportunities

UDRMP Travel Management Designation	Acres	% of UDRMP planning area
Open (cross-county motor vehicle travel allowed)	0	0
Closed to motor vehicles	91,755	23%
Motor vehicles limited to designated roads only, available year-round	83,230	21%
Motor vehicle limited to designated roads only – available seasonally	49,203	12%
Motor vehicles limited to designated roads and trails – available year-round	157,724	39%
Motor vehicles limited to designated roads and trails –available seasonally	17,685	4.4%
Motor vehicles limited to type of vehicle	4,868	1.2%
Acres Available for OHV Trail Opportunities[1]	180,227	45%

[1]The combined acreage of lands designated for motorized use on designated roads and trails, and lands designated as limited to type of vehicle.

The Cline Buttes area has long been popular for OHV use and this demand will likely continue to come from local users as the region's population grows, and those users who come from outside Central Oregon.

While the location of Cline Buttes provides relatively easy access for the growing communities of Bend, Redmond and Sisters, the landscape of the CBRA also provides a draw for visitors from out of the area. In addition to the OHV use, visitors increasingly come to the area to fish, mountain bike, and hike. Residents and visitors to Eagle Crest Resort use trails on adjacent CBRA lands. A river trail along the west bank of the Deschutes River that extends into the CBRA from Eagle Crest is an extremely popular trail route, both on the resort and on adjacent public lands. While Eagle Crest has its own internal trail system, many residential neighborhoods have user created trails that lead to the nearest access gate to public lands as well.

Overall Recreation Setting and Existing Management Direction

Travel Management

Travel management direction for the CBRA is provided by the Upper Deschutes Resource Management Plan (UDRMP, 2005). Approximately 4,078 acres (13 percent) of the CBRA is designated as closed to motor vehicles (see Map 13). This includes the Maston Area, located east of Cline Falls Highway, and a separate 120-acre parcel west of the Deschutes River at Harper Road. Outside of these areas, motorized use is limited to designated roads and trails throughout the majority of the CBRA, encompassing about 27,246 acres (85 percent). This designation includes lands west of Barr Road and east of Fryrear Road, as well as all lands north of State Highway 126. Motorized use is limited to designated roads only on a small 593 acre parcel located west of Fryrear Road (any designated trails in this area are for non-motorized use).

Within the areas designated for motorized use on roads and trails, an interim system of designated roads and trails was identified in the UDRMP. This route system was intended to remain in place until area-specific implementation plans were developed.

Recreation Emphasis

The UDRMP designated BLM administered lands with a recreation emphasis designation, to provide general trail management goals for that area (see Map 13). In the CBRA these designations include:

Non-motorized Recreation Exclusive

Areas managed to promote non-motorized recreational uses. Trails and trailheads in these areas would be designed and managed for non-motorized trail use. These areas are designated closed to motorized use, except for use of public roads and rights-of-way, or roads that access trailheads. This designation includes the Maston Area and Harper Road parcel (4,099 acres or 13 percent of the CBRA).

Non-motorized Recreation Emphasis

Areas managed to provide for motorized use on roads only, with road systems that provide for general access into an area or loop roads to tour an area. Trails and related facilities in these areas would be designed and managed for non-motorized trail use. This area includes lands west of Fryrear Road, and north of Cascade Estates Drive (593 acres 1.8 percent of the CBRA).

Multiple Use, Shared Facilities

Areas managed to emphasize shared road and trail systems for both motorized and non-motorized use. The majority of trails and trailheads in these areas would be designed to accommodate OHV use. Some separated trail or road use can occur in these areas, depending on specific features or management classifications.

This area includes the majority of the CBRA, including lands west of Cline Falls Highway and East of Fryrear Road and all lands north of State Highway 126, for a total of 27,278 acres (85 percent of the CBRA). The UDRMP identified the center and north portions of the CBRA as areas that emphasize shared trails for all users. This left other portions of the CBRA as locations where users may be more likely to be separated by trail, area, or season of use. The UDRMP also identified the Tumalo Canal ACEC as an area that will be managed primarily for pedestrian trail systems. The Tumalo Canal ACEC encompasses 1,046 acres.

Route Types

In the past, there has never been a designated route system in the area, other than State or County roads or ROW roads granted by the BLM to private landowners for property access across public lands. Since the adoption of the UDRMP in late 2005, there is an interim system of motorized trails identified for the area.

Existing Routes - The existing route system known to date in the CBRA includes approximately 377 miles of routes, of which 25 miles are State or County Roads. These routes are shown on Map 3 and Table 37. Approximately 80 miles (22 percent) of these existing routes are right-of-ways.

UDRMP designated motorized trails - The UDRMP identified a system of routes available for motorized vehicle use in the CBRA (See Map 3 and Table 38). This interim system is based on those existing routes inventoried by BLM prior to or during the UDRMP planning process. This existing motorized trail system in the UDRMP does not reflect routes created since 2005 or the many miles of routes that were not inventoried or mapped at the time the UDRMP was finished.

The current UDRMP motorized use system includes 164 miles of trails. In general, these trails tend to be existing roads, although motorcycle, hiking and equestrian use has created narrow, single-track routes in some portions of the CBRA.

Table 37: Existing Routes (All Routes Mapped on Public Lands, including State/County Roads)

Area	Miles	Miles/Sq. Mile
Maston	56.4	8.8 mi/sq. mi
Buttes	81.5	10.2 mi/sq. mi
North of State Highway 126	82.8	6.9 mi/sq. mi
South of State Highway 126	151.9	6.8 mi/sq. mi
West of Fryrear Road	4.7	5.2 mi/sq. mi
Total CBRA	377.3	7.6 mi/sq. mi
Note: does not include road miles within private parcels		

Table 38: Miles and Density of UDRMP Motorized Trail System per Area

Area	Miles	Miles/Sq. Mile
Maston	1.2	0.45 miles/sq mile
Buttes	27.9	4.1 miles/sq mile
North of State Highway 126	44.7	3.9 miles/sq mile
South of State Highway 126	88.4	4.1 miles/sq mile
West of Fryrear Road	1.7	1.9 miles/sq mile
Total CBRA	163.9	3.6 miles/sq mile
Note: mileage does not include State or County Roads		

Non-motorized routes – Currently, there are no designated routes for non-motorized trail use in the CBRA. The UDRMP direction is to provide designated trails for hiking, mountain biking, and equestrian use, but left trail locations to be determined in the CBRA Plan. Until a designated trail system is in place, equestrian and mountain bikes can use existing routes and travel cross-country. The UDRMP calls for mountain bike and equestrian use to be limited to designated trails once a designated system is put in place.

To provide some context, the two areas designated closed to motor vehicles in the UDRMP (the Maston Area and Harper Road parcels) contain approximately 50 miles of existing routes, some of which are roads, others single-track trails or steep angler access trails in the Deschutes River Canyon. In other areas, user-created single-track trail routes were not inventoried until after the completion of the UDRMP, thus these routes were not included in the motorized route system. These currently non-designated routes include a system of roads and trails in the Plateau between Deep Canyon and McKenzie Canyon, and single-track routes maintained by mountain bicyclists on the buttes.

Public land access

There are no developed trailheads or designated access points for the CBRA. The gentle terrain and open vegetation provides easy access from private property and public roads. Over 200 public access points have been identified and mapped in the CBRA (see Map 3) and described in Appendix 2. The greatest concentration of access points occurs along the Cline Buttes Rock Pit road and Barr Road. For the purpose of the CBRA description, public access points are defined as access from public roads, from ROW roads that are open to general public use, and from access points used by resort residents and guests. There are a correspondingly large number of private access points, generally gates, providing direct access to public lands from individual private land parcels.

Access controls in the CBRA are generally fences, of which the majority are grazing allotment/pasture fences, or private property fences. Some fencing has been constructed by the BLM over the past

decade to manage public access. This includes fencing along portions of Fryrear, Innes Market, and Buckhorn Roads. Access into the Deschutes River Canyon, Buckhorn Canyon, Deep Canyon, and the plateau between Deep and McKenzie Canyons is constrained by steep slopes. Also, many heavily used access points either occur on private property or on roads that pass through private property. Key examples of these regularly used locations of trespass include:

- Deep Canyon north and south of State Highway 126 (trespass through parcels 40 and 41);
- The southernmost butte via the FAA road (trespass through Thornburgh Resort Property, parcel 53);
- Fryrear Canyon access via Sage Ranch Road (trespass through parcel 35);
- Access into Buckhorn Canyon via State Highway 126 (trespass through parcel 48);
- Access to the east face of the buttes, south of Eagle Crest Resort (trespass through parcel 58, opposite Salmon Avenue); and
- Access to the east face of the buttes, from Antler Avenue (trespass through parcel 60).

Routes near private property

In addition to the many existing routes that either dead end at or pass through private property in-holdings, many roads or trails in the CBRA are located adjacent to private property. Increased use and residential development within and adjacent to public lands have resulted in conflicts. The current density of routes close to private lands is shown in Table 39.

Table 39: Density of Motorized Routes Near Private Property (Miles per Square Mile)

	within ¼ mile of private	within 1/8 mile of private
Existing Route Density	6.65	7.0
UDRMP Interim System Density	3.22	2.9
Mileage does not include ROW roads used to access private property		

Specific Recreation Setting

Areas Designated for Multi-use Shared Facilities Emphasis

This area includes the Buttes, lands north of State Highway 126, and lands south of State Highway 126 and west of Barr Road (See Table 41). As described previously, a large portion of the CBRA was identified in the UDRMP as being designated for a multiple use, shared facility emphasis. For this area, a large proportion of the trail system is to be shared among all users. The UDRMP elaborated on this direction by emphasizing OHV use in the center and northern portions of the CBRA, and by emphasizing non-motorized trails on the buttes. Access and trail use characteristics for each area are described in the following sections.

Table 40: CBRA Multiple Use, Shared Facilities Acreage

	BLM	Private	State	County
Buttes	5,312 acres (8.3 sq. mi.)	2762.7	162.4	78.6
N of 126	7,718 acres (12.06 sq. mi.)	512.6		3.4
S of 126	14,720 acres (23 sq. mi.)	1242.8	36.25	99
Total	27,750 acres (43.4 sq. mi.)	4518.1	198.65	181
State and County acreage includes lands directly adjacent to CBRA				

Buttes

These lands are located between Barr Road and Cline Falls Highway, and include approximately 5,312 acres of BLM administered land, 2,762 acres of private land, 162 acres of State land, and approximately 80 acres of County land. The buttes area is bordered by Cline Falls Highway and Eagle Crest Resort to the east; residential subdivisions and State Highway 126 to the north; Barr Road along the entire west side; and about ½ mile of residential development to the south. The area includes the buttes themselves, and lower elevation lands adjacent to State Highway 126, Cline Falls Highway, and Barr Road. About 33 percent of the area is private land, primarily Eagle Crest or Thornburgh Resort property. BLM administered lands on the buttes also include a fenced FAA navigation facility, located within a larger 123 acre FAA withdrawal and a communications site with several radio/cell towers. The entire area was designated as limited to designated roads and trails in the UDRMP, with an emphasis for non-motorized trails in the higher elevation portions of the buttes (UDRMP, 2005).

Although the buttes have been a popular location for recreational trail use (OHVs, equestrians, mountain bikers, and hikers) and a popular spot for scenic views, much of this land is private and the past trail and road use has relied in many instances on private property trespass.

Two roads provide access to the tops of the buttes: an FAA site access road and a combination of a gravel ROW road leading to the Cline Buttes Rock Pit and a primitive road to the communication site atop the middle butte. The majority of the FAA access road is on private property and is not available for public use. The access road to the communication site is a steep, narrow road and does not provide a safe, maintainable full size vehicle route for public use in its current location and condition. However, this steep access road is currently open to motorized vehicles as part of the interim system for motorized use in the UDRMP.

The southern third of the buttes area contains segments of the relic Columbia Southern irrigation canal system. This portion of the canal system is designated in the UDRMP as the Tumalo Canal ACEC because it contains relatively intact canal features and helps tell the story of irrigation and settlement in Central Oregon. The UDRMP called for management of a portion of the ACEC for pedestrian trail use, focused on interpretation of the historic canal system.

Buttes Access

There are approximately 60 public access points into the Buttes area, along with about 6 gates or fence walkovers from Eagle Crest Resort and a dozen or more access gates from individual private parcels (see Appendix 2).

Buttes Trail Use

The Buttes has a history of recreational trail use on a system of old roads and user-created routes. Equestrian and OHV use are long-standing activities in the area, although mountain bike use has also occurred consistently over the past decade. As noted previously, the FAA road has long been used by the public to access the higher elevation areas on the buttes. The FAA road also provided relatively easy access for motor vehicles to reach the top. Several different gates are located on the FAA Road near the top of the south butte; these can be locked by the FAA to restrict access to the 123 acre FAA withdrawal. The FAA has reported problems with vandalism to gates and trespass within their fenced navigation facility (Filer, August 30, 2006).

Comments made by the public during the Deschutes County Conditional Use Permit process for the Thornburgh Resort demonstrated a high level of use and interest in trails on the buttes. These comments also demonstrated the lack of broad public knowledge of where private property occurs on the buttes.

Specific routes on the buttes include motorcycle hill climbs on the west, north, and south (a highly visible power line route) sides of the southern butte; downhill mountain bike trails built by riders on the south and east face of the southern butte, beginning at the FAA navigation site fence; and multiple routes located both uphill and downhill of the Cline Buttes Rock Pit Road. Many people use a combination of power line roads and fenceline trails. Due to the large number of power lines and road ROWs on the buttes, there is a relatively large amount of wide and steep routes (4 to 18 feet width) in this area.

Table 41: Existing Route Miles and Densities – Buttes Area

Route Type	Miles	Miles/Sq. Mile
Existing routes, including State/County Roads	81.5	10.2 mi/sq. mi
Interim UDRMP motorized route system[1]	27.9	4.1 mi/sq. mi
Rights of Ways[2]	21.5	2.69 mi/sq. mi

[1]Routes currently open to motorized travel as part of the UDRMP (RMP Map 13).
[2]Roads and/or utility lines with approved Right of Way grants.

The Tumalo Canal ACEC is located south of the buttes, in an area that varies from small hills and basalt ridges, to a small, sandy valley. Trail use in the Tumalo Canal ACEC includes equestrian, OHV, and hiking use. In general, the soils in this area are soft, and the area has never received high levels of mountain bike use. Trail use occurs within the relic canals and on top of the canal berms, and on the roads throughout this area. The central portion of this area, with the greatest number of intact canals, was identified in the UDRMP for future development of an interpretive hiking trail system. Single-track routes to the south of the ACEC lead to a user-created trail crossing of Cline Falls Highway, and connect to routes in the Maston area. Another regularly used crossing point on Cline Falls Highway occurs between the Cline Buttes Rock Pit Road and the red cinder right-of-way road in the Maston area. Much of the current use of the Tumalo Canal ACEC area is from local horseback riders and adjacent residents.

Area between Barr Road and Fryrear Road

The area between Barr Road and Fryrear Road includes approximately 23 square miles (14,720 acres) of BLM administered land, 1,242 acres of private land, and 135 acres of County and State land. State Highway 126 forms the north boundary of the area, with Barr Road to the east, Fryrear Road to the west, and Innes Market/Gerking Market Roads generally forming the southern boundary. Due to the ease of access from all these State and County Roads, the area has seen consistent and, in some locations, heavy use by OHVs, full size vehicles and other recreational activities. Although generally flat, the area contains some canyons, plateaus, and basalt ridges. There are at least eight blocks of private land within this area. Other land uses in this area include several existing ODOT material sites (See Map 5), a large CEC east-west oriented power line, and a Deschutes County solid waste transfer station (Fryrear Road). This area was designated as "limited to designated roads and trails" and identified in the UDRMP for future development of an OHV trail system, with an emphasis on OHV trails in the northern portion of this area.

The area is popular for OHV and equestrian use, although certain areas do receive hiking use, mostly along portions of the relic canal system and areas close to subdivisions. The existing ODOT cinder pit located west of Barr Road is a popular OHV play area, although it is not currently designated or managed as such. About half of the eight private land blocks within the area are developed. Those not yet developed or fenced generally receive high levels of public use. The developed parcels in this area generally have the highest incidence of fenceline trails adjacent to private property – due to development blocking routes used by the public in the past.

Central Area Access

There are approximately 54 public access points into this area from State and County Roads (see Appendix 2).

Table 42: Existing Route Miles and Densities – CBRA between Barr Road and Fryrear Road

Route Type	Miles	Miles/Sq. Mile
Existing routes, including State/County Roads	151.9	6.84
Interim UDRMP motorized route system[1]	88.4	4.1
Rights of Ways[2]	19.56	0.88

[1]Routes currently open to motorized travel as part of the UDRMP (RMP Map 13)
[2]Roads and/or utility lines with approved Right of Way grants

Central Area Trail Use

This central portion of the CBRA contains approximately 136 miles of routes, not including State or County roads. Of this total, approximately 88 miles are currently available for public use with motorized vehicles, approximately 19 miles are ROWs granted for roads or utility lines, and about four miles occur as roads that serve as the primary access to private parcels, but are not authorized under a right-of-way grant. The majority (83 miles) of these existing routes are in the four to 18 foot width range, although there is a high number (36 miles) of single-track trails scattered throughout the area as well.

This area has seen steady growth in the amount of OHV use over the past several decades. The area has relatively easy access from State Highway 126, and from numerous points along Barr Road. The existing ODOT cinder pit (Material Site No. 41, Map 5) on the west side of Barr Road has been a popular use area for OHV riders, as have the various canyons located at the western edge of this area (Deep Canyon, Dry Canyon, Fryrear Canyon). Like many other areas in the CBRA, the increase in all types of use has resulted in increased conflicts between different users, particularly in the canyons. Concerns raised in this area have included safety and maintenance problems on ROW roads that are used frequently as OHV routes.

This area has a long history of equestrian use, with steady and regular use throughout the area, particularly the canyons on the western edge of the CBRA. In addition, certain trails have been created and/or signed by local residents, including a route along a portion of the Columbia Southern Canal system on private and public lands, and trails located south of the Fryrear Ranch subdivision. Some of these routes have been signed as trails by local residents for well over a decade.

Area north of State Highway 126

The area north of State Highway 126 includes approximately 7,696 acres (12 square miles) of BLM administered lands. These public lands are bordered by State Highway 126 to the south, McKenzie Canyon Road to the northwest, residential subdivisions to the east, and rural residential and agricultural lands to the north. The area is bisected north-south by Buckhorn Road, a Deschutes County maintained gravel road. The entire area is bisected by 5 canyons, all oriented southwest to northeast. This area was designated roads and trails (motorized use) in the UDRMP. There are approximately 512 acres of private property inholdings in this area, in six different parcels. Most of these have not yet been developed or fenced. Approximately 324 acres of County land are located adjacent to the CBRA's northern boundary. A portion of this area (1,540 acres or 20 percent) is part of the Buckhorn Mining Claim, established in 1988. The approved/permitted mining operations (perlite mine serial no. ORORE-059712) encompass about 2 acres on the west side of Buckhorn Canyon (see Map 5).

Access

The area has approximately 36 public access points, with the majority occurring from Buckhorn Road and a few heavily used locations on State Highway 126 at Deep Canyon. Access from the north and east is primarily from adjacent residential areas, although some access occurs from McKenzie Canyon, in the vicinity of the small reservoir. For a more detailed description of access, see Appendix 2.

Trail Use

The area has historically been used by equestrians and OHV users, although the canyons also tend to draw other users, including hunters, target shooters, geocachers, and hikers. The area north of the State Highway and east of Buckhorn Canyon receives a great deal of use due to its relative proximity to Redmond. Since Buckhorn Road is a well maintained County Road, and has an adjacent power line to the west, there is a great deal of use between the power line and road. Because it is the largest and most visible canyon in the area, Deep Canyon likely receives the greatest amount of use. This use includes a variety of OHV use adjacent to, and north of State Highway 126. Trail use appears to decrease as distance from Highway 126 increases. Access into Deep Canyon from the north side of State Highway 126 is difficult, especially for vehicles with trailers. As mentioned previously in the Central Area discussion, access into Deep Canyon from State Highway 126 requires the public to trespass on private property. With slightly easier access, it is likely that Deep Canyon on the south side of the Highway receives much greater visitation than to the north. The area between Deep Canyon and McKenzie Canyon is relatively difficult to access, and appears to receive the greatest amount of use from local equestrians, who have developed a trail system complete with posted signs on the plateau. The entire area north of State Highway 126 has a relatively high amount of narrow trails, due to the topography, creation of horse trails on the westernmost plateau, and the relatively recent creation of many motorcycle trails in the remainder of the area.

Table 43: Existing Route Miles and Densities – North of State Highway 126

Route Type	Miles	Miles/Sq. Mile
Existing routes, including State/County Roads	82.8	6.9
Interim UDRMP motorized route system[1]	44.7	3.9
Rights of Ways[2]	20.27	1.69

[1]Routes currently open to motorized travel as part of the UDRMP (RMP Map 13).
[2]Roads and/or utility lines with approved Rights of way grants.

Non-Motorized Recreation Exclusive - Maston area

The 4,099 acre (6.4 square mile) Maston area includes BLM administered lands between the Deschutes River and Cline Falls Highway, along with one isolated 120 acre parcel on Harper Road and three parcels of BLM administered land on the east side of the Deschutes River (at Jaguar Road, Quarry/ McVey Roads, and 63rd Street). The area includes approximately 18.8 acres of adjacent County land, in several parcels located on the Deschutes River. These public lands encompass the Maston grazing allotment. The Maston area differs from the rest of the CBRA by the absence of interior private parcels (inholdings). However, there are about 5 parcels located between BLM administered lands and the Deschutes River, all of which require ROW roads for private property access through the Maston area.

The area historically has been used by OHV users, equestrians, hikers, and anglers. Mountain bike use in the area is fairly recent, in part due to the area's exposure from the Cline Buttes planning process. Conversations with area anglers indicate that the remoteness and light use along this stretch of river, particularly the southern portion, is one of the reasons for their visitation.

The area was designated closed to motorized use in 2005 (UDRMP, pg. 117), although the Red Cinder Road ROW road at the north end of the area was left open to public motorized use pending area-specific planning. Past OHV use has included travel from the Buttes area across Cline Falls Highway in several places. OHV use appears to occur most frequently in the southeast corner of the area.

Maston Area Access

The Maston area is bordered by county roads to the west and south, and public access typically occurs from either of these two roads (Cline Falls Highway and Newcomb Road. Cline Falls Highway forms the western edge of the area, while Newcomb Road extends about one mile along the south boundary of the area, before turning south and connecting to Harper Road. A non-County, BLM granted ROW road (ROW 24/38, Map 5) extends along the rest of the southern boundary of the area, and provides access to parcels 15 and 16 located on the western canyon rim of the Deschutes River. The Deschutes River forms the eastern boundary of the area, while a residential subdivision is directly to the north, with Eagle Crest Resort slightly further north. Rural residential development occurs to the south of the Maston area, including homes in the White Rock Loop area and the Deschutes River Ranch development.

At a minimum, there are about 25 public access points into the Maston Area and Harper Road parcel. The most heavily used access points into the area occur at nine locations on the north side of Newcomb Road, which is not fenced. Newcomb Road and the Red Cinder Road (ROW roads 24/38 and 21 on Map 5) are often used by CBRA visitors trying to reach the Deschutes River Canyon. For a more detailed description of access to the Maston area, please see Appendix 2.

Maston Area Trail Use

There are approximately 50 miles of routes in the Maston area, not including public roads such as Cline Falls Highway or Newcomb Road. Roughly half of these are user created, narrow routes. Most of the remaining routes are primitive roads, between four to eight feet in width. There are numerous river access trails and routes along both sides of the Deschutes River. In general, the most heavily used portions of the Maston area include the southwestern corner adjacent to Newcomb Road/Cline Falls Highway, and the various river access points.

Table 44: Existing Route Miles and Densities – Maston Area

Route Type	Miles	Miles/Sq. Mile
Existing routes, including State/County Roads	56.4	8.8
Interim UDRMP motorized route system[1]	1.2	0.45
Rights of Ways[2]	15.85	2.47

[1]Routes currently open to motorized travel as part of the UDRMP (RMP Map 13).
[2]Roads and/or utility lines with approved Rights of way grants.

Two power line access roads form major north-south corridors through the area, while Newcomb Road along the south and the red cinder road to the north provide the major east-west routes. An unimproved dirt road is located between the two power line corridors and provides a third north-south corridor. Approximately 7.5 miles of relic canals historically have been used as trail routes in the south and center portions of the area. The northeast portion of the area contains a gentle canyon or draw, with a sizeable north-facing slope and elevated viewpoints. There are several single-track trails in this area, which is relatively remote and undisturbed. Local residents have identified this area as a popular location for hiking and interpretive use (Lonsdale, 2007).

Both ROW roads currently offer motorized vehicle access into the Maston area, close to the river canyon. The red cinder road is currently open to public motor vehicle use, although it is not widely recognized as a public land access point due to lack of identifying signs or visitor maps for the area. The ROW road at the east end of Newcomb Road is closed to public motor vehicle access at the point where the road enters the CBRA and parallels the river canyon. However, this closure has not been clearly signed, and many people drive into BLM on this road, particularly to access the casual use river access trail at the southernmost power line crossing the Deschutes River Canyon.

Non-Motorized Recreation Emphasis – Area West of Fryrear Road

This area includes 590 acres (0.9 square miles) located west of Fryrear Road and north of Cascade Estates Drive. There are approximately 4.7 miles of routes in this area, of which 2.8 miles are currently available for motorized use. The area is bordered by Fryrear Road to the east, and Cascade Estates Drive to the south.

Recreation use of this area is relatively low and has not presented many management issues over the past decade. The area has many basalt rock ridges, making full size vehicle access difficult and generally confined to several short routes starting from Fryrear Road (see Table 45). These routes generally parallel Fryrear Road or extend a short distance into the eastern half of the parcel, and typically lead to dumping areas or spots where firewood theft has occurred. Since the area is separated from the rest of the CBRA by Fryrear Road, the fence built along the east side of Fryrear Road in 1997 limited any trail connections between this parcel and the rest of the Cline Buttes area.

Table 45: Existing Route Miles and Densities – West of Fryrear Road

Route Type	Miles	Miles/Sq. Mile
Existing routes, including State/County Roads	4.7	5.2
Interim UDRMP motorized route system[1]	1.7	1.9
Rights of Ways[2]	1.09	1.18

[1]Routes currently open to motorized travel as part of the UDRMP (RMP Map 13).
[2]Roads and/or utility lines with approved Rights of way grants.

Access

Several unimproved roads enter into the parcel from Fryrear Road. These routes extend into the area for about ½ mile, before dead-ending at particularly rocky areas. Several routes extend from private property from residences along Cascade Estates Drive. There are no existing public access points from this road, although the road does pass through BLM administered land for about ¼ mile.

Trail use

Trail use in this area appears to be low. This may be due in part to the parcel's separation from the rest of Cline Buttes by Fryrear Road. One route connects Fryrear Road to a private parcel located north of Cascade Estates, and this route appears to receive regular use by motor vehicles.

Dispersed Recreation Use (Entire CBRA)

Hunting

The CBRA includes portions of the Upper Deschutes and Metolius Wildlife Management Units. The Upper Deschutes unit includes CBRA lands north of State Highway 126. The Metolius unit includes CBRA lands north of State Highway 126. Hunting occurs in the CBRA, generally focused on deer

and elk. Factors that influence hunting opportunities in the CBRA include the number of public roads and the resulting high numbers of road kill animals in the management units as well as the marginal habitat in the management unit compared to other parts of Oregon (ODFW 20007 Hunting Forecast). Damage hunts have occurred in the western portion of the CBRA. In addition, the increasing level of development creates conflicts between firearm users and adjacent homeowners.

Camping

Camping is not a major recreation use in the CBRA. Most camping use occurs at the north end of Barr Road, where several user-created parking areas have been created to serve OHV use. OHV visitation from western Oregon and Washington during the winter and early spring tends to create the most demand for camping. Other areas where camping has occurred on a regular but less frequent basis include Deep Canyon, the south end of Barr Road, and easily accessible areas along the Deschutes River Canyon rim. There is likely some camping associated with hunting and equestrian use as well.

Target Shooting

Approximately 1,284 acres (4% of CBRA) are closed to all firearm discharge (RMP Map 7). This includes the Tumalo Canal ACEC, the separate parcel of CBRA lands south of Harper Road, and the parcels located east of the Deschutes River at Jaguar Road and at Quarry Avenue. Approximately 8,214 acres (25 % of CBRA) are closed to firearm discharge unless legally hunting. These areas generally correspond to the entire Maston and Buttes areas (CBRA east of Barr Road). Target shooting usually depends on full size vehicle (road) access. BLM has identified areas that receive consistent target shooting use, including:

- several locations immediately north of County maintained portion of Newcomb Road (Maston area);
- the power line corridor west of Buckhorn Road and north of State Highway 126;
- the existing ODOT Cinder Pit west of Barr Road;
- Deep Canyon both north and south of State Highway 126; and
- Buckhorn Canyon and other canyons and rimrock north of State Highway 126 and east of Buckhorn Road.

Interpretive, Event, and Commercial Use

Portions of the CBRA have been used by COCC, Bend Metro Parks, and other organizations for interpretive, recreational or class exercises. The BLM receives requests from a variety of individuals and organizations interested in offering equestrian, mountain bike, and guided hiking opportunities in the CBRA.

In the past, Eagle Crest Resort, through a contractor (Equine Services), held a special recreation permit from the BLM to provide trail rides in the CBRA. There are currently no approved special recreation permits solely for CBRA use. In the past, group events have occurred in the area, both for OHV clubs, and equestrian groups. These events have typically started at the Barr Road/State Highway 126 intersection or off State Highway 126 at the bottom of Deep Canyon. Issuance of permits for events has been hampered in the past by the lack of designated, maintained trails and the high number of existing routes that cross private property.

Rafting/boating

The section of the Deschutes River in the CBRA is not highly used for rafting or boating, in part due to low flows in the summer (See Hydrology Section). The 14.5-mile stretch of river between Tumalo

State Park and Cline Falls State Park is long for a winter paddle (when the river has sufficient flows) due to the short daylight hours. However, visitors access the river from BLM administered lands with inflatable rafts and inner tubes during the summer. Input from the Bend Paddle Trail Alliance indicates that none of the existing access points offer good conditions for public put-in or take-out points (Day, 2006).

Geocaching

Approximately 20 different geocaches are currently located within the CBRA. The area is popular because of scenic views, natural setting, and proximity to Redmond and Bend. Like other recreation uses in the CBRA (and BLM administered lands in general), many of these caches occur on, or require trespass across private property. The Tumalo Canal ACEC was closed to placement of geocaches in the UDRMP, while the remainder of the CBRA remains open to this use.

3.11 Wildlife

Introduction

This section focuses on priority wildlife species. The vegetation section describes more fully the existing conditions of the plant communities which wildlife depend upon. Additional information on wildlife species and their habitats can be found in the Proposed Upper Deschutes Resource Management Plan and Final Environmental Impact Statement (UDPRMP/FEIS, USDI 2005).

Priority wildlife species, called "Species of Focus" (SOF), are listed in Table 46. Species of Focus are wildlife species for which there is ongoing concern, or local interest in a population or habitat status. Species were included if they met one of the three following criteria and were of management concern associated to the proposed project:

- Species that are included in the Special Status Species Policy (6840) which includes: federally listed threatened, endangered or proposed species;
- Bureau Sensitive species.
- Species of local interest, such as mule deer (*Odocoileus hemionus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), prairie falcons (*Falco mexicanus*) and golden eagles (*Aguila chrysaetos*).

Approximately 198 different wildlife species may occur in the project area. Approximately 130 of these species have been documented either in the immediate area or nearby in similar habitats. Six species designated as BLM Sensitive have the potential to occur in the project area, however the bald eagle (*Haliaeetus leucocephalus*) would be an infrequent visitor and the pygmy rabbit (*Brachylagus idahoensis*) likely does not occur. There have been no documented sightings of the pygmy rabbit in the project area. There are no federally listed or proposed species known to occur in the project area. There are four species of local interest that occur (Table 46). Species of focus discussed in this section are mule deer, Rocky Mountain elk, golden eagles and prairie falcons. Appendix 3 lists all known and suspected wildlife species that may occur in the CBRA, and the habitats they use.

Table 46: Wildlife Species of Focus Inhabiting the Project Area

Common Name	Scientific name	Assessment Type: Single-species or Source Habitat (Multi-species[1])
Mule Deer	*Odocoileus hemionus*	Single-species
Rocky Mountain Elk	*Cervus elaphus nelsoni*	Single-species
Prairie Falcon	*Falco mexicanus*	Both
Golden Eagle	*Aquila chrysaetos*	Both

[1]For multi-species assessment types the animal's associated source habitat(s) is (are) named.

This section also focuses on the three main habitat types, referred to as source habitats, present in the project area: shrub-steppe, juniper woodlands and riparian habitats.

Sixty-four percent (20,273 acres) of the planning area consists of old growth juniper woodlands and 36 percent (11,221 acres) shrub-steppe habitats. Twenty-four percent (2,734 acres) of shrub-steppe habitats are existing shrub-steppe while 76 percent (8,487 acres) are dominated by young juniper. There are also two miles of riparian habitats along the Deschutes River.

The UDRMP allocated all BLM public lands to one of the three wildlife emphasis levels; these include primary, secondary and general (see Map 14). Each of these levels provides different management objectives and guidelines for species and source habitats. The UDRMP also provides guidance for species such as raptors that should be applied consistently across the planning area regardless of wildlife emphasis.

This section describes the species of focus and their source habitats as they occur in the three wildlife emphasis allocations.

The Primary Wildlife Emphasis Area makes up 13 percent (4,090 acres) of BLM administered lands in the project area. This area is bordered on the west side by Cline Falls Highway, generally on the east side by the Deschutes River, the south by Newcomb Road and to the north by a subdivision adjacent to Eagle Crest Resort. This area contains 3,556 acres of old growth juniper and 444 acres of shrub-steppe habitats. Twenty four percent (107 acres) of shrub-steppe habitats are currently dominated by young juniper. There are 3.63 miles of ROWs for private land owner access. Table 47 displays the existing amounts of all travel routes within this emphasis area.

The Secondary Wildlife Emphasis Area makes up 13 percent (4,194 acres) of BLM administered lands in the project area. This area generally is bordered on the west side by Fryrear Road and on the east side by Dry Canyon, the south by Sage Ranch Road and to the north by Highway 126. This area contains 2,671 acres of old growth juniper and 1,506 acres of shrub-steppe habitats. Eighty-one percent (1,225 acres) of shrub-steppe habitats are currently dominated by young juniper. There are 1.32 miles of ROWs for private land owner access. Table 48 displays the existing amounts of all travel routes within this emphasis area.

Table 47: Travel Routes Within and Bordering the Primary Wildlife Emphasis Area

Road Jurisdiction	Total Miles	Miles per square mile of BLM
BLM designated roads and trails for motorized use[1]	4.88	0.76
BLM non-motorized routes	49.25	7.72
BLM granted ROWs[2]	3.63	0.57
State and County Roads	2.12	0.33
BLM, State and County designated roads and trails for motorized use	7.0	1.1

[1]Includes ROW roads, non-ROW roads that are improved and used regularly as driveways, and BLM designated routes for public motorized vehicle travel
[2]BLM granted ROW refers to private landowner's access routes and is assumed they're driven daily (not utility ROWs used infrequently).

Table 48: Travel Routes Within and Bordering the Secondary Wildlife Emphasis Area

Road Jurisdiction	Total Miles	Miles per square mile of BLM
BLM designated roads and trails for motorized use	21.03	3.21
BLM non-motorized routes	18.29	2.79
BLM granted ROWs	1.32	0.2
State and County Roads	2.47	0.38
BLM, State and County designated roads and trails for motorized use	23.5	3.59

Table 49: Travel Routes Within and Bordering the General Wildlife Emphasis Area

Road Jurisdiction	Total Miles	Miles per square miles of BLM
BLM designated roads and trails for motorized use	155.71	4.25
BLM non-motorized routes	95.79	2.61
BLM granted ROWs	13.74	0.38
State and County Roads	20.71	0.57
BLM, State and County designated roads and trails for motorized use	176.42	4.81

The General Wildlife Emphasis Area makes up 75 percent (23,698 acres) of BLM administered lands. This area generally is located in the middle and northern areas of the project area. This area contains 14,046 acres of old growth juniper and 9,271 acres of shrub-steppe habitats. Seventy-seven percent (7,154 acres) of shrub-steppe habitats are currently dominated by young juniper. There are 13.74 miles of ROWs for private land owner access. Table 49 displays the existing amounts of all travel routes within this emphasis area.

Species of Focus

Mule Deer

While mule deer can be found year round in the project area, they are most abundant during the winter months when they move down from higher elevation summer range onto their winter range. Forty-eight percent (15,040 acres) of the project area is located in mule deer winter range (see Map 14).

In general, mule deer find abundant forage in open juniper woodlands and shrub-steppe habitats. As the number of juniper trees increases in woodlands, suitable forage plants for deer decrease. For example, bitterbrush and sagebrush decline in abundance and vigor as juniper cover increases. Juniper woodlands provide suitable hiding cover for deer. Stands of sagebrush and topography can also provide suitable cover and screening for deer from inclement weather and human disturbances.

One of the main issues for mule deer is increasing amounts of human developments, including roads and trails located in winter range. Greater amounts of development and travel routes fragment deer habitats into small patch sizes making them less suitable for deer use. Juniper trees and shrubs provide hiding cover that helps minimize human disturbance activities that could otherwise cause deer to move out of the area. Thomas et. al. (1979) stated "the ratio of 40 percent of a land-type in cover to 60 percent in forage areas of proper size and arrangement approximates optimum habitat in the Blue Mountains." Oregon Department of Fish and Wildlife often recommends (personal communication,

2005) the 40/60 ratio of cover to forage during BLM vegetation management planning. The Prineville District often uses this guideline during vegetation management in the mule deer winter range**.**

There are approximately 90 miles of motorized roads and trails resulting in a density of 3.82 miles per square mile of winter range. This density of travel routes puts this area into the range indicating a moderate level (47 percent) of human influence. There are 6.16 miles of ROW roads (private land access) in deer winter range within the CBRA.

Deer winter range is made up of 59 percent (8,809 acres) old growth juniper woodlands and 41 percent (6,231 acres) shrub-steppe habitats. The shrub-steppe habitats consist of 21 percent (1,279 acres) suitable shrub-steppe habitats and 79 percent (4,952 acres) shrub-steppe that is dominated by young juniper. Nine percent (1,279 acres) of the deer winter range within the CBRA provides shrub-steppe foraging habitat and 91 percent (13,761 acres) provides juniper hiding cover. Of the 13,761 acres of juniper cover, 36 percent (4,954 acres) is young juniper occupying historical shrub-steppe habitat.

Wildlife Emphasis Areas

Primary

- This area does not contain any recognized deer winter range. However, because of the available water located in the Deschutes River and the fragmentation of their winter range by human developments this area is likely used more by wintering mule deer.

Secondary

- This area contains 23 percent (3,507 acres) of the deer winter range in the project area.
- There are 20.5 mile miles of roads and trails for motorized use within this area, resulting in 3.74 miles of route per square mile of habitat.
- The total amount of designated roads and trails and non-designated routes within this habitat falls into the range indicating a moderate level (51 percent) of human influence.
- 1.32 miles of ROWs exist for private landowners to access their property.
- Ninety six percent (3,367 acres) of the deer winter range is made up of juniper hiding cover and four percent (140 acres) of existing shrub-steppe foraging habitat. Seventy eight percent (2,641 acres) of the juniper cover is old growth juniper and 22 percent (726 acres) is shrub-steppe habitat that is currently dominated by young juniper.

General

- This area contains 77 percent (11,533 acres) of the deer winter range in the project area.
- There are 90 miles of roads and trails within this area resulting in 3.82 miles of route per square mile of habitat.
- The amount of designated roads and trails and non-designated routes within this habitat falls into the range indicating a moderate level (55 percent) of human influence.
- 4.84 miles of ROWs exist for private landowners to access their property.
- Ninety percent (10,393 acres) of the deer winter range is made up of juniper hiding cover and 10 percent (1,140 acres) of existing shrub-steppe foraging habitat. Fifty nine percent (6,167 acres) of this juniper cover is old growth juniper and 41 percent (4,226 acres) is shrub-steppe habitat that is currently dominated by young juniper.

Rocky Mountain Elk

There are 28,860 acres of elk winter range on BLM administered lands, covering 92 percent of the project area (see Map 14). In general, elk find abundant forage in shrub-steppe habitats and open juniper woodlands. As the amount of juniper increases, forage usually will decrease. This may not always be the case, as on north facing slopes bunchgrasses can still be abundant in dense woodland cover. Juniper woodlands also provide suitable hiding cover for elk.

One of the main issues for elk populations is increasing amounts of human developments, including roads and trails located in winter range. As development occurs in winter range (including roads and trails), elk habitats are fragmented into smaller patch sizes making them less suitable. Juniper trees provide hiding cover that helps minimize human disturbance activities that could otherwise influence elk to move out of the area.

There are 202 miles of roads and trails for motorized use within elk winter range resulting in a density of 4.5 miles per square mile with a habitat effectiveness of 24 percent.

There are 16.7 miles of ROW roads for private land access within elk winter range in the CBRA.

Elk winter range is made up of 78 percent (17,881 acres) old growth juniper woodlands and 22 percent (5,169 acres) shrub-steppe habitats. These shrub-steppe habitats consist of 49 percent (2,528 acres) existing shrub-steppe habitats and 51 percent (2,584 acres) shrub-steppe that is dominated by young juniper.

Wildlife Emphasis Areas

Primary

- Elk Winter Range within Primary Wildlife Emphasis areas include 1,366 acres (five percent) of the elk winter range in the CBRA. Elk likely visit this area infrequently due to human developments, fragmentation of their winter range and their sensitivity to human disturbance.
- There are 2.5 miles of roads for motorized use in this area, resulting in 1.2 miles of route per square mile of habitat.
- This area has a habitat effectiveness of 34 percent.
- 0.48 miles of ROWs exist for private landowners to access their property within elk winter range.
- Eighty six percent (1,178 acres) of the elk winter range is made up of juniper hiding cover and 14 percent (187 acres) of existing shrub-steppe foraging habitat. Ninety nine percent (1,164 acres) of this juniper cover is old growth juniper and one percent (15 acres) is shrub-steppe habitat that is currently dominated by young juniper.

Secondary

- Elk Winter Range within Secondary Wildlife Emphasis Areas includes 4,176 acres (14 percent) of the elk winter range in the CBRA.
- There are 23.5 miles of designated roads and trails in this area, resulting in 3.6 miles of route per square mile of habitat.
- This area has a habitat effectiveness of 24 percent.
- 1.32 miles of ROWs exist for private landowners to access their property.

- Ninety three percent (3,896 acres) of the elk winter range is made up of juniper hiding cover and seven percent (280 acres) of existing shrub-steppe foraging habitat. Sixty nine percent (2,671 acres) of this juniper cover is old growth juniper and 31 percent (1,225 acres) is shrub-steppe habitat that is currently dominated by young juniper.

General

- This area contains 81 percent (23,318 acres) of the elk winter range in the CBRA.
- There are 176 miles of motorized travel routes within the general wildlife emphasis area, resulting in 4.8 miles of route per square mile of habitat.
- Habitat effectiveness is 23 percent for this area.
- 13.74 miles of ROWs exist for private landowners to access their property.
- Ninety one percent (21,200 acres) of the elk winter range is made up of juniper hiding cover and nine percent (2,117 acres) of existing shrub-steppe foraging habitat. Sixty six percent (14,046 acres) of this juniper cover is old growth juniper and 34 percent (7,154 acres) is shrub-steppe habitat that is currently dominated by young juniper.

Golden Eagles

There are three active golden eagle nesting territories (Jaguar Road, Fryrear Road and Deep Canyon) located within the CBRA and two historic territories (Buckhorn Canyon and Awbrey Falls) located outside, but within ½ mile of the CBRA. Golden eagles are sensitive to human activities near nest sites during the breeding season. The UDRMP provides guidance to minimize disturbance actions within ½ mile of active nest sites during the breeding season. There are 2,107 acres of BLM administered lands within ½ mile of golden eagle nest sites in the CBRA. Golden eagles nest in large ponderosa pine trees and cliffs and forage in shrub-steppe habitats and open juniper woodlands to feed primarily on jackrabbits and ground squirrels.

There are a total of 44 miles of designated roads and trails and non-designated routes (26.36 miles on BLM and 17.66 miles on private, state or county lands) within ½ mile of all eagle nesting territories and none are closed seasonally. There are 1.53 miles of ROW roads existing on BLM within ½ mile of the nest sites for private land access.

Prairie Falcons

There are three active prairie falcon nesting territories (Deschutes River North, Deschutes River South and Fryrear Canyon) located within the project area. There are 367 acres of BLM administered lands within ¼ mile of these nest sites. It is unknown how consistently occupied and successful these territories have been, but a neighbor reported one nest site was often occupied and in 2006 two sites were occupied. Prairie falcons are sensitive to human activities near nest sites during the breeding season. The UDRMP provides guidance to minimize disturbance actions within ¼ mile of active nest sites during the breeding season. Prairie falcons typically nest in cliff faces and feed on small birds and small mammals in open juniper woodlands and shrub-steppe habitats. While prairie falcons are smaller and more mobile than golden eagles they are more effective hunting in open juniper woodlands and shrub-steppe habitats than dense vegetative cover.

There are a total of 8.22 miles of roads and trails and undesignated routes within ¼ mile of the three active prairie falcon nesting territories and no miles are closed seasonally. There are 0.74 miles of ROWs on BLM within ¼ mile of the nest sites for private landowners to access their property.

Source Habitats

Juniper Woodlands
Old growth juniper woodlands provide food, cover, and nesting resources for many different wildlife species (see Appendix 3). For example, Townsend's solitaire (*Myadestes townsendi*) and American robins (*Turdus migratorius*) feed on berries; deer and elk use juniper woodlands for cover; and the American kestrel (*Falco sparverius*) and northern flicker (*Colaptes auratus*) nest in cavities of older trees. Down logs also provide foraging opportunities for woodpeckers, as well as cover for snakes, lizards and small mammals.

There are approximately 20,273 acres of old growth juniper woodlands in the project area. The total current amount of roads, trails and non-designated routes (including County and State roads) falls into the range (50.5 percent) indicating a high level of human influence within this habitat.

There are 14.04 miles of ROW roads within old growth juniper woodlands for private property access.

Wildlife Emphasis Areas

Primary:

- Contains seventeen percent (3,556 acres) of the old growth juniper habitat within the CBRA.
- The amount of designated roads and trails, and non-designated routes within this habitat falls into the range indicating a moderate level (47 percent) of human influence.
- There are 3.63 miles of ROW roads on BLM for private land access.

Secondary:

- Contains thirteen percent (2,671 acres) of the old growth juniper habitat within the CBRA.
- The amount of designated roads and trails and non-designated routes within this habitat falls into the range indicating a moderate level (47 percent) of human influence.
- There are 0.81 miles of ROW roads on BLM for private land access.

General:

- Contains seventy percent (14,143 acres) of the old growth juniper habitat within the CBRA.
- The amount of designated roads and trails, and non-designated routes within this habitat falls into the range indicating a high level (52 percent) of human influence.
- There are 9.6 miles of ROWs on BLM for private land access.

Shrub-Steppe
Shrub-steppe habitat provides food, cover and nesting resources for many different wildlife species (see Appendix 3). For example, shrub-steppe habitat provides foraging opportunities for deer, elk, golden eagles and prairie falcons, nesting habitat for sage sparrows (*Amphispiza belli*) and rufous sided towhees (*Pipilo maculates*) and cover for black-tailed jackrabbits (*Lepus californicus*) and mountain cottontail rabbits (*Sylvilagus nuttallii)*.

There are approximately 11,221 acres of shrub-steppe habitats in the project area. Of this, 76 percent (8,487 acres) is dominated by young juniper and 24 percent (2,734 acres) is currently functioning as shrub-steppe. The total current amount of roads, trails and non-designated routes (including County and State roads) falls into the range (47 percent) indicating a moderate level of human influence within this habitat.

There are 4.28 miles of ROW roads within old growth juniper woodlands on BLM for private land access.

Wildlife Emphasis Areas

Primary:

- Contains four percent (444 acres) of the shrub-steppe habitat within the CBRA.
- The amount of roads and trails and non-designated routes within this habitat falls into the range indicating a high level (51 percent) of human influence.
- There are no ROWs existing for private landowner access.

Secondary:

- Contains thirteen percent (1,505 acres) of shrub-steppe habitat within the CBRA.
- The amount of roads and trails and non-designated routes within this habitat falls into the range indicating a moderate level (48 percent) of human influence.
- There are 0.51 miles of ROW roads existing on BLM for private land access.

General:

- Contains eighty three percent (9,416 acres) of shrub-steppe habitat within the CBRA.
- The amount of human travel routes within this habitat falls into the range indicating a moderate level (47 percent) of human influence.
- There are 3.77 miles of ROW roads existing on BLM for private landowner access.

Riparian

There are two miles of river and associated riparian habitats on BLM administered lands within the CBRA. The riparian area is located along the Deschutes River in the primary wildlife emphasis area. There are no riparian habitats located in the Secondary or General Wildlife Emphasis Areas.

Approximately 1.1 miles (50 percent) of the river located on BLM within the CBRA have young junipers encroaching upon the riparian vegetation. There are no private land access ROW roads located within or along the Deschutes River in the CBRA.

3.12 Transportation and Rights of Way

Introduction

The CBRA contains State and County roads, rights of way (ROW) roads granted by the BLM for private property access, and a wide variety of non-maintained routes of varying widths and conditions (see Figures 12 through 16). There are about 365 miles of routes in the CBRA; the full complement of known routes is shown on Map 3. The current CBRA transportation system was designated in the Upper Deschutes Resource Management Plan (UDRMP) in 2005. The UDRMP identified a system of routes available for motorized travel, intended to serve the area until further site-specific planning was undertaken (see Table 38). This system was identified primarily for managing OHV use and used a portion of the existing routes known at the time the UDRMP was completed.

Figure 12: Miles of Route by Width, Maston Area

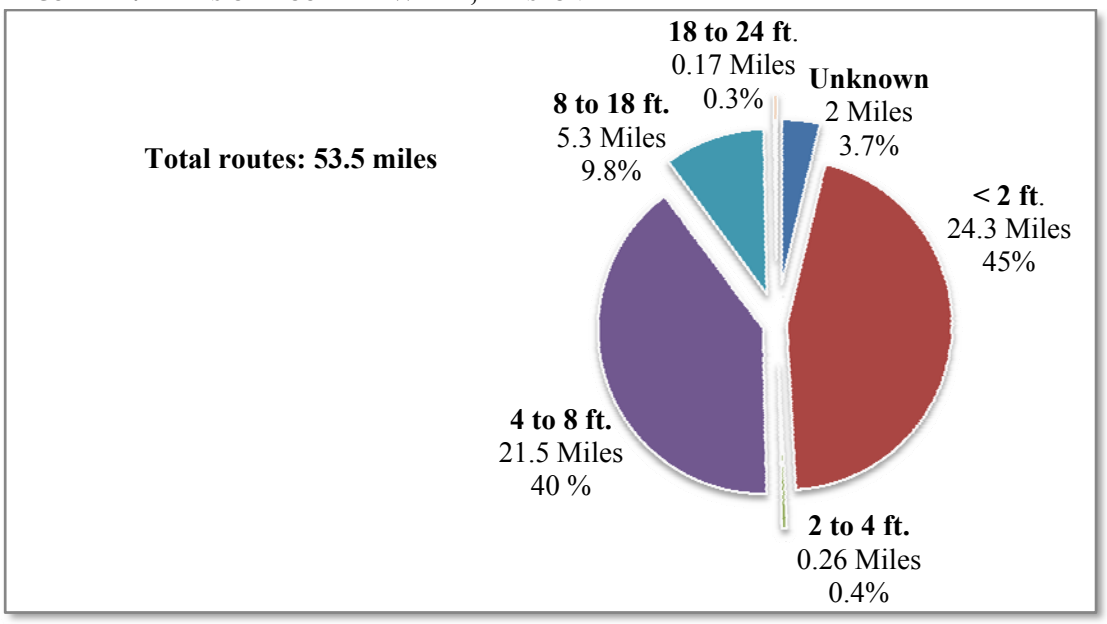
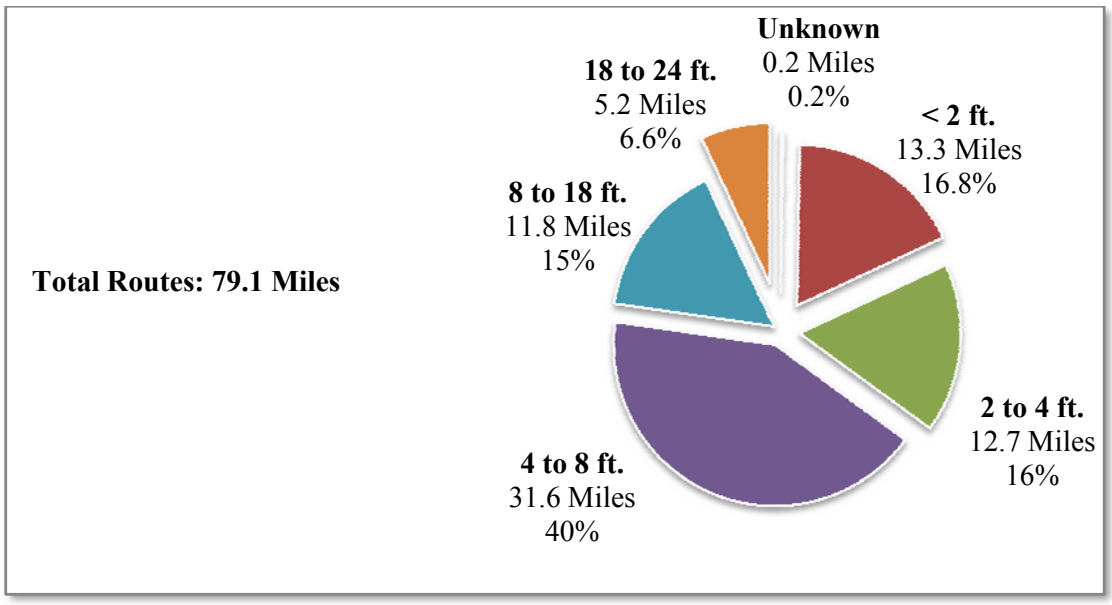


Figure 13: Miles of Route by Width, Buttes Area



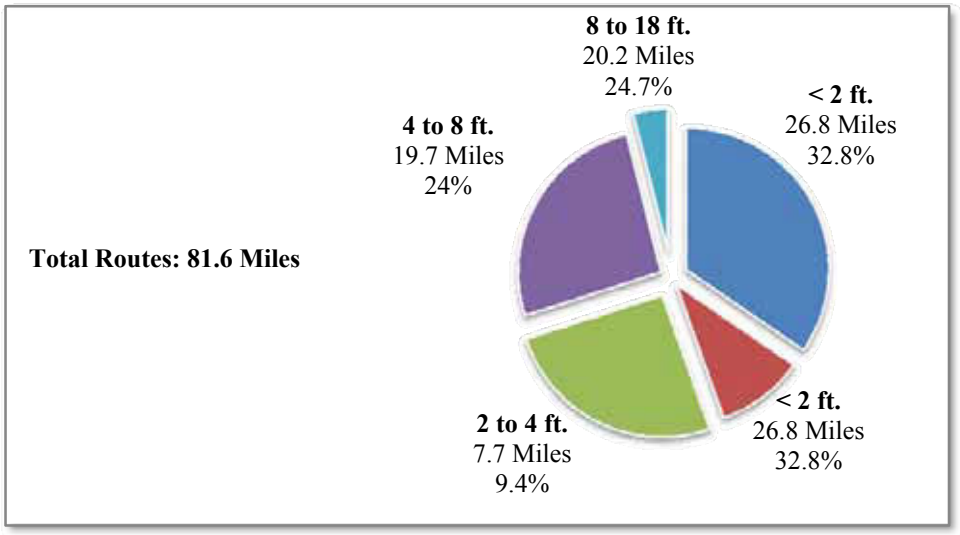


Figure 14: Miles of Route by Width, North of State Highway 126

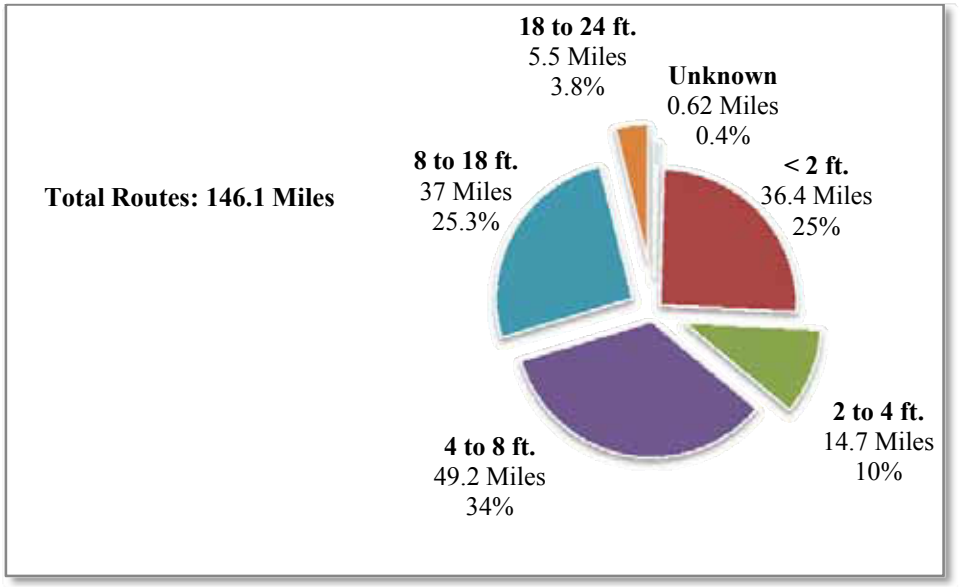


Figure 15: Miles of Route by Width, Beteween Barr Road and Fryrear Road

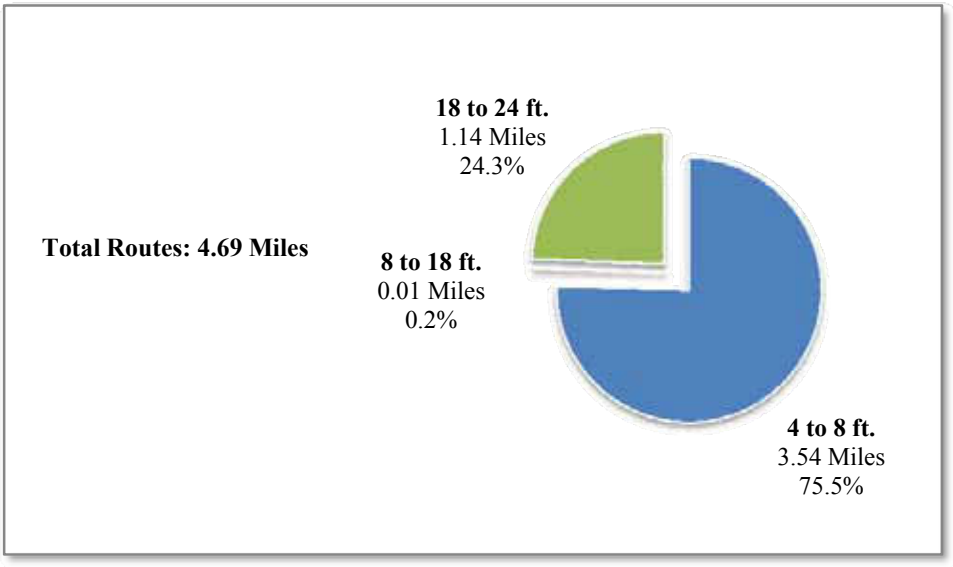


Figure 16: Miles of Route by Width, West of Fryrear Road

For the purposes of the CBRA planning effort, BLM conducted field inventories in 2005 and 2006 that inventoried, mapped, and categorized all existing routes by width and surface type. This effort increased the known miles of routes for the CBRA, particularly narrower routes in more difficult or remote terrain. Additional data were collected to identify route jurisdiction, maintenance responsibility, allowable uses, ROW status, administrative use, and access controls.

None of the roads in the CBRA are currently maintained by the BLM. The only maintained roads outside of the State or County systems are ROW roads across public lands that are maintained by private property owners. In most cases, these ROW roads are open to general public use, including OHV travel.

There are several private in holdings that lack legal road access. Many of these parcels are undeveloped; however some are developed parcels with maintained/improved roads that lack legal ROW grants.

Many existing road ingress/egress points to the CBRA occur at locations that are undesirable for intersections and/or not authorized by ODOT or Deschutes County through approach permits.

Existing Roads and Road Uses

Oregon Department of Transportation (ODOT)
U.S. Highway 20, the main east/west route through the center of the state, touches the southeast corner of the CBRA (at the Innes Market Road intersection). This road connects Bend and Sisters to the western part of the CBRA.

State Route 126, the connector between Sisters, Redmond and Prineville, bisects the CBRA east-west for a distance of about 5.3 miles. This road is being considered for expressway status (Hilton, 2007). At the western edge of the planning area, State Route 126 includes steep grades, curves and passing lanes in the vicinity of Deep Canyon. ODOT has expressed concerns regarding the need to minimize the number of ingress/egress points at the highway, and in general, the need to move these intersections east, away from Deep Canyon. Neither ODOT nor the County retain jurisdiction on the relic asphalt sections of the old highway on either side of the current State Route 126, with the exception of the portion of Kingwood Road east of the CBRA and north of State Highway 126, which is maintained by the county. While the relic portions of the highway are used by the public, they are not public roads, and their asphalt surface is not being maintained.

Deschutes County
There are about 25 miles of County Roads within the CBRA; these include Innes Market Road, Barr Road, Cline Falls Highway, Buckhorn Road, and Fryrear Road.

Deschutes County roads are generally permitted through ROW grants as provided by the Federal Lands Policy and Management Act (FLPMA), 1976.

Major County Roads

- Fryrear Road – Fryrear Road is a paved, double lane rural collector road located on the western edge of the planning area, and bisects about 2.3 miles of BLM administered lands. Due to public land fencing projects that occurred a decade ago, the number of access points into the CBRA from Fryrear Road is relatively low.

- Barr Road – This road is a native surfaced, rural local road that bisects the CBRA north to south. Barr Road is not maintained by the County, and is in poor condition. Standard clearance passenger vehicles cannot navigate the entire stretch of Barr Road from north to south, due to its poor condition. The county does maintain the portion of Barr Road outside the CBRA between Cline Falls Highway and Gerking Market Road. The northern portion of Barr Road is maintained by contractors when they are operating in the existing ODOT cinder pit material site (ROW 40 and 41, Map 5). Public use on this portion of Barr Road is fairly heavy, particularly by OHV riders traveling from parking areas near State Highway 126 to the ODOT Cinder Pit. Since very little of Barr Road is fenced, the number of access points into the CBRA from this road has grown to approximately 50 routes (see Appendix 2).
- Buckhorn Road – Buckhorn Road bisects the CBRA north of State Highway 126 and provides an extension of Barr Road to the north. Buckhorn is maintained by the County as a gravel road and provides a connection between Lower Bridge Road and State Highway 126. Over the 3 mile stretch on public lands, Buckhorn Road provides access to approximately four private parcels.
- Cline Falls Highway – Cline Falls Highway splits the eastern portion of the CBRA north to south, running along the eastern base of the Buttes. Approximately 4 miles of this double lane, paved rural arterial road pass through public lands, roughly between Newcomb Road to the south and Eagle Crest to the north. The road provides access to Eagle Crest Resort, to a subdivision located south of Eagle Crest Resort, and access to the Thornburgh Resort property. Several improved right of way roads lead into the CBRA from Cline Falls Highway. These include the Cline Buttes Rock Pit Road (ROW 15) to the west, and the red cinder road (ROW 21) to the east, which provides access to private parcels near the Deschutes River.
- Innes Market Road – Innes Market Road borders the south edge of the CBRA, connecting U.S. Highway 20 to Cline Falls Highway. Approximately 1.7 miles of this paved, double lane, rural collector pass through BLM administered land. Innes Market provides few, if any, access points into public lands.
- Newcomb Road – Newcomb Road borders the south end of the CBRA east of Cline Falls Highway. This double-lane, gravel, rural local road passes through approximately ¾ miles of public land, heading east from Cline Falls Highway, then south to connect with Harper Road. The portion of Newcomb Road running north-south is not presently maintained by the County. Newcomb Road does provide access to several private parcels located east of Cline Falls Highway and south of Newcomb Road. The county portion of Newcomb Road, when combined with a BLM granted ROW (ROW 24/38) extending eastward, provides access to several private parcels located along the Deschutes River Canyon in the Maston Area (parcels 15 and 16, Map 5).

Private Roads

These are roads that are not public right of ways and are maintained by a separate entity (e.g., roads within Eagle Crest Resort). While these roads may provide access to BLM administered lands for individual or groups of property owners, their use by the general public is by permission only. Often the private nature of these roads is unsigned, or noted with handmade signs. Within or adjacent to the CBRA, these routes include:

103rd	95th
63rd	Quail Tree Drive
Sage Ranch Road	Fryrear Ranch Road
All roads within Eagle Crest Resort	FAA Road (aka VOR Road)

BLM Routes

BLM currently broadly categorizes all trails, ruts, tracks, wheeltracks, driveways, routes, roads, highways, etc. (planned or unplanned) as Transportation Linear Features. Those features formally recognized, designated, and approved represent the "Transportation System." Those features that are part of the Transportation System are further categorized as "Roads, Primitive Roads, or Trails." BLM defines all man-made linear features that are not part of the "Transportation System" as "Transportation Linear Disturbances." They are created by everything from cows and horses to full size vehicles and are of inconsistent width. Routes under BLM jurisdiction in the CBRA include the following general categories:

- Roads and trails designated as part of the UDRMP motorized vehicle route system (see Map 3), which constitutes 164 miles of routes open to general public use on motorized vehicles.
- Roads granted as ROWs that provide access to private property. These roads may be open to general public motorized vehicle use (if they are included in the UDRMP system). If absent from the UDRMP system, these roads are restricted to property access, administrative use, and non-motorized travel by the public.
- Non-designated routes which are not open to public motor vehicle use.

In general, most existing routes in the CBRA are over 4 feet in width.

UDRMP Interim System

The UDRMP interim system of motorized use routes serves as the current OHV trail system. This system is described in greater detail in the Section 3.9 (Recreation) of this EA.

Rights of Way (ROW)

Rights of way are grants that authorize the use of public lands for specified purposes such as roads, pipelines, or other utility lines (see Map 5). Rights of way have been granted in the CBRA for many years on an individual, as-requested basis, generally as new private property development occurs. The majority of ROWs in the CBRA are roads that provide access to private parcels. These road ROWs often include co-located power or telephone lines. There are approximately 78 miles of existing ROWs in the planning area (See Table 50). Road and material site ROWs, and their corresponding map identification numbers, are shown in Table 51 and 59.

Table 50: Rights of Way (Miles and Density) by Type and Area

Area	Power/Trans	Road	Telephone	Total Miles	Miles per Square Mile
Maston	8.51	6.27	1.07	15.85	2.47
Buttes	8.12	11.36	2.04	21.52	2.69
North of 126	2.38	12.8	5.08	20.26	1.69
South of 126	5.01	14.42	0.12	19.55	0.88
West of Fryrear	0	1.09	0	1.09	1.18
Total	24.02	45.94	8.31	78.27	1.58

Table 51: CBRA Road Rights of Way

Map ID Number	Serial Number	ROW Width (ft)	Notes
26	OR 42679		FAA reservation
4	OR 45930	20	
12	OR 42879		FAA
33	OR 04116		ODOT Cinder Pit (see Table 59, item 40)
3	OR 56890	16	
2	OR 57337	16	
7	OR 60850	15	
36	OR 20138a	60	
6	OR 23774	30	
9	OR 06645	400	State Hwy 126
34	OR 43973	20	
32	OR 52520	30	
30	OR 47767	20	
28	OR 35535	60	
31	OR 46053	30	
27	OR 46666	50	
24	OR 19460	30	
38	OR 23805		Overlap with ROW #24
21	OR 45975	20	
15	OR 50410	40	Road and Waterline
10	OR 49350	varies	Road, Water Storage (Eagle Crest)
39	OR 55575	16	Overlap with ROW #11
35	OR 51362	60	County Road
22	OR 62871	50	
37	OR 64065		McConnell Road
11	OR 61170	varies	Thornburgh Resort
13	OR 15986 OR 42879 OR 44038 OR51574		Communication Site Road

Table 52: CBRA Material Sites

Map ID Number	Serial Number	Size (acres)
38	ORTD 031278	40
39	ORTD 01664	20
40	ORTD 04116	10
41	ORTD 01773	20
42	ORTD 031963	10
43	ORTD 01952	40
44	ORORE 01705	20
45	ORTD 01888	40

Right of way roads vary from driveways to single residences to primary access roads leading to destination resorts. ROW roads that may carry relatively high volumes of traffic in Cline Buttes include:

- ROW 11 – Thornburgh Resort ROW;
- ROW 10 - Eagle Boulevard between Eagle Crest Phase 2 and 3 (Buttes Area);
- ROW 10 - Eagle Boulevard between State Highway 126 and Eagle Crest Phase 3 (Buttes Area). This road also includes a portion of the Thornburgh Resort ROW and the access road to parcel 52, Map 5; and
- ROW 15 - Cline Buttes Rock Pit Road (Buttes Area)

Other ROW roads that carry moderate volumes of traffic or serve as key recreation access routes include:

- ROW 24/38 - Newcomb Road (access to Deschutes River);
- ROW 21, aka Red Cinder Road (access to Deschutes River); and
- ROW26 - FAA Road (access to buttes, although use of this road by the public is private property trespass).

Other Rights of Way or Reservations

In addition to the linear ROWs discussed above, the CBRA also includes rights of way, reservations and mining claims. These include eight existing mineral material site authorizations ranging from 10 to 40 acres in size, most of which were granted to ODOT in the 1950's (See Map 5 and Table 52). The proposed ODOT material site/quarry (Site N) is approximately105 acres in size.

Portions of the CBRA north of State Highway 126 are included in the Buckhorn Mining Claim block, which consists of 20 unpatented mining claims covering approximately 1,540 acres, mostly north of State Highway 126 and west of Buckhorn Road. The claims, originally filed for in 1988, are for granular perlite which is used as an absorptive in environmental spills. There is currently an approved operating plan for 2 acres of disturbance for both the mining and processing facilities (serial number ORORO-059172). Although the mine claims cover 1,540 acres, only 2 acres has been utilized over the past 21 years. The 2 acre mine site is located on the west slope of Buckhorn Canyon. There are approximately 6.8 miles of publicly accessible motor vehicle routes on BLM administered lands within the 1,540 acre claim area, and an additional 4 miles of ROW roads or County roads. The public is currently allowed to drive the access road along the length of Buckhorn Canyon to within 1/4 mile of the mine site.

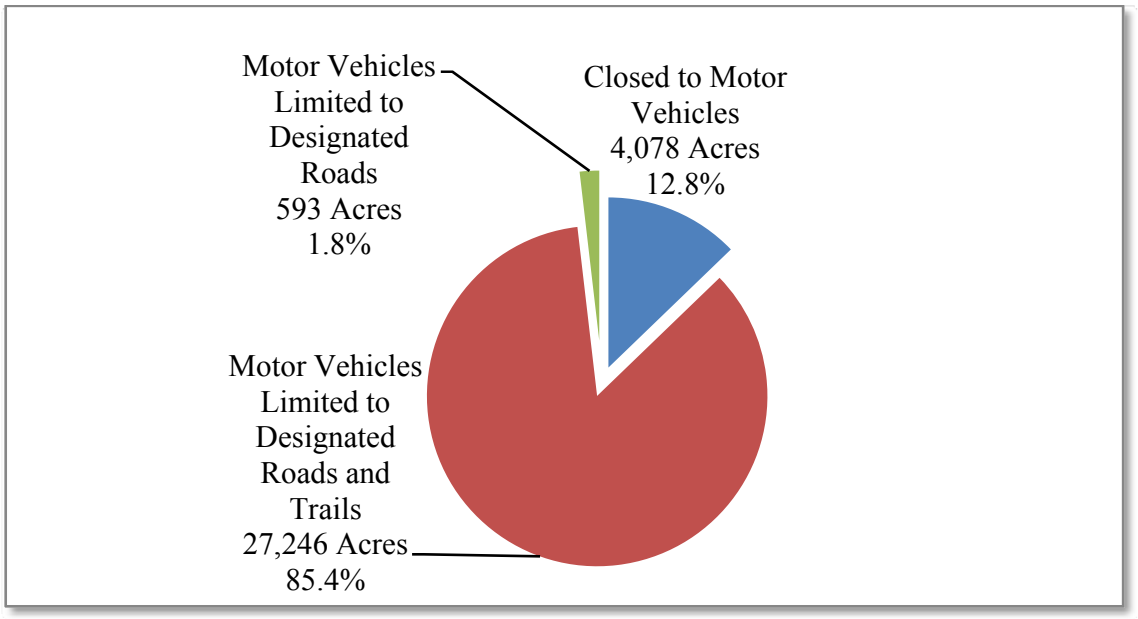
There is a 120-acre FAA withdrawal at the top of the southernmost butte. These lands were transferred to the FAA for use as a navigational facility. Within these 120 acres, there is a relatively small fenced area that contains structures and facilities, and a 1,200 foot clear zone around the facility, where no other structures are permitted (see Map 5). The withdrawal includes portions of the FAA site access road that occur on BLM administered lands, although the majority of the FAA road occurs on Thornburgh Resort property.

Existing Management Direction

Travel Management Designations (UDRMP)

The CBRA is managed under three different travel management zones, based on the UDRMP (2005). These zones provide allocations on how motor vehicles are managed within a specific area, and include the designations of "Open," "Limited," and "Closed" to motor vehicles (See Figure 17 and Map 13). For the majority (85.4%) of the CBRA, motorized vehicle use is limited to designated roads and trails (which were identified in the UDRMP on RMP Map 13 and depicted in this EA on Map 3). A portion of the CBRA is managed as closed to motorized vehicles, and a smaller portion located west of Fryrear Road is managed for motorized use on roads only.

FIGURE 17: UDRMP TRAVEL MANAGEMENT DESIGNATIONS (ACRES)



In addition to the preceding travel management designations and motorized trails identified in the UDRMP (See Table 38) the following UDRMP transportation management guidelines apply to the area:

- For administrative use (See Glossary for definition), motorized vehicle use off designated roads and trails is not allowed in the Peck's milkvetch ACEC during March 1 through August 15 (RMP ROD, Objective TU-6, Allocation 1, page 139).
- Obtain permits from respective jurisdictions for all designated access points (RMP ROD, Objective TU-2, Guideline 11, page 137).

Maintenance Standards and Responsibility

The BLM does not provide regular maintenance for any routes in the CBRA. The UDRMP does provide some general guidance for route maintenance (UDRMP Objective TU-2, Guidelines 3-5, and page 136). The management guidelines in the UDRMP are consistent with Maintenance Intensity 1, which applies to the non-ROW roads within the designated route system in the UDRMP. This maintenance intensity stresses minimal levels of maintenance, only what is necessary to protect adjacent lands and resource values. Routes under this maintenance intensity may be impassable for extended periods of time. Of the 164 miles of motorized use routes identified in the UDRMP, approximately 40 miles of this system are road ROWs that are maintained by property owners and thus do not receive a BLM maintenance intensity.

The routes in the CBRA that are not part of the designated motorized system fall under a maintenance intensity of 0. For the purposes of transportation management, these routes are not part of a designated system and have no planned annual maintenance or defined maintenance standards.

Administrative Access

No designated road system exists for administrative use in the CBRA. Administrative access (including fire suppression) uses existing, unimproved roads. During the development of the CBRA alternatives, routes typically used for administrative purposes were identified.

Much of this informal administrative network of routes depends upon travel through private property. BLM has no legal easements through private property in the CBRA. Routes identified as having some administrative use that rely of private property access include the following:

- Routes into Deep Canyon from State Highway 126, particularly access into the Canyon to the north of the highway;
- Routes to the upper portion of the Buttes, particularly the FAA road;
- Routes into Buckhorn Canyon, to the west of Buckhorn Canyon Road;
- Routes that provide access to the plateau between Deep Canyon and McKenzie Canyon;
- Routes that cross the southern portion of the CBRA from Barr Road to Fryrear Road; and
- Access to the CEC Powerline corridor (ROW OR 012676) from Fryrear Road.

ROW Requests/Private Property Access

Several specific requests for ROW grants have been incorporated into this EA. In addition, developed parcels lacking authorized ROWs and undeveloped parcels that are likely to need road or utility access were considered in development of the CBRA road system. In some cases, past ROW grants required a landowner to pass through a separate intervening private parcel. During the course of this plan, access by ROW holders through some private parcels was closed by the intervening landowners, requiring consideration of alternate routes. The parcels needing some form of ROW consideration are shown in Map 5.

Specific ROW grant applications

Parcel 41

The majority of this parcel (see Map 5) is located north of State Highway 126. A smaller portion of the property extends across the state highway. There is currently no legal ROW from BLM for this parcel. Access is currently achieved through the casual use of the route at MP 100.36, as described for parcel 42 (see Table ROW 2, Appendix 2). Access to the State Highway at this location occurs on a grade, adjacent to passing lanes on the highway.

Approximately 20 acres of this parcel is located south of State Highway 126. Access to this portion of the property is provided by the casual use of one of two primitive routes. One route begins at a wire gate on the south side of the state highway, at the western end of a long portion of the relic highway. From this point, a 1,400-foot unimproved road heads west, parallel to the highway, going up over a small ridge, then dropping into private property. The other access occurs at the bottom of Deep Canyon, at a metal gate on BLM administered lands, then heads east, paralleling the highway for 1,500 feet before entering the private parcel. This access is the same location as described for parcel 40.

Parcel 42

BLM has received a request for new road and utility ROWs to provide legal access to a 40 acre parcel (parcel 42, Map 5 and Table ROW 1, Appendix 2) located ½ mile north of State Highway 126 on the east side of Deep Canyon. There is currently no BLM ROW access for this parcel. The existing access is accomplished through the casual use of two routes. These include an unimproved route that leaves State Highway 126 at about MP 100.36 through a break in the guardrail, down a short grade to a powerline ROW and continues northeast. This route begins on BLM administered lands, but soon enters a separate private parcel (parcel 41) for about 0.3 miles, before it crosses back into public lands for a second time. At this point, the route continues for about 0.5 miles across a bench on the west side of Deep Canyon to the subject 40 acre parcel.

Another existing route starts from State Highway 126 about 0.75 miles south of the previously described access. This route leaves the highway near the east end of the passing lane section, heads across a flat area, before descending down a steep draw in the middle of T 14 S, R 11 E, Section 2. Portions of this route are over 13% slope.

Parcel 49

During the planning process, BLM received notice that the existing ROW road to parcel 49 (ROW 4, Map 5) would be rendered inaccessible due to the closure of a portion of the road going through an intervening 80 acre private parcel (parcel 48). The existing ROW road is a 1.4 mile long, homeowner maintained road that extends north from State Highway 126 at milepost 102.5, approximately 1 mile west of the Barr Road/Highway 126 intersection. The ROW holder has requested an amended ROW Grant to maintain access from State Highway 126. There is legal access available to the subject property from Lower Bridge Road, although access to the house on top of the ridge does require a limited amount of travel on public lands, even from travel starting at Lower Bridge Road.

Within the intervening private parcel (parcel 48), the road splits and a non-ROW route heads northeast back into BLM administered lands and directly down Buckhorn Canyon. This canyon route is used by BLM for administrative purposes, including access to the 664-acre Buckhorn Canyon grazing allotment and for access to an active mining claim (perlite mine serial no. ORORO-059712).

The intervening private parcel does not have a residence on it at the present time, but recently has been fenced. The BLM has no legal easement through the intervening private parcel. The mine operator has had some type of agreement for access; however, the existing property owner has indicated that this agreement was made for a restricted number of trips over a limited period of time (Putman, 2007).

Parcel 48

Consideration of ROW road alternatives for access to Parcel 49 (see above) resulted in the need to consider a separate ROW grant for Parcel 48, which has relied on casual use of the ROW road for Parcel 49.

Parcels 28, 29, 30, 31, and 32

These parcels comprise a 240-acre private inholding located in the southwestern corner of the CBRA. This parcel is divided into 5 lots of varying sizes (see Map 5 and Table ROW 1, Appendix 2). These lots are held by three separate owners, all of whom have provided deeded access across each other's parcels for the purpose of homeowner access. The current ROW (ROW 31, Map 5) granted for access to this parcel is a 2.7 mile road which begins at Dusty Loop, about mid-way between Innes Market and Gerking Market Roads. This ROW route was granted in 1991, but has not been improved or used as a primary access route. The existing route granted as a ROW by BLM passed through a portion of an intervening private parcel (parcel 20); however, the construction of approximately ½ mile of new route adjacent to and east of this private parcel was authorized in the original environmental assessment (EA OR – 056-0-74) for the ROW. This new section of approved ROW has not been constructed.

Typically, the various owners of these parcels use a 2.2-mile route that starts at Innes Market/State Highway 20 intersection, first using a separate ROW road (ROW 32, aka Dusty Dirt Road) for about ½ mile, then heading east and north on a non-ROW road in T 16 S, R 11 E, Section 10 and 3, and T 15

S, R 11 E, Section 34. During the planning process, property owners have requested continued use of this non-ROW road, either as casual use, or as an additional ROW Grant. Property owners have also expressed interest in subdividing their property, and have raised concerns about the cost of upgrading this route to County standards, due to its length and existing condition. Much of this route is located in the bottom of a small draw, and the homeowner maintenance of the existing ROW (which provides access to parcel 27) has resulted in drainage problems and large piles of debris due to poor ROW road maintenance on BLM administered lands. ODOT and Deschutes County Road Department have expressed concerns regarding the location and alignment of the ROW road 32 into the CBRA from the Innes Market Road/U.S. Hwy 20 intersection. ODOT has identified the need to relocate this ROW road intersection approximately 200 feet east on Innes Market Road (Hilton, 2007).

Parcel 56

This 160-acre parcel on the east face of the northern butte is the site of an existing rock quarry (parcel 56, Maps 5 and 9). The Cline Buttes Rock Pit is located south and east of Eagle Crest Phase 3, and the road ROW for access to the quarry is located immediately west of Eagle Crest Phase 2. The operators of the rock pit have requested an amendment of their ROW grant to allow paving the gravel surfaced access road.

Undeveloped Parcels without Specific ROW Grant Requests

The following parcels are those without improved or maintained routes that may result in future road ROW requests. These parcels typically have existing routes on public lands leading to them, but in most cases, these are primitive user-created routes of varying widths.

Parcel 40

This parcel is located at the bottom of Deep Canyon (see Table ROW 2, Appendix 2). Access is currently achieved through a metal gate located on BLM administered lands south of State Highway 126, then traveling a short distance (approximately 500 feet) to the private parcel. This route is heavily used by public land visitors to access the canyons south of the State Highway, although there is no legal access through this private parcel for the public or for BLM administrative use.

Parcel 34

This undeveloped, 160-acre parcel is located about 1 mile west of Barr Road and 1.25 miles south of the large CEC power line (ORE 12676) that bisects the CBRA (See Maps 5 and 9 and Table ROW 2, Appendix 2). Multiple access routes are currently available from Barr Road and Dusty Loop Roads, with the Barr Road links being the shortest. The route that appears to receive the most use starts at Barr Road south of the Thornburgh Resort property continues west for ½ mile, then northwest for ¾ mile to connect with the southeast corner of the subject property. This route is used by BLM for administrative purposes.

Parcel 61

This 80-acre County owned parcel (see Maps 5 and 9) is located adjacent to, and south of the Thornburgh Resort property (see Table ROW 3, Appendix 2). A rough, unimproved road follows the southern edge of the Thornburgh Resort property, and comes close to the northern boundary of the County parcel. The approved secondary access road (ROW 11, aka Bennett Road) for the Thornburgh Resort comes within about 1/8 mile of the northeast corner of the County parcel.

Parcel 19

This approximately 60-acre County parcel (see Maps 5 and 9) is located North of Dusty Loop, (see Table ROW 3, Appendix 2). A gravel road from Dusty Loop Road provides access to the parcels located east of the County parcel, although no road connection appears to continue west to reach the County parcel. No access roads exist to the County parcel via Dusty Loop road to the south.

Developed Parcels without Specific ROW Grant Requests

There are approximately 12 private parcels that have some form of constructed, improved or maintained access routes; however, BLM records shows no existing ROW grants for these roads. These include parcels 1, 2, 3, 21, 23, 24, 26, 28, 43, and 44. These roads are typically short stretches of paved or gravel driveways and account for approximately 4 ½ miles of roads in the CBRA.

Parcel 39

Access to the 160-acre parcel (see Table ROW 2, Appendix 2) located approximately 1 mile south of State Highway 126 is achieved through the casual use of a relic portion of the old highway 126 and an existing user-created gravel road oriented north-south. Neither the old highway grade or gravel road is under County jurisdiction or ROW grant from BLM. Access is also available to this parcel through the use of an unimproved route known as A.J. Warrin Road, which bisects the subject parcel. This route extends 1.6 miles from Barr Road to the east, and 2.3 miles from Fryrear Road to the west. Motor vehicle access into BLM administered lands at A.J. Warrin Road/Fryrear Road intersection was closed due to trailhead development on State owned land in 1997.

Parcels 21, 23, 24, 25 and 26 (Multiple Tax Lots on Gerking Market and Dusty Loop Roads)

There are four driveways constructed and maintained across public lands in this area that are not secured by ROW grants. The routes and Tax Lots are listed in Table ROW 2, Appendix 2. Generally these roads are gravel roads, less than 400 feet in length.

Parcels 1, 2 and 3

Three roads provide access to private property on the east side of Cline Falls Highway between SW Salmon Avenue and the red cinder road (ROW 21, Maps 5 and 9). These include two short, gravel driveways serving individual residences, and a gravel road (83rd Street) that provides access to a subdivision located between the CBRA (Maston area) and Eagle Crest Resort. All of these routes are short sections of road, less than 400 feet long. These routes are described in Table ROW 2, Appendix 2.

Parcel 43

A 350-foot driveway connects the private parcel to McKenzie Canyon Road. It appears this parcel has legal access to Holmes Road, so the gravel driveway across public lands is redundant (See Table ROW 2, Appendix 2).

Parcel 44

The private property at 69550 and 69580 Holmes Road have an access road that parallels Holmes Road for about 750 feet on public lands (See Table ROW 2, Appendix 2).

3.13 Range Management

There are 13 grazing allotments in the CBRA (Map 16). Four of these allotments do not currently have permittees (Table 53).

TABLE 53: GRAZING ALLOTMENTS WITHIN THE CBRA

Allotment #	Allotment Name	Acres	AUMs[1]	Vacant (Y/N)
05003	Broaddus-Carder	15	2	N
05004	Lamb	44	6	N
05006	Emmrich	211	20	Y
05065	Lower Bridge	6,050[2]	310	N
05070	Lafollette Butte	3,664[2]	190	Y
05071	Odin Falls	3,795[2]	252	Y
05072	Struss	1,726	143	Y
05073	Cline Buttes	10,671	700	N
05075	Desert Springs	2,227	112	N
05076	Buckhorn Canyon	664	68	N
05078	Home Ranch	3,773	193	N
05079	Whiskey Still	1,415	100	N
05080	Maston	3,624	209	N

1. **AUMs**: represent livestock active preference forage allocation, expressed in animal unit months (AUM)
2. Includes acres and AUMs outside of the Cline Buttes Planning Area
Source: UDRMP Appendix G.

Provisions were made in the UDRMP to remove a portion of the Whiskey Still Allotment adjacent to the relic canals from grazing.

The Cline Buttes allotment covers approximately 30% of the planning area, in two pastures located south of State Highway 126 and east of Cline Falls Highway (see Map 16). The western pasture includes a portion of the canyons at the west edge of the planning area and lands eastward toward, but not including, Barr Road. The western pasture includes lands both west and east of Barr Road, and the majority of public lands on the buttes themselves.

The Cline Buttes allotment is fenced, including an east-west fence along State Highway 126, a north south fence on the east edge of Dry Canyon, an east-west fence in the middle of the planning area, a north-south fence west of Barr Road, and various fences on the Buttes. In many cases, the location and maintenance of these fences and gates by the permittee has resulted in the only controls on vehicle travel in the area. Fence cutting is a constant issue for the permittee. The unmanaged vehicle use in certain parts of the planning area (e.g., the north end of Barr Road) has compromised rangeland standards by the repeated off-road disturbance to the vegetation.

The Maston Allotment includes approximately 3,624 acres east of Cline Falls Highway. This represents about 11% of the planning area. This allotment has been in non-use status since 1993, but the grazing permit was recently transferred and the new permittee expresses interest in grazing the allotment in the near future.

The western edge of the Maston Allotment is fenced along Cline Falls Highway, although this fence is in poor condition. With the exception of an occasional private property fence, or exclusion fence along the Deschutes River Canyon rim, the remainder of the allotment is unfenced, including the southern boundary along Newcomb Road. Like the Cline Buttes Allotment, fence cutting and unmanaged vehicle access is an issue in the Maston Allotment.

Chapter 4 - Environmental Consequences

This chapter forms the scientific and analytic basis for comparisons of the possible environmental effects of implementing each alternative. This chapter is organized by resource and is in the same order as Chapter 3. In general, each resource section in Chapter 4 is organized based on these headings: vegetation management, transportation and recreation management, and specific ROW grants.

4.0 Hydrology and Water Quality

Vegetation Management

No Action Alternative
Juniper would not be thinned within the riparian area of the Deschutes River, nor on the side slopes into the canyon. Juniper would continue to encroach into the riparian area and compete with shrubs and small trees such as willow, water birch and alder. On the side slopes, juniper would continue to expand and compete with native grasses and shrubs. In the long-term, riparian vegetation would likely remain dominant in the riparian area. However, juniper would out compete and shade out many riparian shrubs and grasses resulting in juniper comprising a larger percentage of the riparian area than existed historically. Floodplain function of the Deschutes River would be slightly diminished due to the conversion of multi-stemmed shrubs, small trees, and herbaceous vegetation to single stemmed juniper trees. Continued encroachment of juniper onto the canyon slopes mapped as "shrub-steppe dominated by young juniper" would likely result in reduction in native grasses, shrubs, and subsequent litter and groundcover. In the long-term, reduced ground cover and increased bare ground may result in reduced infiltration, increased overland flow and loss of surface soil.

Water quality in terms of temperature, pH, and dissolved oxygen would not be affected measurably as a result of not thinning junipers in the river canyon.

All Action Alternative (Common to All Action Alternatives)
All vegetation management treatment designs in the Deschutes River Canyon would be developed in cooperation with Oregon Parks and Recreation who administer the State Scenic Waterways. There

are approximately 24 acres of riparian area along 2 miles of river located within the CBRA. Project design features call for treatment of junipers within the riparian edge by hand, typically girdling or cut, lop and scatter (see Appendix 4). These treatment types would reduce competition with native riparian species such as willow, alder, water birch and sedges.

On the canyon side slopes, approximately 60 acres are classified as "shrub-steppe" and are characterized by low density juniper. These sites would be treated by either burning the trees in the standing position, girdling, or by cutting, lopping, scattering the branches, and leaving the boles on site. These methods would be performed by hand and would result in little to no effect in watershed function and processes. In the long-term, lopping and scattering branches may provide micro-habitats and additional roughness on the side slopes, improving infiltration and reducing overland flow and/or riling.

There are approximately 105 acres of vegetation classified as "shrub-steppe dominated by young juniper" within the canyon; these sites are more densely populated with young juniper. All of these sites within the river canyon would be treated by hand using a variety of methods, including: 1) cutting, lopping, and scattering, creating small clearings (a few acres) over time or 2) thinning 20-30% of the total juniper at a time, extending the work over time until most of the young juniper has been cut. Option 2 may include thinning small juniper and letting them lie where they fall, providing fuel for a prescribed burn upon the next entry, or using swamper burn piles in locations with low visibility (see Appendix 4).

One segment (east side of the river near 63rd Street) within the canyon is potentially accessible by vehicle by using a road that runs down the canyon. Specific project design feature are included for this area, to allow vehicular and mechanized treatments. These include allowing off-road vehicle use on the river terrace where slopes are less than 15% to load trees for removal, and would be limited to one pass off road during dry weather conditions. Tracks would be covered with slash and hidden to discourage further use. Trucks would not be allowed within 30 ft. of the riparian area (see Appendix 4).

Cutting or burning standing junipers on the side slopes would result in no measurable increase in sediment to the stream channel. Prescribed burning of thinned junipers may directly cause some slight increase in sediment production on the steep, canyon side slopes in the short term, but would likely not cause any measurable increase in sediment reaching the river channel. The effects from treatment of all six segments of hill slope vegetation would include some slight sediment production in the short term, but long term all treatments would result in improved ground cover and infiltration which would reduce potential for hill slope erosion.

Because of their low density and small size, junipers within the riparian area provide little or no shade to the river. As a result, cutting junipers within the riparian area would have no measurable effect on stream temperature. There would be no measurable changes in the 303(d) listed water quality parameters as a result of implementing the proposed action.

Within the Deschutes River canyon, pH and dissolved oxygen values would not be affected as a result of vegetation management actions.

A report by the Upper Deschutes Watershed Council identified uncharacterized urban runoff from Bend, agriculture, and water diversions as potential influencing factors affecting pH values within the middle Deschutes River (Jones, 2003). As a result, the pH levels within the middle Deschutes seasonally reflect slight to moderate alkaline conditions. A river's pH values can be altered by

increased primary production (aquatic plant growth) due to increased nutrient loading. Cutting and disposing of juniper branches by piling and burning or lopping and scattering would cause no measurable increase in nutrient loading and subsequent pH values in the Deschutes River. Prescribed burning of a thinned stand of shrub-steppe dominated by young juniper may cause a slight, short term (first year following burn) increase in nutrients to the river, but would not likely have any measurable effect to pH values. Following the first year after the burn, there would be no measurable increase in nutrients resulting from the burn.

Dissolved oxygen is the concentration of oxygen in the water which is produced within the aquatic system via two processes; primary production photosynthesis and passive atmospheric aeration. Aquatic plants utilize photosynthesis during daylight hours resulting in oxygen production, while organic and inorganic matter consumes oxygen during respiration and decomposition processes. Stream temperature affects the dissolved oxygen content of water and is directly proportional to the temperature (Hutchinson 1957). As stream temperature increase, the solubility of oxygen decreases in a nonlinear manner (US EPA, 2001). The middle Deschutes, in the vicinity of the project area, does not meet the dissolved oxygen standards as this reach may be more nutrient rich and may exhibit increases in decomposition processes possibly due to decreases in flow, increases in primary producer die offs, and increases in organic and inorganic inputs from uncharacterized urban runoff, rural land use, and agriculture (Jones, 2003). Prescribed burning of a thinned stand of shrub-steppe dominated by young juniper may cause a slight, short term (first year following burn) increase in nutrients to the river, but would not likely have any measurable effect to dissolved oxygen values.

Transportation /Recreation

No-Action Alternative

User-created trails would continue to be used and new ones created (due to non-motorized, cross-country use) over time as the population within Central Oregon increases, causing some hill slope soil erosion. There are currently 5 miles of user-created pedestrian foot trails within the Deschutes River Canyon side slopes and bottom. These trails typically go straight down the canyon slope causing some hill slope erosion. Currently, an immeasurable amount of sediment produced from surface erosion is probably reaching the stream channel, but does not likely measurably affect stream channel water quality parameters. In the long-term, as use of the user-created trails increases, additional sediment may reach the channel. However, it is unlikely that the small amount of sediment would negatively affect water quality parameters.

Road use in the bottom of Buckhorn Canyon would continue on approximately 1.1 miles of BLM-administered road. This road would be open to public motorized vehicle use, as well as administrative use for access to a mine and grazing allotment. Approximately 0.7 mile of the road located in the upstream portion of an ephemeral draw provides for mine (OR-059712) access. Continued use in the upper section where steeper slopes exist on the road into the canyon would maintain potential for erosion and road instability. Continued use on the lower 0.4 mile of road would have no negative effects.

Effects Common to All Action Alternatives

Implementation of any action alternative would reduce the number of trails in the Deschutes River canyon from the current 5.0 miles of user-created trails to 3.4 miles of constructed trails. In addition, trail design guidelines (Appendix 1) would be used to construct trails that decrease and minimize surface erosion, ensure tread stability, and disperse water collected on the trail surface. In the short term, some surface erosion would be produced during construction of the trails but would not likely

reach the river. Therefore, water quality parameters of temperature, pH, and dissolved oxygen would not be affected with implementation of any action alternative.

Alternatives 2 and 4
Road use in Buckhorn Canyon would continue on approximately 0.7 miles of road in the upstream portion of the draw for use into a mine. Unlike the No-Action Alternative, use would be restricted to administrative access only. Approximately 0.4 miles in the lower, downstream end would be closed. Closure on the lower section of the road would not improve resource conditions as the lower section is low gradient and relatively non-erosive. Limited use in the upper section where steeper slopes exist on the road into the canyon would minimize potential for erosion and road instability when compared to the No-Action Alternative. Signs and ghost fencing would be used to limit public use of this road from any crossing trails. Alternatives 2 and 4 provide for two trail crossings, at the upper and lower ends of the canyon. Trail design guidelines (Appendix 1) would be used to construct trails that decrease and minimize surface erosion, ensure tread stability, and disperse water collected on the trail surface. In the short term, some surface erosion would be produced during construction of the trails.

Alternative 3
Road use in the bottom of Buckhorn Canyon would continue on approximately 0.4 miles of road in the lower portion of the draw to access the mine (see Map 7). This road would be open for administrative use only. Approximately one-half mile of new road construction would be required around parcel 51 (Map 5) to provide access into this lower portion of the canyon via Buckhorn Road. Construction of this new access road would result in some erosion and surface compaction in the drainage over the short term. Continued use on the lower 0.4 miles of road would have no negative effects.

Alternative 3 does not provide for crossing trails in either the upper or lower portions of Buckhorn Canyon. By limiting access to administrative use only, Alternative 3 provides less opportunity for surface water flow, erosion and effects to the ephemeral draw.

Right of Way Grants

No-Action Alternative
The current ROW road 32 (Map 5) located in an ephemeral draw in the very southwest corner of the project area would continue to be used and maintained by the ROW holder for approximately 0.4 mile. This road would also continue to receive motor vehicle use by landowners as a casual use access route to Parcels 28 – 32 and by the general public. Over time, road conditions and condition of the ephemeral channel may deteriorate with continued use and concentration of flow in the roadbed, depending on the type of maintenance done by the ROW holder.

Alternatives 2 and 4
The current ROW road 32 (Map 5) located in an ephemeral draw in the very southwest corner of the project area would be closed to general public motorized vehicle use and used solely for the ROW holder access and administrative use. Under this alternative, the volume of motor vehicle use on the road would be much lower, as only one parcel, instead of five would be using the road for access. Over time, road conditions in the bottom of the ephemeral draw may continue to deteriorate, depending on maintenance practices. However, the likelihood and severity of this would be less than the No-Action Alternative, due to the lower traffic volumes.

Alternative 3
ROW 32 would become used as part of a new, longer ROW road that provides access to parcels 28 – 32 (see Map 10). Use levels would be similar to the No-Action Alternative. Effects on the ephemeral drainage would be minimized by requiring improvements to the roadbed for stability, and installation of drainage control structures.

4.1 Special Status Plant Species & Peck's Milkvetch ACEC

Vegetation Management

No-Action Alternative
There are no vegetation management actions proposed in the No-Action Alternative, therefore no direct effects would occur to Peck's Milkvetch or to the ACEC. In the long term, the lack of vegetation management and continued suppression of wildland fires may lead to encroachment of juniper into currently open areas and possible impacts to Peck's Milkvetch through shading.

Alternatives 2 - 4
Under all action alternatives, 93% of the acreage occupied by Peck's milkvetch sites would be treated for hazardous fuels reduction within WUI bands 1 and 2 (see Table 54). Pre-treatment surveys would occur before vegetation treatments are designed. Project design features (in addition to those in the UDRMP) to minimize effects to Pecks Milkvetch are found in Appendix 4. Effects are generally related to mechanical disturbance of the soils, vegetative material left on the soil which would cover plants and small sites where concentrations of vegetative material is burned. This would be especially true for sites in WUI Band 1, which would receive the most intensive treatments. However, since 87% of Peck's milkvetch sites in Band 1 are found within old growth juniper, the likelihood of such impacts is lower since the density of vegetation needing treatment for hazardous fuels reduction is generally less than in the other vegetation types. This is similar for Bands 2 and 3, with sites in old growth juniper at 76% and 85% respectively. Five percent or less of all sites is found within the shrub-steppe/juniper, which is likely to receive the greatest level of treatment disturbance.

Treatment in all sites would likely open up the shrub/juniper canopy and produce environmental conditions more favorable for Peck's milkvetch. This would be evidenced by an increase in plants occupying a site, an increase in flowering and fruit production, an increase in seedling establishment and an increase in overall size and vigor.

Long-term impacts to Peck's milkvetch sites from vegetation treatment are expected to be negligible.

Table 54: Acres of Peck's Milkvetch by WUI Band and Vegetation Type

Vegetation	WUI Band			Totals	Percent of Total
	1	2	3		
Shrub-steppe	38	96	6	140	14.5%
Shrub-steppe/Juniper	11	25	4	40	4.1%
Old Growth Juniper	322	402	62	786	81.4%
Totals	371	523	72	966	
% of Total	38.4%	54.1%	7.5%		

Table 55: Within Peck's Milkvetch ACEC, Acres of Vegetation Type by WUI Bands

Vegetation	WUI Band			Totals	Percent of Total
	1	2	Outside		
Shrub-steppe	120	429	167	716	7.1%
Shrub-steppe/Juniper	146	420	269	835	8.3%
Old Growth Juniper	1,931	4,332	2,209	8,472	84.6%
Totals	2,197	5,181	2,645	10,023	
% of Total	22%	51.7%	26.3%		

The effects of vegetation management to Peck's milkvetch within the ACEC would be similar to the effects to Peck's milkvetch sites analyzed above, since 96% of the documented Peck's milkvetch acreage in the planning area is within the ACEC.

In the long term, under all action alternatives, it would be expected that 73% of the ACEC would be treated for hazardous fuels reduction (Bands 1 and 2). Approximately 24% of the ACEC is in Band 1 (the highest level of treatment), and of this, 88% is considered old growth juniper. Therefore, while the treatments in Band 1 are likely to be more intense, there is less likelihood that a substantial portion of the vegetation would be impacted since the density of vegetation needing treatment for hazardous fuels reduction is generally less than in the other vegetation types. Only 7% of this Band consists of shrub-steppe/juniper, the vegetation most likely to be treated. Proportions are similar for Band 2 and for portions of the ACEC outside WUI Bands.

The effects of proposed actions under all alternatives would be negligible to slightly positive, in the long term, to Peck's milkvetch and the Peck's milkvetch ACEC. These actions, taken in combination with other actions rangewide for the species would not be expected to contribute toward a need for federal listing as Endangered or Threatened.

Transportation/Recreation

No-Action Alternative
Under Alternative 1, 12.3 miles of designated roads/trails and existing undesignated routes would remain within documented Peck's milkvetch sites, with a calculated density of 8.2 miles per square mile (see Table 56). In addition to a greater density of designated routes, Alternative 1 has a slightly greater potential for disturbance to Peck's Milkvetch due to the higher mileage of undesignated routes available to non-motorized use and a greater number of public access points into the ACEC, particularly for motor vehicles. These access points include numerous locations along Barr Road, which forms the eastern edge of the ACEC.

Alternatives 2 – 4
The mileage and density of all routes would decrease from the existing situation under all action alternatives, with a shift from designated roads/trails that are open to all types of travel to roads and trails predominantly open to non-motorized uses. All action alternatives would decommission undesignated routes and limit bicycle and equestrian use to designated trails. All Action Alternatives would result in a reduction of route density in Peck's Milkvetch Sites of 50 to 60 percent (Table 56).

Table 56: Miles and Density of Routes within Peck's Milkvetch Sites

Alternative	Designated Route (motorized)	Designated Route (non-motor)	Undesignated Route (non-motor)	Total Density (Mi/ Sq Mi)	Percent Change
1	6.65	0	4.64	7.48	
2	0.48	4.54	0	3.32	- 55%
3	0.7	3.9	0	3.05	- 59%
4	0.14	4.0	0	2.78	- 63%

The effects of the trail plan to the Peck's milkvetch ACEC would be similar to the effects to Peck's milkvetch sites analyzed above, since 96% of the documented Peck's milkvetch acreage in the planning area is within the ACEC.

Under Alternative 1, 88 miles of designated roads/trails and existing undesignated routes would remain within the Peck's milkvetch ACEC, with a calculated density of 5.6 miles per square mile. The mileage and density of all routes would decrease from the existing situation under all action alternatives, with a shift from routes that are open to all types of travel to routes predominantly open only to non-motorized uses. All action alternatives would reduce routes by approximately 30 percent (see Table 57). All action alternatives would greatly reduce the number of designated access points into the ACEC, particularly those for motorized vehicle use.

Table 57: Miles and Density of Routes within Peck's Milkvetch ACEC

Alternative	Designated Road/Trail Miles	Density (Miles/Sq Mile)	Percent Change
1	88	5.6	0
2	56	3.5	-36%
3	57	3.6	-35%
4	65	4.1	-26%

As a result of reductions in route mileage and the shift to predominantly non-motorized use, there would be less disturbance to Peck's milkvetch and the ACEC from motor vehicles straying from established routes. In the long term this would be evidenced by an increase in plants occupying a site, an increase in flowering and fruit production, an increase in seedling establishment and an increase in overall size and vigor.

Due to a limited number of designated trailheads and access points, opportunity for education, signing and enforcement due to trailheads and designated trails, all Action Alternatives would increase the likelihood that trail users stay on designated trails. Alternative 3 provides for slightly greater motorized trail use within the ACEC, due to the location of an OHV trailhead at the south end of Barr Road.

Right of Way Grants

Under Alternatives 1, 2 and 3, ROW grants would have no effect on special status plants. Under these alternatives all ROWs are on existing roads with approximately two to three miles passing through documented Peck's milkvetch habitat, depending on the alternative. Routine maintenance of these ROWs, within the established route, would have no effect.

Under Alternative 4, approximately one-third mile of new ROW road construction is proposed within Peck's milkvetch habitat (see Plainview Road, Map 10). This would eliminate approximately one acre of documented Peck's milkvetch habitat.

Overall, rights-of-ways under any alternative would not be expected to have a significant effect on Peck's milkvetch.

Under all alternatives, ROW grants would have no effect on Peck's milkvetch ACEC. The differences in route miles are negligible and would not affect the values for which this ACEC was designated.

Cumulative Effects

Continued private land development in the area may affect Peck's Milkvetch as native vegetation is displaced by roads, site construction and landscaping. The remaining undeveloped private land inholdings in the CBRA are typically parcels of 160 acres or less, and include one 160 acre parcel (Parcel 34, Map 5) within the ACEC. The largest blocks of undeveloped private land in the CBRA occur to the east of Barr Road. However, botanical surveys conducted during the Thornburgh Resort ROW EA (OR-056-05-066) did not find Peck's Milkvetch on these private parcels (1,980 acres) or adjacent BLM-administered lands (BLM, 2007).

The nearby Tumalo Recreation Area was designated as Closed to motor vehicles in 2005. This area includes approximately 4,000 acres of the Peck's Milkvetch ACEC and 706 acres of Peck's Milkvetch Sites (i.e., 42 percent of total) outside of the CBRA. Over the long term, as management actions are taken in the CBRA and the Tumalo Recreation Area, there will be a cumulative beneficial effect on Peck's Milkvetch and the ACEC as a whole. The combined effect of management actions in the CBRA and the rest of the Peck's Milkvetch ACEC would not be expected to contribute toward a need for federal listing as Endangered or Threatened.

4.2 Soils

Indicators used to compare environmental consequences between alternatives include: acres of treatments with potential to detrimentally damage soils, miles of roads and trails with the potential to detrimentally damage or cause soil erosion (e.g., pounds of soil eroding using WEPP road model outputs). A "0.75lbs/ft" soil erosion threshold indicator is used to help identify travel routes with potential erosion problems or needs for future management. This erosion rate ("0.75lbs/ft") translates into creating a 6 inch deep by 2 ft wide rut over a 150 year time period. For CBRA, the highest pounds/foot rating determined in a WEPP analysis was 0.43lbs/ft which indicates minimal water erosion effects for roads and trails in the plan area.

The UDRMP requires that soils will be managed to maintain productivity and minimize erosion. Detrimentally disturbed soil areas with active erosion will be rehabilitated using existing erosion control practices and/or to completely restore soil productivity to blend into the surrounding soil surface. The proposed action would, through a combination of planned designated routes, project design features, and restoration and erosion control practices, result in a reduction of existing detrimental soil disturbance from what currently exists.

Assumptions

- A detrimentally impacted soil will not recover to a native perennial vegetation cover within 2 years following an impact disturbance.

- Detrimental disturbance reduces the ability of the soil to grow native perennial vegetation that will provide a protective soil cover.
- Juniper woodland stands with tree canopy cover greater than 40% will under wild fire conditions burn hot enough to detrimentally impact the soil.
- Disturbance in areas identified as highly vulnerable to soil erosion (sensitive soils) can have a greater detrimental impact in a shorter period of time than in areas identified as non vulnerable to erosion or non sensitive.
- The longer an area is in a detrimentally impacted condition, without protective soil cover, especially on sensitive soils, the greater the adverse impact to soil health.
- Healthy stands of native bunch grass are good for maintaining and replenishing organic matter content necessary for healthy soil function.
- The cumulative effect of repeated entries in a woodland site, for a variety of human activities, including dispersed recreation, can adversely affect soil resources.
- Down trees/logs in forest and woodland sites are essential to long term soil productivity.

Vegetation Management

No Action

Alternative 1 would not cause any direct impacts to soil resources because there would be no vegetation treatments. However, if juniper density is allowed to progress to closed canopy juniper stands, then detrimental soil impacts from stand replacement wildfires could be greatest for the No-Action Alternative (Alternative 1). One consequence of not treating fuels by prescribed fire or by mechanical means could be an increase in large, high-intensity wildfires. Wildfires typically burn hotter than prescribed fire (>300 degrees C) and can damage soil productivity through surface organic matter and nitrogen volatilization (Boyer, 1980). Juniper invasion is increasing throughout the planning area. With this increase in young juniper density, Alternative 1 would have the greatest potential for stand replacement wildfires.

Proposed Action

Mechanical Treatments

Most vegetation management activities would impact soil resources to some extent. The degree to which the soil is impacted is generally related to the total amount of activity planned. The greatest potential for adverse impact to soils exists with the use of methods that can cause high levels of ground disturbance (see Table 1). Detrimental soil disturbance is most common in the form of compaction, displacement, puddling, hot burns with soil temperatures over (300 degrees C), and/or erosion. Other site factors that can impact productivity but for which no specific standards have been developed are soil nutrient levels, organic debris (limbs, down logs, etc) and fire intensities. Tractor-based machine piling, using a flat blade, moving back and forth pushing woody material over the soil surface has the potential to displace large amounts of soil. Proposed treatment methods and project design features, such as SW-5, would minimize negative soil impacts to less than 20 percent.

In CBRA the major erosion concern would be from wind erosion and blowing dust during the dry summer months. On the steep units (greater than 35 percent) in the canyons and on Cline Butte, displacement is the major concern because it is an irreversible loss of top soil. However, the proposed action would limit heavy equipment to slopes less than 20 percent (PDF SW-2) which addresses this concern.

Compaction is the widest-spread environmental consequence related to soils that occurs as a result of woodland management. Erosion is primarily a concern on compacted, bare-surfaced skid trails,

temporary roads, and landings. Repeated entries can have an adverse effect on the soil resource. Forest monitoring results (Slaughter and Gasbarro 1988) have shown that the cumulative effect of multiple entries commonly results in excessive amounts of soil compaction on ground-based tractor units. Compaction can be partially alleviated through subsoiling (see Glossary). Erosion is another hazard that must be specifically addressed, because of the potentially irreversible loss of topsoil. The erosion hazard is typically confined to compacted skid trails and landings where the infiltration rates have been reduced. Units that have been logged previously typically receive special protective measures designed to keep detrimental soil impacts within guidelines. Those measures can include using designated skid trails placed 100 feet apart, directional falling, winching, and mastication or chipping as an alternative to machine piling. Timber felling does not directly affect the soil resource; however, it does affect the way that machines can transport, or skid, logs to the sorting and loading areas (landings). If trees are felled in a way that reduces the skidding travel area, then impacts to the soil can be reduced.

The proposed action would have greater amounts of ground-based harvesting activity than Alternative 1. Mechanical harvest activity for woodland management would be greatest in areas with higher densities of young juniper, which occur in old growth juniper woodlands and shrub-steppe habitats that are dominated by young junipers. If juniper thinning is done carefully, using the least impacting methods necessary (e.g., hand thinning, swamper burning, leaving woody debris on site, etc.) then the proposed action would be more beneficial to soil function in the long term.

Fire Management

Fire management activities affect the soil resource in three ways. The first is the effect that machines used for piling slash have on the physical condition of the soil; the second is the effect that removing woody debris has on long-term productivity of the site; and the third is the effect of fire itself on the soil. Machine piling was identified as the leading cause of soil compaction in woodland areas based on Malheur National Forest monitoring results.

Prescribed fire also has short- and long-term effects on soils. Immediate effects result from the loss of protective organic matter (i.e. live and dead vegetation), biological crusts, and changes in the physical and chemical characteristics of the soil surface. These effects vary according to the fire intensity and duration. High fire intensity or duration may cause some soils to become hydrophobic (water repellant), which impedes infiltration and increases surface runoff. It should be noted that some coarse-textured sandy and pumice soils are naturally hydrophobic. Volatilization of nutrients may have additional long-term consequences to site productivity. Germination, vigor, and spread of some noxious weed species and introduced annuals are more pronounced following fire. Fire applied in inappropriate locations (warm and dry sites such as south aspects with high annual to perennial grass ratios) can allow these undesirable plant species to increase and spread. Soil losses under these conditions can be greater compared to when healthy native vegetation is present.

One consequence of not treating fuels by prescribed fire or by mechanical means could be an increase in large, high-intensity wildfires. Wildfires typically burn hotter than prescribed fire (>300 degrees C) and can damage soil productivity through surface organic matter and nitrogen volatilization (Boyer, 1980).

The increased mechanical treatments proposed in the action alternatives would reduce the wildfire potential but would have effects similar to those described in the timber/woodland management section on detrimental impacts to soils. The effects of these treatments would be most intense within the first WUI band (0 to 600 feet) around communities. Project design features included in this plan and adaptive management (including monitoring) are expected to minimize the detrimental effects on soil productivity from these actions.

Transportation/Recreation and Right of Way Grants

For the effects on soils resources, this section deals with recreation, transportation and ROW decisions. The transportation system has two basic effects on the soil resource. First; it takes land out of production. Once a road or trail has been constructed, the site has lost much of its potential to grow vegetation. The cut-slopes and road/trail tread loose potential to grow vegetation due to loss of topsoil and compaction respectively. Fill slopes have the greatest potential for reestablishing vegetation cover. The second effect is the impact of the road on water quality over time, which is addressed above in the water quality section. Roads are major collectors and funnels of water. Paved roads and rock-surfaced roads tend to produce less sediment than natural surfaced roads. Surfaced roads produce little sediment over time and are easily maintained. Natural surfaced roads composed of native soil material are responsible for most of the sediment that leaves the road system. The suitability of a site for recreation use may be influenced by soil factors like drainage and susceptibility to erosion and compaction. Public use at developed sites often denudes and compacts the soil surface (Beardsley and Wagar 1971; Cull et al 1981).

No Action

The majority (87%) of existing routes in the Cline Buttes plan area are native surfaced, unimproved routes. The designed, designated and monitored road system being proposed for the action alternatives will put more land in production by decommissioning and closing existing roads than what currently exists (Alternative 1). Table 58 summarizes the miles of proposed trails by alternative. Based on the anticipated differences in erosion and sedimentation between alternatives, the effects on soils would be highest under alternative 1 with 340 miles of total routes and no route decommissioning.

Non-Motorized Recreation Effects on Soils

Alternative 1 would provide the greatest opportunity for negative effects to soils from human travel activities. Some of the most broad-reaching negative effects from Alternative 1 would result from the fact that it would be harder to manage human travel because of the high number of access points and allowing equestrians and mountain bikers to travel off of designated trails. Also, there would be no ability to limit additional trail creation or keep people on the existing un-designated travel routes. For example, there are approximately 180 public access points, no designated trailheads and approximately 176 miles of existing, undesignated travel routes available solely to non-motorized use in Alternative 1. Additionally, because equestrian and mountain bikes would not be limited to designated trails and could travel cross-country, in Alternative 1, new trails would be added over time increasing the amount of bare ground.

Motorized Recreation Effects on Soils

Alternative 1 has approximately 80 access points from public and ROW roads to the motorized trail system. Given the large number and dispersed nature of these access points, it is likely that greater amounts of cross country travel and soil compaction or displacement may occur under this alternative. Effects occurring within the width of the actual road or trail would be similar to those described for mechanized activities in terms of compaction and soil displacement, however, Alternative 1 does not provide route widths or maintenance standards and routes would likely become wider over time.

Alternatives 2 – 4

Table 58 summarizes the miles of proposed trails by alternative. Based on the anticipated differences in erosion and sedimentation between alternatives, the effects on soils would be highest under alternative 1 with 340 miles of total routes. It would be lower under any of the action alternatives,

and average about 234 miles of trails. This is a reduction of 106 miles of existing routes compared alternative 1. All action alternatives provide for ROW roads that are located and constructed to avoid erosion and surface drainage problems, including provision of roadbed and road surfacing and drainage control features.

Non-Motorized Recreation Effects on Soils

There can be negative effects on soils from non-motorized activities such as hiking, mountain biking, horseback riding, hunting, and dispersed camping. Uncontrolled non-motorized use such as user-created recreational trails on sensitive soils or concentrated use that can occur in staging areas and access points can lead to compaction, displacement, and erosion effects similar to those described for motorized activities. These effects are currently occurring uncontrolled in portions of the CBRA. Unmanaged trail use in locations like the Buttes and Deschutes River Canyon are affecting soils because they tend to occur at a higher activity levels on steep, challenging slopes that are more prone to erosion.

Currently, there are about 34 more miles of undesignated, unmaintained routes available for non-motorized trail use existing in the CBRA than would occur as designated and maintained non-motorized trails under any of the proposed action alternatives. Trails proposed in all action alternatives are typically less steep than existing user created routes and have design and maintenance standards to minimize erosion. The action alternatives would decommission existing routes, would have designated trail heads with parking areas and would concentrate the staging use in fewer areas on non-sensitive soils. Of the action alternatives, Alternative 4 has the most miles of proposed non-motorized trails followed closely by Alternative 3. Alternative 2 has the fewest miles of proposed non-motorized trails.

Motorized Recreation Effects on Soils

Motorized recreation and travel includes the use of Class I, II and III OHVs and passenger vehicles. Under all alternatives, recreational and passenger vehicles would be required to stay on designated roads and trails except when riding or driving in designated "play" areas or staging areas. For all alternatives, effects on soils in terms of area would generally be confined to the actual mileage of the road and trail system. Alternatives 2, 3, and 4 would designate a road and trail system (including a limited number of designated trailheads) that would be designed and located to avoid degrading sensitive soils, riparian, and other sensitive areas.

Common to all action alternatives, detrimentally disturbed soil areas and areas with active erosion would be rehabilitated to improve soil productivity. The proposed action would show through a combination of planned designated routes, restoration and erosion control practices, a reduction of existing detrimental soil disturbance from what exists presently in the no action alternative.

All motorized vehicle travel has some effects on soils. Spinning wheels, high speed turns, hard acceleration, hill climbing and travel during very wet or very dry soil conditions can cause additional disturbance and soil displacement. Some, but not all, of these effects can be reduced with redesigned road and trail networks, and rehabilitation measures. Proposed directional signs and numbering of major roads/trails would also help recreationists and the general public stay on designated routes, minimize detrimental impacts to soils and vegetation, and navigate more efficiently. Class II vehicle use includes travel on roads and on challenging "rock crawling" routes. This is typically done in areas with a variety of steep bedrock terrain with obstacles, using specially built 4-wheel-drive vehicles. As there is little soil associated with these areas other than at the staging areas at the base of the climb or on flat benches or summits at the top of the route, soil impacts would be minimal, and primarily would involve the routes into these areas.

The effects of motorized activities would be less impacting to soils under the action alternatives than in the No Action alternative due to the proposed designed and managed trail system, reduction in the number of public access points, and closure of approximately 72 miles of the 164 miles of existing motorized trail identified in Alternative 1. As there is little difference between miles of motorized trail proposed for each of the action alternatives, the soil effects are not expected to be different.

Route Decommissioning

Route decommissioning is not differentiated between motorized and non-motorized routes among the alternatives. In comparing the alternatives for decommissioning, the more decommissioning proposed, the better for soil health in reducing compaction and allowing restoration of plant cover for protecting against erosion. Alternative 2 has the most miles of proposed decommissioning at 201, followed by Alternative 3 with 192, followed by Alternative 4 at 187 miles. No decommissioning would occur under Alternative 1. New routes constructed for each of the action alternatives are within 7 miles of each other and average 128 miles of new construction. It is assumed that the designed and designated trail construction in the action alternatives will be less impacting to the overall soil resource than the routes identified for decommissioning.

Cumulative Effects

There are no additional cumulative effects on soils beyond those described in the cumulative effects sections for old growth juniper woodlands and the shrub-steppe communities.

Table 58: Trail Miles per Alternative

Trail Type	Alt 1 (Miles)	Alt 2 (Miles)	Alt3 (Miles)	Alt4 (Miles)
OHV Class I, II, and III (all motor class)	-	41	42	50
OHV Class I and III	-	36	38	27
OHV Class III (motorcycle only)	-	13	13	14
Subtotal Motorized All	164	91	93	91
Horse	-	47	82	80
Mountain Bike	-	28	34	32
Shared non-motorized	-	44	11	4
Parallel Horse/Bike	-	9	0	1
Pedestrian	-	14	15	26
Public Road Right of Way	-	0	0	0
Non-motorized All	176	141	142	144
Total	340	232	235	235

Table 59: Route Decommissioning, Construction and Retention

Route Actions	Alt 1 (Miles)	Alt 2 (Miles)	Alt 3 (Miles)	Alt 4 (Miles)
Decommissioned routes	0	201	192	187
Routes Retained	340	139	149	153
New Trail Constructed	0	132	125	128
Total Existing Trails[1]	340	271	274	281

[1] For alternatives 2, 3 and 4 this row includes the miles of "Public Road Rights of Way" which is not included in the "Total" row (Table 58)

4.3 Air Quality

Vegetation Management

No Action Alternative
Under the No Action Alternative, the increase in juniper across the landscape and continued suppression of wildfires would increase the likelihood of large-scale, high-intensity fires across the planning area. Similar situations could occur on adjacent lands and increase the likelihood of fires spreading to the CBRA. An increase in fuels and fire intensity would amplify total emissions and duration of fire event emissions. Smoldering combustion of woody fuels may continue to produce smoke and cause air quality concerns several days after the event.

Wildfires tend to burn longer than prescribed fires. During summer burning season, lengthy inversions may occur causing smoldering fires to produce the majority of local smoke. During open-flame fires, convection lifts smoke into the atmosphere. Transport winds may carry smoke some distance, dispersing it in the process.

During prescribed fires, conditions can be selected to maximize these dispersal effects. Burn plans stipulate optimal conditions for effective smoke dispersion. Prescribed project units would be smaller than most wildfire areas. This difference is important for the amount of particulates produced. During prescribed fires, evening temperatures are generally lower and relative humidity (RH) is higher resulting in greater fuel moisture. The overriding differences between natural and prescribed fire events are that operational conditions can be selected with the prescribed event, and all tools are available to choose optimum conditions for minimizing smoke effects.

Action Alternatives
Short-term (3-5 years) effects on air quality from the action alternatives would be slightly greater than the No Action alternative, but would be less in the long term (greater than 5 years) because of the reduction in risk of large-scale wildfires. In the long term, conversion of juniper to sagebrush would reduce smoke emissions from wildfires. Treatments would be applied across the landscape.

Production of dust would from vegetation management activities would be greatest for the proposed action (Alternatives 2 – 4). However, dust production from use of chainsaws would be negligible. Heavy machinery would be used during the late fall, winter, and early spring when soils are frozen. Dust production at that time would be minimal.

In the action alternatives reduction of juniper would reduce risk of large-scale, high-intensity fires and level of smoke produced from those events. However, as fires become more common in CBRA, duration of emissions would decrease as the fuels structure is shifted from trees to shrubs and herbaceous plants and perennial grasses and forbs will dominate the plant community and provide a fairly continuous fuel layer. During a wildfire event, the amount of smoke produced would be less than the initial fire because of loss of woody vegetation.

Prescribed burning would be conducted in late summer and fall. The free burning stage of prescribed fire would be about the same volume as wildfire, but smoldering phases of prescribed fire would

not last as long as those of wildfire. Smoke production is generally reduced to negligible levels 2-3 days after ignition of a prescribed fire versus up to 7-10 days following containment of a wildfire. Reductions in juniper would also increase shrub and herbaceous vegetation. Smoke produced by fires in post-treatment stands would be less than that produced by fire in fully-developed woodlands.

The nearest federally designated Class I airsheds are the Sisters and Jefferson Wilderness areas, about 35 miles west of the CBRA. The intrusion of smoke into Class I airsheds from prescribed burning operations in the action alternatives would be minimal due to distance, the smoke dispersion, and the prevailing southwest to northwest air flow.

Transportation/Recreation

No Action Alternative
Alternative 1 would continue the current trends in terms of dust created by road and trail use in the CBRA. OHV use is heaviest in the winter and early spring months – times when soil conditions are less prone to dust. However, several locations would continue to exhibit some dust generation, including the Cline Buttes Rock Pit Road (due to gravel truck/commercial vehicle use) and the north end of Barr Road (due to high speed OHV use). Alternative 1 has the greatest mileage of designated roads and trails adjacent to private property, which although difficult to quantify, would likely present greater conflicts with adjacent residents. Alternative 1 does not provide maintenance levels and also does not limit roads and trails to specific vehicle types, so over time, routes would likely get wider through use by all sizes of vehicles, and also due to vehicles going around ponded or rocky sections of non-maintained roads//trails.

Alternatives 2-4
Alternatives 2-4 would decrease dust through limiting access to designated, gravel surfaced trailhead parking areas and by reducing the density of motorized roads and trails adjacent to private property (see Table 6). Roads which currently have the greatest dust abatement issues (Cline Buttes Rock Pit Road/ROW 15 and the northern portion of Barr Road) would not be part of the OHV system. These are non-county roads in the CBRA that have had dust issues identified previous to the CBRA planning effort. The Cline Buttes Rock Pit road ROW would be amended in all action alternatives to allow paving, which would abate dust issues along this road for adjacent Eagle Crest Resort residents. Access to the ODOT cinder pit material site (ROW 40/41, Map 5) would not be available via Barr Road, requiring OHV riders to use maintained trails to access the area from the Barr North Trailhead, thus decreasing the amount of high speed OHV use and dust from Barr Road.

The provision of designated trailheads on Newcomb Road and at the Tumalo Canal ACEC may slightly increase traffic on these county maintained roads and result in dust. This may result in calls for increased road maintenance or lower speed limits/greater enforcement actions on these roads.

Alternatives 2 – 4 all provide for greater amounts of narrower, more technically challenging trails than the No-Action Alternative, which would tend to reduce vehicle speeds and dust generation.

Rights of Way

Alternative 1 provides for the greatest amount of public motor vehicle use on Rights of Way Roads, which could result in greater amounts of higher speed traffic and therefore dust. All action alternatives greatly decrease the amount of public motor vehicle use of homeowner maintained ROW roads, thereby decreasing dust issues. New ROW roads authorized in the CBRA allow for gravel surfacing, which would tend to decrease dust issues as well. As noted above, the Cline Buttes Rock Pit Road ROW grant would be amended to allow paving of this route near Eagle Crest Resort.

Cumulative Impacts

There would be minimal cumulative effects to air quality under the Proposed Action. Adjacent Forest Service fuels management projects, such as Glaze Meadows, SAEFER and Metolius Wood (Sisters RD) or Grizzly Fuel break, and Crooked River Ranch Fuels Reduction (Crooked River National Grasslands) would continue to treat vegetation mechanically and with prescribed fire. Emissions from those projects would be on the scale of days and different time frames throughout the year. The treated areas in projects would reduce potential for large-scale, high-intensity wildfires and risk of deleterious effects to air quality. This has reduced the threat of wildfire adjacent to CBRA for 3-5 years. After that period, perennial grasses and forbs will dominate the plant community and provide a fairly continuous fuel layer. Potential for wildfire would increase under these conditions, but the amount of smoke produced would be less than the initial fire because of loss of woody vegetation.

ODOT is seeking approval for a rock quarry (Site N) located west of Barr Road (see Map 5 and 9). If approved, this use would be required to comply with State of Oregon air quality and emission standards. Roads within the site that are used as part of the surface mining operation, and access roads to the site shall be constructed and maintained in a manner by which all applicable State DEQ standards for vehicle noise control and ambient air quality are satisfied.

While it is accepted that some change in climate conditions will occur in the future, it is not possible to reasonably foresee the specific nature or magnitude of the changes. All alternatives provide for motor vehicle use in the CBRA, and while the alternatives vary by mileage of routes and number of access points, the changes in vehicle use and emissions in the future are uncertain and not quantifiable in terms of climate change. Climate change involves the concept of "carbon sequestration." Carbon moves continually between solid and gaseous states. Vegetative ecosystems fix carbon into a solid form from an atmospheric gaseous state during metabolism and growth, and release carbon back into the atmosphere as carbon dioxide (CO2) during decomposition. This conversion of carbon into a solid form is known as carbon sequestration. Decomposition can occur through slow microbial action, or rapid through combustion (fire). The amount of carbon stored at a site in the form of biomass reflects the net balance between carbon uptake and release. The biomass in the naïve shrub-steppe and old growth woodland ecosystems within the selected parcel represents the long-term carbon storage, or "sink".

Human activities alter biological carbon sequestration and release through land management. Cutting and removing trees ceases metabolic CO2 uptake and begins the lengthy decomposition process and release of CO2 back into the atmosphere. In the CBRA, the decomposition process naturally occurs over a period of many decades, or even centuries. Burning, either through wildland or prescribed fire, greatly accelerates the process of carbon decomposition. The chemical process of combustion combines biomass carbon with atmospheric oxygen to immediately release CO2 into the atmosphere.

The conversion of private lands in general from native shrub-steppe and old-growth juniper woodlands to private development may impact the carbon cycle with the clearing of trees and other vegetation. As a result, more carbon is released into the atmosphere and less is stored in vegetation. This increases the importance of BLM administered lands supporting native vegetation that can actively sequester atmospheric carbon.

4.4 Fire Management

Vegetation Management

No Action Alternative
The CBRA is designated for full suppression by the UDRMP and the COFMS Fire Management Plan. Any fires discovered would be suppressed using the appropriate management response. Based on the fire suppression requirements and continued growth and expansion of juniper across the planning area, the forest canopy would continue to increase, thus increasing the crown fire hazard and probability of intense fire behavior (Yanish 2002). Wildfires would continue to be a rare event, but the hazard and difficulty of suppression would continue to increase with increasing fuels. Flame lengths and fire line intensity would increase. Presence of large-scale, high-intensity wildfires would require a larger number of local fire control resources and would be harder to control with available resources. Most wildfire events occur in clusters because of ignition by convective storms. Multiple lightning strikes may ignite multiple fires, increasing demands on local resources.

The Condition Class would remain a 3, indicating a departure from historic conditions. Wildfires would burn with greater intensity due to the increased fuel loading and could potentially burn over larger areas because of greater fuel continuity. Firefighter and public safety would be at greater risk once fires are ignited. Fire suppression efforts would be restricted to primarily indirect attack strategies because of fuel loading and potential flame lengths.

Alternatives 2 - 4
Short-term (3-5 years) effects on Fire Management from the action alternatives would be slightly greater than the No Action alternative, due to increase in fuel loading due to mechanical treatments. However, over the long-term, the risk of large-scale, high intensity wildfires would be lower. Overall, young juniper stands would be converted to sagebrush and grasslands that would foster lower intensity fire behavior, thus reducing suppression costs/efforts and smoke emissions. Treatments would be applied across the landscape.

The CBRA would move through herbaceous and shrubby plant phases following management actions of treatments. Effects of the treatments would vary according to the appropriate method chosen to implement the project (refer to vegetation section of this chapter). Western juniper cover and density would decrease and understory herbaceous plants would increase (Quinsey 1984; Koniak 1985; EOARC, unpublished data). At some point in the future, number of trees and cover would reach the point where adjacent fires would not move through the canopy of western juniper stands, but would burn as surface fires within CBRA. Fire may become more common in that area due to the shift from Condition Class III toward more appropriate Condition Class I.

Transportation/Recreation

Access to the CBRA would be limited to a much smaller number of developed trailheads, where visitor information and contacts could be made much easier. The existing trend of scattered, user created parking and informal use camping areas would decrease. Camping associated with trail use would occur in sites better suited for this use and presenting fewer hazards for unintentional fire starts. The administrative road system in the CBRA would retain those roads identified by BLM as being used routinely for fire patrol/suppression.

Rights of Way

ROW grants would be authorized for constructed and maintained roads for parcels that are currently requesting ROWs. As parcels without ROWs are developed, ROW corridors identified in this EA would serve as future ROW grants and help provide improved and maintained access roads in a timely fashion. The use of constructed and improved roads for access would benefit both administrative use and ingress/egress during emergencies.

Cumulative Effects

The scope of the cumulative effects analysis includes fuels reduction projects within the Cline Buttes planning area, Deschutes National Forest, Sister Ranger District, Crooked River National Grasslands as per the Schedule of Proposed Actions (SOPA, 2008) and the private lands within the Greater Sisters and Redmond Community Wildfire Protection Plans. As the intent of the various projects all have one significant objective--reduce the fire hazard by treating and breaking up the continuity of vegetation.

The combination of fuels treatments in the CBRA and other projects would create a more defendable space and increase the effectiveness of suppression resources throughout the region.

4.5 Visual Resources

Introduction

Management actions that may have an effect on the scenic quality of the CBRA include thinning of juniper and shrubs; development of roads, trails and trailheads, authorization of ROWs, and the closing and rehabilitation of undesignated routes. The standard by which Visual Resource Impacts are assessed is the VRM Management Classes and Key Observation Points (KOPs) identified in the UDRMP. The BLM contrast rating process (BLM Manual 8431-1) involves an assessment of the degree and type of landscape change between the existing and future condition in terms of the contrast introduced by the management action. Contrast is rated for characteristics of form, line, color and texture.

VRM Analysis Assumptions and Process

Assumptions

The level of analysis for different actions in the CBRA plan is based on the following assumptions from the BLM's VRM policy/process or made by the Prineville District VRM Specialist:

1. ROW grants that authorize site specific and long term development of new or improved (gravel or paved roads) or utility lines have a greater potential to introduce contrast in the landscape compared to native surface roads and trails due to greater width and color contrasts due to surfacing and elevated structures (powerlines).
2. Small parking areas with no restrooms and located on flat terrain would have limited visual effects compared to the current condition of numerous user created parking areas scattered throughout the CBRA. Assessments were done by a BLM visual resource specialist for major trailheads proposed in each alternative (i.e., trailheads that include restroom structures, signs and parking areas for more than 10 – 12 vehicles).
3. The general level of concern and potential impacts of management actions in the CBRA are dependent on visibility of management actions due to steep slopes and angle of view. Flat areas that are not seen from elevated viewpoints/KOPs can generally absorb management actions such as trails and vegetation management actions.
4. The general level of concern and potential impacts of management actions in the CBRA are greater in areas where visitors spend greater amounts of time and travel slowly (e.g., hikers along the Deschutes River) versus areas where visitors are travelling at greater speed or views are incidental (i.e., views from State Highway 126).
5. VRM Analysis is based on both short term and long term visual effects. Short term effects are described in terms of general length and intensity of effects. Within the context of this project, and visual resource management guidelines and practices of the BLM, short term effects are generally considered to be less than 5 years in duration. Long term effects of vegetation management actions are generally assumed to be positive, as the area changes toward a historic range of plant communities and composition.
6. The overall change in vegetation communities includes changes in density of juniper woodland and changes in the acreage and patterns of shrub steppe openings in the juniper woodland cover in the CBRA. Vegetation management actions may result in finer scale changes such as changes in understory grasses and forbs or temporary expansion or decrease of exotic annuals in the management area. These changes would not be highly apparent to the casual observer, and would not be a significant visual resource impact. However, the potential for regular and highly apparent color contrast and defined forms from cheatgrass (such as hand pile and burns on steep slopes that may result in discernable yellow/bright green dots seasonally) were identified and assessed.
7. Juniper thinning to meet ecological and public safety/fuels management goals in the UDRMP may increase the visibility of existing and proposed ROWs. In VRM Class 4 areas, these effects of increased visibility of existing ROWs is within management goals for visual resources, but in VRM Class 2 and 3 areas visible from KOP's, mitigation for these potential effects is proposed.
8. Since vegetation management actions in the CBRA plan are programmatic, further site specific review and treatment design and monitoring will occur. Monitoring efforts will be focused on VRM Class 2 areas and use BLM's contrast rating methodology post treatment for both short term and long term effects.
9. Fences proposed in the CBRA plan are not critical features with regards to visual resources. Generally, fences are proposed along roadways, which is a common occurrence throughout the planning area. Fences would be three or four wire fences, with green or brown metal fence posts. Fences at major trailheads will include sections of wood buck and rail type fencing or rock walls to improve the visual character of these sites and help them match fence designs in the rural areas surrounding the CBRA (see Appendix 1, Figures 34 and 35).

10. Alternative 1 does not propose any new route construction and while it designates a specific system of routes for motorized vehicle travel, it does not identify any of the other existing routes for decommissioning or limit non-motorized travel to a designated trail system. It is assumed that no significant closure or rehabilitation/decommissioning of routes would be undertaken.
11. Alternative 1 does not propose specific vegetation management goals other than the general direction in the UDRMP. The assumption is that vegetation management activities would not occur in the CBRA.

Process

All Action Alternatives are similar enough that an analysis by area and alternatives is not necessary. However, each alternative was compared with regards to the change in density of roads and trails within VRM Class 2 and 3 areas visible from Key Observation Points (see Tables 60 - 62).

The vegetation management strategy is common to all action alternatives, while the trail and trailhead proposals are also similar. All major trailhead proposals, ROW Grant proposals, and OHV play areas were analyzed in the field, using BLM's Contrast Rating Methodology. Vegetation management goals and potential methods were reviewed in the field using the same process for VRM Class 2 and 3 areas within view of Key Observation Points as identified in the UDRMP. This field assessment included the following steps:

1. Identification of seen areas (VRM Class 2 and 3) from KOPs
2. Field review and verification of seen areas (VRM Class 2 and 3)
3. Field identification of existing visual character of these seen areas and of areas where major trailheads or ROW grants are proposed
4. Assessment of degree of contrast introduced for VRM Class 2 and 3 areas seen from KOPs and for ROWs and major trailheads.
5. Development of mitigation measures to reduce contrast to meet or exceed VRM management classes.

Vegetation Management

No Action Alternative

No specific vegetation management strategies are proposed in Alternative 1. While short term effects would be minimal or non-existent, over the long-term, there would be little opportunity to enhance longer distance views, and increase the vegetative diversity in the CBRA. The existing high density of young junipers overall in the area would tend to diminish opportunities for long range views, including scenic view of other parts of the CBRA and views of the Cascades. The density of young junipers would also tend to diminish opportunities for comprehensive views of the relic Columbia Southern Canal system (e.g., Tumalo Canal ACEC), since the canal is a relatively shallow and unobtrusive feature in the landscape, and in many places is currently overgrown with young juniper trees.

Over the long-term, there would be an increase in the density of juniper, with a slight increase in dark green color of expanded juniper woodland. The increase in density of juniper would tend to increase the sense of enclosure, and further reduce longer distance views. As a general rule, there would be a decrease in middleground and background views. Gentle undulations in topography would be less

discernable under the proposed action, and finer textures due to grassland and shrub components of the plant community would decrease.

Proposed Action

One of the directions in the UDRMP is to undertake vegetation management actions to move the area towards a historic range of plant communities and composition, reducing the density of young juniper in the CBRA and restoring shrub-steppe and old growth juniper woodland/savannah conditions. The degree of public understanding of these different vegetative types and their historic range is unclear, although it is likely that many current visitors to the area consider the present state to be natural, albeit with some locations with dense routes and disturbance that degrades scenic quality or naturalness. Figures 18 through 23 show the major vegetative conditions in the CBRA, including:

- Old Growth Juniper (typical form)
- Old Growth Juniper woodland dominated by young juniper
- Old Growth Juniper with low density of young juniper
- Sagebrush Steppe
- Sagebrush Steppe dominated by young juniper
- Riparian

The analysis of effects on visual resources considers the long term direction toward a historic range of plant communities to be a long term positive visual effect. The discussion of vegetative management effects considers methods used to achieve this long-term goal and their short term impacts.

Short term effects

Short term effects of vegetation management activities include the presence of material piles prior to removal or burning, burn scars (either from pile burning or prescribed fire), widening of existing routes or creation of new routes through cross-country travel during treatment operations, presence of downed trees prior to removal, presence of slash scattered in an area post treatment, and presence of yarding areas. Smaller scale visual impacts can include stumps and cut faces, which create a contrast in form and/or color.

The characteristics of short term impacts were defined for various treatment types. These treatment types are described in the Vegetation Management Section of Chapter 2 (CBRA Alternatives). The typical short term changes and contrast created by these treatment types are characterized in Table 64. Project Design Features to meet or exceed Visual Quality Standards include measures for selecting where treatments are located, restrictions on equipment use in some areas, limitations on use of public woodcutting areas in the Tumalo Canal ACEC, scale and types of treatments within the Deschutes River Canyon, and use of existing routes and development of travel plans for vegetation management activities. Appendix 4 contains the full list of project design features that apply to VRM Class 2, 3 and 4 areas in the CBRA.

Figure 18:
Old Growth Juniper (Typical Form)

Figure 19:
Old Growth Juniper Dominated by Young Juniper

Figure 20:
Old Growth Juniper Savanna with Low Density of Young Juniper

Figure 21:
Sagebrush Steppe Bordering Juniper Woodland

Figure 22:
Sagebrush Steppe Dominated by Young Juniper

Figure 23:
Riparian Vegetation Along the Deschutes River

Table 64: Visual Contrast of Treatment Methods by Distance Zone and Slope Class

Distance Zone	0 to ¼ mile		¼ to ½ mile		Beyond ½ mile		Notes
Slope	Low to Moderate	Moderate to High	Low to Moderate	Moderate to High	Low to Moderate	Moderate to High	
ATV Broadcast Seed	Low	Mod	Low	Low	Low	Low	Use of ATV (quad) to broadcast seed. Use of existing or designated routes represents no change to visual resources. Cross country use may introduce color or line contrast, but use would generally be a concern only on steeper slopes within immediate foreground view.
Bundler	High	High	Mod	High	Low	Mod	Use of tired vehicle on and off roads. Contrast created by tracks and cleared areas or areas of color contrast due to disturbed soils when vehicles make multiple passes or turning movements. Short term contrast dependent on density of roads and trails in an area prior to route decommissioning and on steepness of slope. Contrast dependent on location and size of landings or loading areas for bundled material.
Chainsaw (Hand)	Low	Low	Low	Low	Low	Low	Degree of contrast dependent more on condition and treatment of materials post cutting – whether material is left in place, cut smaller, etc. Stump height may introduce regular and somewhat geometric form, and cut face of stumps and tree stems may introduce color contrast with surroundings by leaving a light tan color in place of darker browns , grays and reddish bark of junipers bark.
Chemical	Low	Low	Low	Low	Low	Low	Little to no effect of change other than light brown colors of treated grasses
Forwarder	Mod	High	Low	Low	Low	Low	Use of tired vehicle on and off roads. Contrast created by tracks and cleared areas or areas of color contrast due to disturbed soils when vehicles make multiple passes or turning movements. Short term contrast dependent on density of roads and trails in an area prior to route decommissioning and on steepness of slope. Contrast also dependent on amount of slash or residual material dispersed onsite after removal of logs.
Helicopter	Low	Low	Low	Low	Low	Low	Used for removal of trees out of Deschutes River Canyon in order to avoid large amounts of slash, logs and cut stems of trees within foreground view of hikers, anglers and others on the river. Visual effect on canyon limited to cut faces and stumps left behind, which can be flush cut and/or painted to reduce contrast.
Hand Pile and burn	Mod	High	Low	Mod	Low	Low	Short term effect of slight changes in color as cut material cures and regular, rounded form of many hand piles. Degree of contrast dependent on amount of standing juniper left. Color contrast as boughs dry and turn reddish color is a short term effect, typically lasting only 1 season until piles are burned. Color and form contrast of black burn piles may last up to 5 years, dependent on post treatment reseeding. Potential for color contrast from cheatgrass in burn locations depending on post treatment reseeding done or not. Visibility and degree of contrast greater on steeper slopes in foreground view.
Hydro-seed	Low	Low	Low	Low	Low	Low	Typically done from existing or designated roads/trails, therefore no effect to visual quality.
Lop and Scatter	Low	Mod	Low	Low	Low	Low	Short term color contrast as material dries and turns reddish color. Change in form from vertical trees to ground cover/mulch. Some foreground color contrast due to cut stumps/Stems
Portable Chipper	Low	Low	Low	Low	Low	Low	Unit pulled by vehicle used to chip materials to mulch. Material may be hauled off site or scattered. Fineness of material left generally reduces visual effect to low or no contrast.
Skyline	Low	Low	Low	Low	Low	Low	Removal of logs/stems out of canyons by use of cables.
Slash-buster	Mod	High	Mod to low	Mod	Low	Low	Use of tracked machine with boom mounted cutting head. Method allows for treatment of relatively large area due to machine's 25 foot reach from either side of a road. Contrast dependent on degree of travel off existing or designated routes. Method may leave woody residue which may help cover or soften visual edges of travel route post treatment, which minimizes effects of treatments on level ground and at middleground/background distances.
Swamper burn	Mod	Mod	Low	Mod	Low	Low	Burn pile fed as material is harvested. Short term contrast due to black burn pile lasting up to 5 years. Contrast dependent on degree of visibility from KOP and retention of screening vegetation. Potential for longer term color contrast from cheatgrass in burn locations depending on post treatment reseeding done or not. However, frequency of piles would be lower than hand pile and burn, which reduces scale of visual effects. Visibility and degree of contrast greater on steeper slopes in foreground view.

Wood Cutter (Commercial)	Low	Mod	Low	Low	Low	Low	Woodcutting under contract. Typically done by hand crews. Low degree of visual contrast due to slash left on site. Use of vehicles can be managed to select designated routes under contract. Introduction of line and color contrast from vehicle use can be rehabilitated by post treatment work as part of contract.
ATV with Arch	Low	Mod	Low	Low	Low	Low	Removal of logs/trees using quad and dragging one end of log/tree. Use of existing routes over 50 inches in width prior to decommissioning represents no change in visual condition. Cross country use may introduce color or line contrast, but use would generally be a concern only on steeper slopes within immediate foreground view.
Prescribed Broadcast Burn	Low	Mod	Low	Low	Low	Low	Short term introduction of color contrast from burned and blackened area. Prescribed burns generally planned as low intensity ground fire, with some, but not all junipers burned. Blackened burn scars are short term effect, typically lasting 1 season. Areas with a high density of young juniper may be thinned prior to, or after burning to avoid a blanket density of standing dead trees. Longer term change in many areas from gray foliage color of sagebrush to light green and pale gold of native grasses.
Crushing	High	High	High	High	Mod	Mod	Tracked vehicle with rotating drum attachment that reduces vegetation down to approximately 1' height. Use of equipment generally produces some soil disturbance.
Drill and Harrow	Mod	High	Low	Mod	Low	Low	Equipment pulled behind rubber tired or tracked vehicle, using disks or tines to scarify soil and prepare seedbed.
Feller-Buncher	Mod	High	Mod-Low	Mod – High	Low	Mod – Low	May be tracked or rubber tired vehicle. Use may introduce contrast in line and color from creation of new routes, particularly in areas of repeated travel or turning movements. Degree of contrast dependent on whether existing routes are used or new routes created. Steepness of slope, whether use is in foreground view and the percentage of vegetation treated in each area would also affect degree of contrast.
Hydro Axe	Mod to Low	Mod to High	Low	Mod	Low	Low	Cutting of shrubs and chipping/depositing material. Method places layer of material ahead of machine, thus minimizing color and line contrast due to soil disturbance.
Harvester	Mod to Low	Mod	Low	Mod to low	Low	Low	In areas of dense existing road networks, harvester provides a way to thin juniper with little ground disturbance, other than at landings, dependent on how logs/tree stems are transported. Some color contrast from cut faces on trees. Branches and residue would be stripped and deposited at site. Degree of contrast somewhat dependent on use of existing routes vs. cross-country use.
Mower	Mod	High	Mod to low	Mod	Low	Low	Mower pulled behind a rubber tired vehicle that typically mows shrubs and very small trees to a height of 6 to 8 inches. Mower requires one pass for treatment, and is typically 4' to 6' wide. Mowers are not used in dense woodlands or steep slopes. Soil color and line contrasts introduced by vehicle passage are generally obscured by chipped materials post-treatment.
Machine Pile (burn)	Mod	High	Mod	Mod	Low	Low	Some color and line contrast introduced by vehicle travel off existing or designated routes. Scattering slash on roads after treatments may soften this contrast. Short term color and form contrast due to the presence of large piles of material before burning. Short term color contrast of blackened burn piles would last 1 season. Potential for cheatgrass to grow in spot where pile was burned, which may create seasonal color contrast in early spring.
Wood Cutter (public)	Mod	High	Low	Mod	Low	Low	Short term contrast created by felling trees and leaving for a season to cure prior to allowing public to access area to cut wood. Public use of existing roads and cross country travel may introduce color and line contrast. Post treatment decommissioning prior to decommissioning of unwanted routes would reduce introduction of color and line contrast.
Skidder	High	High	Mod	High	Mod	Mod	Use of skidder may introduce color and line contrast due to creation of new travel routes and linear skid trails as top end of tree/stems are dragged to landing area
Low to moderate slope: 0 to 20 percent, Moderate to High slope: 20 percent and above							

Long term effects

The long term effects of the Proposed Action includes a restoration of shrub steppe in many portions of the CBRA, with a change from dense dark green stands of young juniper or mottled dark green coverage of lower density young juniper stands seen against a background of sage green, light green and grays of shrub steppe and rocky areas to much larger areas of light green, sage green and grays as larger areas of shrub steppe landscape are restored or the density of juniper stands is decreased. This type of change is illustrated conceptually in Figures 24 and 25.

In general, the long term effect of vegetation management would be to change the overall texture of the landscape from a coarse or moderate texture of juniper woodland to many areas of lighter and finer texture sagebrush steppe, grasslands or Old Growth woodlands/savanna. This change would increase the visibility of, and the dominance of landform and topography as a visual element in the CBRA. This would increase the diversity of the landscape and provide greater edge effects between open and dense woodland areas. Another long term benefit of this change would be to open up views of both the CBRA landscape as well as views of the surrounding features, including highly scenic views of the Cascades. Areas where restoration of shrub steppe would produce a visible change in texture and color include the canyons north of State Highway 126, areas adjacent to the north end of Barr Road, the southeast facing slopes of the southern butte and a large area south of State Highway 126 and east of Deep Canyon.

Another long term effect of the proposed action would be to reduce the density of young juniper trees within old growth juniper woodlands and provide a greater variety and density of understory vegetation. Although the composition of native bunchgrasses, non-native grasses and shrubs is not likely a major contributor of scenic quality for most casual observers of the area, the reduction in young junipers would help to highlight the larger old growth trees, which generally have outstanding scenic character that is often obscured within dense stands of younger, pointed top juniper trees. The larger old growth juniper trees tend to have strong visual character, with rounded tree form, thickly ridged bark, gnarled limbs and deep greens and reddish brown colors.

Certain treatment types have the potential to increase the occurrence of exotic annual species, particularly cheatgrass in the CBRA. Cheatgrass is common in many portions of the area already, and an increase in this vegetation type is not considered a significant visual impact unless it occurs in highly visible locations (steep slopes) and in patterns that are noticeable and discernable as a high degree of contrast. In any case, the expected increase in cheatgrass and other non-native plants on some sites would peak in 3-5 years and gradually diminish over the long-term without further disturbance. Project design features (pdf's) provide direction to avoid certain treatment types such as hand piling and burning on steep slopes within VRM Class 2 areas to avoid introduction of color contrast due to the seasonal occurrence of small light green patches where burn piles have occurred (see Appendix 4).

The removal of young juniper within the Deschutes River Canyon is not likely to greatly change the scenic quality of the canyon at large. The BLM administered portions of the canyons are typically seen in combination with private portions of the canyon walls. Regardless of the degree of juniper thinning on public lands, the presence of untreated private land in the canyon will maintain a mixture of juniper and sagebrush-steppe vegetation. Photo-simulations of a 25 percent and 50 percent reduction in juniper were done for different portions of the canyon. Treatments up to 50 percent reduction create low amounts of contrast with the characteristic landscape (see Figures 26 – 28). Treatment methods that leave large amounts of juniper residue, particularly large logs, tree boles, and branches within the Deschutes River Canyon close to the riparian area would create a moderate degree of long term visual contrast in the canyon, for visitors who are at the river's edge. Treatment types that avoid this condition by removing large woody debris (physical removal or burning in swamper burn piles) or limit the scale of treatments and mix debris into the riparian band are proposed in mitigation/design features. Treatment methods that burn individual standing trees or groups of trees were evaluated

Figure 24: Deep Canyon, View West (Exsisting Condition)

Figure 25: Deep Canyon, View West (Juniper Thinning)

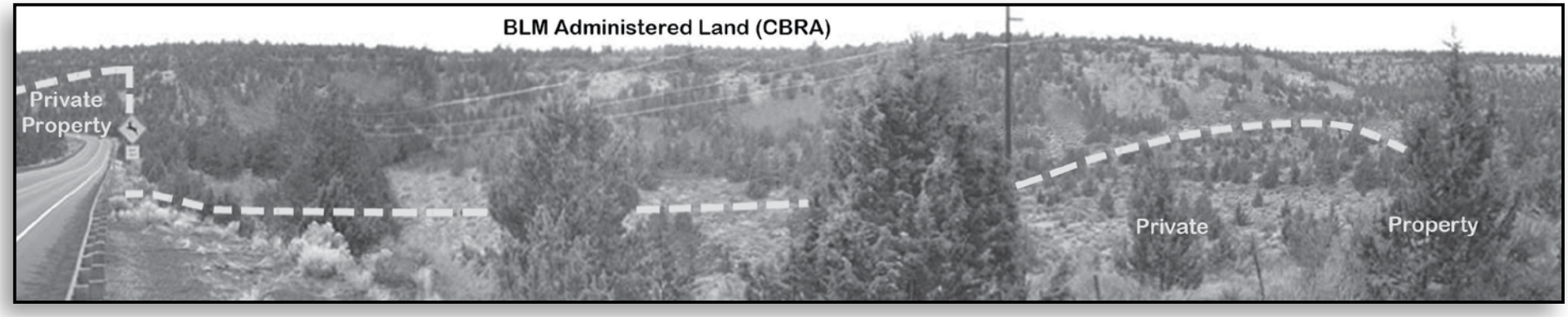


Figure 26: Deschutes River Canyon, View West (Exsisting Condition)

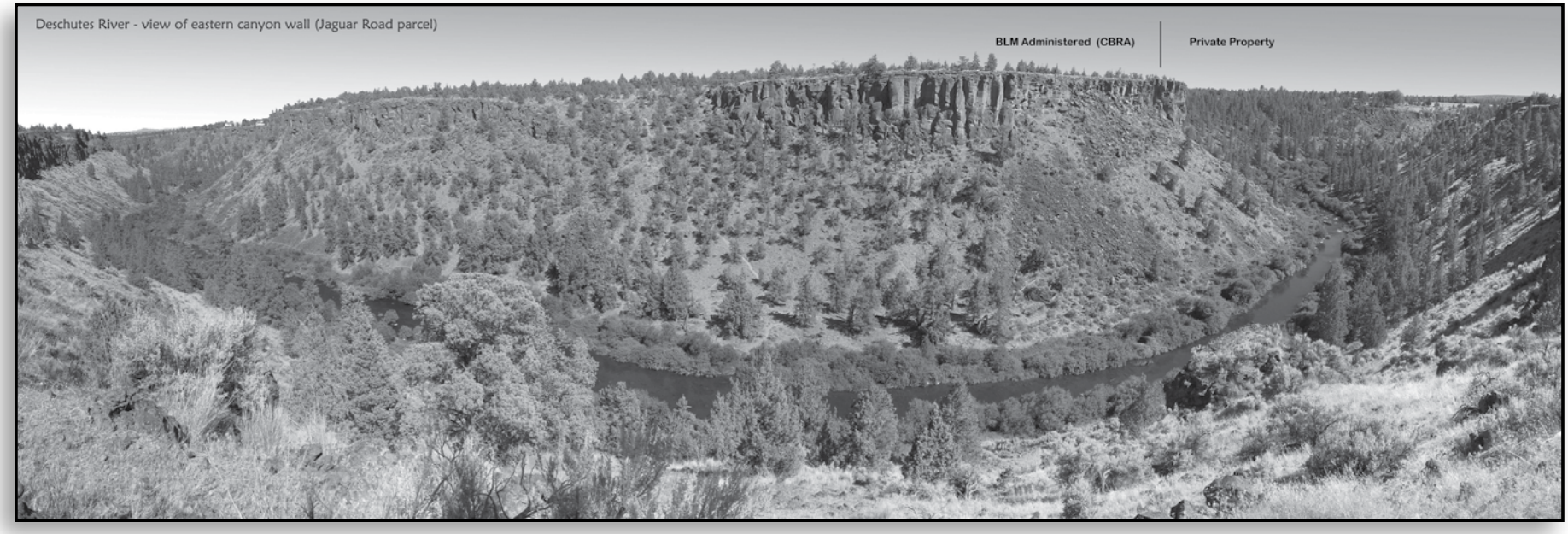


Figure 27: Deschutes River Canyon, View West (25% Juniper Reduction)

Figure 28: Deschutes River Canyon, View East (50% Juniper Reduction)

Figure 29: Deschutes River Canyon, View West (Exsisting Condidtion)

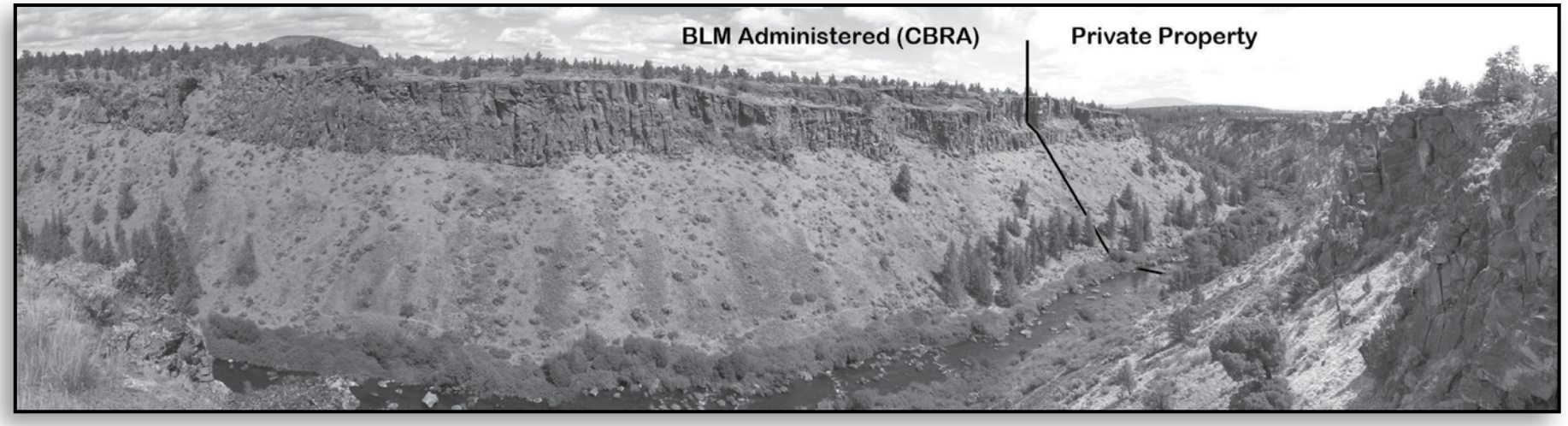


Figure 30: Deschutes River Canyon, View West (25% Juniper Reduction)

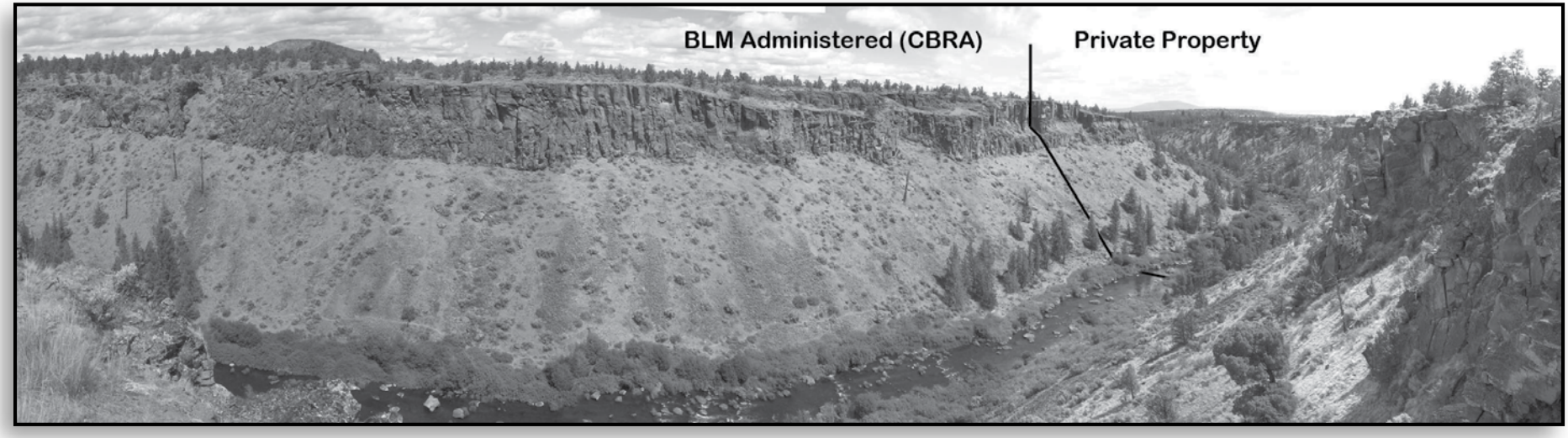
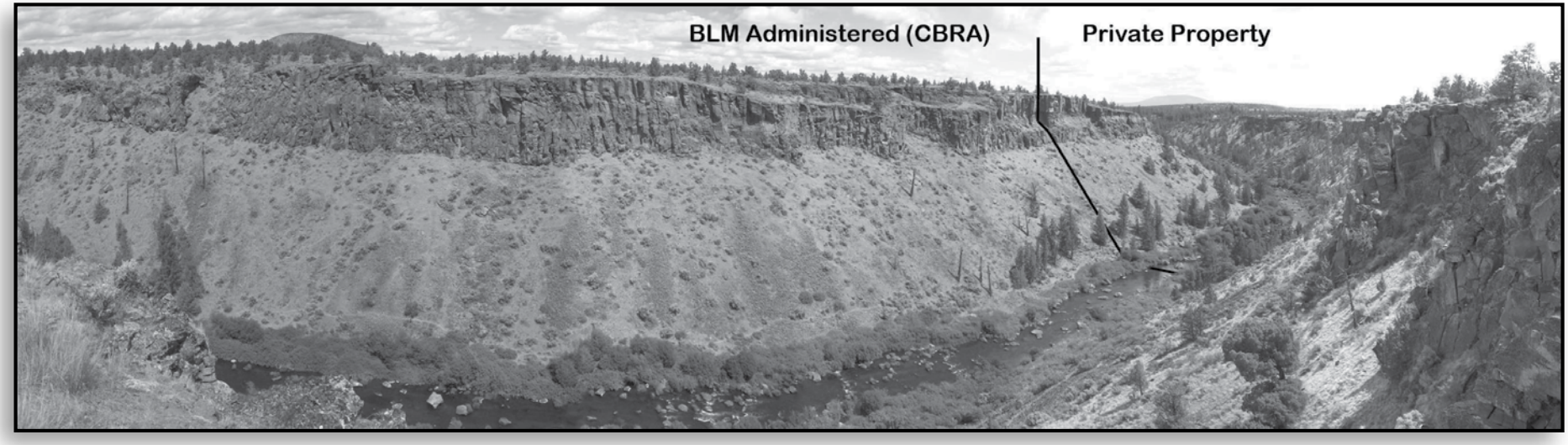


Figure 31: Deschutes River Canyon, View West (50% Juniper Reduction)



through the use of photosimulations and found to create a low degree of visual contrast, particularly on the upper slopes of the river canyon where standing dead trees are seen against a backdrop of columnar basalt (see Figures 29 – 31).

The thinning of juniper within the Tumalo Canal ACEC has the potential to open up scenic views of the Cascade range and provide much better viewing opportunities of the relic Columbia Southern Canal system. Much like the Deschutes River Canyon, vegetation management activities have the potential to introduce contrast by leaving large amounts of juniper residue (logs, large branches) and stumps in an area of pedestrian/interpretive trails. Treatment types that avoid this condition within the immediate foreground of the designated pedestrian/interpretive trails are included in project design features/mitigation measures.

There may be cases where vegetation management activities may result in opening views of existing structures adjacent to BLM administered lands, or of existing or proposed ROWs (particularly existing or proposed above ground utility lines) or in creating hard edges or lines between treated and untreated lands. Management practices identified for all areas of the CBRA provide mitigation measures and additional treatment design review to minimize the likelihood of these effects.

Transportation/Recreation

No Action Alternative
Alternative 1 would have the fewest management changes to the existing visual conditions in the CBRA, at least for the short term. Over the long term, the lack of planned and managed trail and transportation systems and the high number of access points may result in increased density of travel routes and an increase in visible contrast between vegetated and barren areas. This increase would likely be most apparent in the existing areas of very high route density and user created parking areas, including:

- North and South Ends of Barr Road
- South end of Buckhorn Road
- Deep Canyon north and south of State Highway 126
- Southern portions of the Maston area near Newcomb Road and the Deschutes River

In the case of Barr Road, while these disturbed areas are in VRM Class 4 zones which allow management actions to be a dominate visual element, these areas do serve as gateways or major entry points to the area, making further degradation of scenic quality in these locations an issue.

Overall, Alternative 1 provides the heaviest footprint of travel routes throughout the CBRA. A comparison of route density within immediate foreground view (1/4 mile) and middleground view (1/2 mile) of key observation points is shown in Tables 60 - 62.

Without a designated non-motorized trail system, it is likely that additional user created trails will occur in places like the Maston Area. The increase in trail density would not likely have a major effect on scenic resources, based on extensive field review, the presence of narrow, singletrack trails are not highly apparent, even on the face of the buttes and the Deschutes River Canyon. However, trail routes are visible from the existing public access points (Red Cinder Road, Jaguar Road, Quarry/McVey Road, and the southernmost powerline crossing near Newcomb Road).

Effects Common to All Action Alternatives
The CBRA plan calls for the development of the following features: ROW roads and associated utilities, Administrative roads, Trails, Trailheads, and Fences.

Table 60: Density of Routes Within Viewshed of State Highway 126 (mi/sq. mi)

VRM Class	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Miles	Density	Miles	Density	Miles	Density	Miles	Density
Class 2	35.4	**9.47**	30.7	**8.2**	32.3	**8.6**	32.3	**8.6**
Class 3	17.9	**10.1**	11.7	**6.5**	12.1	**6.8**	10.1	**5.6**
Viewshed: data for seen area from edge of highway to ½ mile distant								

Table 61: Density of Routes Within Tumalo Canal ACEC (mi/sq. mi)

VRM Class	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Miles	Density	Miles	Density	Miles	Density	Miles	Density
Class 2	12.4	**9.5**	9.1	**7.0**	7.4	**5.7**	9.6	**7.4**
Class 4	14.7	**10.2**	9.3	**6.5**	8.0	**5.6**	8.6	**6.0**
Viewshed: data for Tumalo Canal ACEC boundary								

Table 62: Density of Routes Within Viewshed of Deschutes River (mi/sq. mi)

VRM Class	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Miles	Density	Miles	Density	Miles	Density	Miles	Density
Class 2	5.6	**17.6**	3.8	**12**	3.9	**12.2**	3.9	**12.2**
Class 4	0.07	**7**	0.1	**10**	0.07	**7**	0.1	**10**
Viewshed: data for seen area from bottom of Deschutes River Canyon								

All Action Alternatives decrease the density of routes throughout the CBRA, which would provide a long term increase in the scenic quality of the area. Tables 60 - 62 show the density of routes per alternative within the viewshed of KOPs.

Areas of higher management concern for visual resources in the CBRA are identified as VRM Class 2 and VRM Class 3 areas. These are areas that were identified in the UDRMP for more careful project design to protect scenic values. A more specific discussion of the visual effects of transportation management for VRM Class 2 and 3 areas are described below.

VRM Class 2 Areas

Seen from KOPs

State Highway 126 at Deep Canyon – The heavily roaded areas within immediate foreground view of State Highway 126 in Deep Canyon would be closed to vehicle use and access from the highway. Relatively few trail routes would be located within view of State Highway 126. In general, the proposed trails are moderate or difficult class trails that are narrower and far less dominant features than the existing braided roads adjacent to the highway. For all alternatives, the single trail route located on the east face of Deep Canyon near the highway would be an equestrian trail located approximately ½ mile from the highway. Portions of this trail route are screened from view by topography, and the existing setting provides a high degree of variety in terms of form, line, color and texture which would enable a trail to be located in such a way to be substantially unnoticeable. The reduction in route miles in this area, and location and type of routes would improve the visual quality of the area and meet VRM Class 2 objectives.

State Highway 126 at Cline Buttes - CBRA lands on the buttes are intermittently visible from the highway at a distance of approximately ½ mile. Views of many areas on the north face of the buttes are blocked by the terrain of private land adjacent to the highway. The most visible portions of the northern butte are the private lands located at higher elevations than CBRA lands. The non-motorized trails

proposed around the northern butte are oriented along the contour lines and would be unnoticeable from the highway, even in the few areas where views are possible. The only motorized trail proposed on the buttes is located on an existing ROW road (OR 015986) that is not visible from KOPs and is generally not visible from surrounding vantage points (the radio communication site road).

Mountain bike trails would be located on the southeast facing slope of the southern butte, and would not be visible from State Highway 126. Where potentially visible from the highway, any trails on the buttes would be visible at a distance of about 1 mile or more and would not attract attention or create a noticeable level of contrast. Existing trails on this portion of the butte are not highly apparent from closer range views including Cline Falls Highway and the Maston area.

Deschutes River – Trails proposed within the viewshed of the Deschutes River are limited to river access trails. These trails are rated difficult and will be narrow, pedestrian only routes. In all cases, these routes are either existing trails or relocated portions of existing trails that have been rerouted to avoid the steeply descending user created routes. While these user created access routes are not highly apparent or attract attention, the steep portions of these river access trails do create a low degree of visual contrast by creating a faint vertical or zigzag line in a landscape that is characterized by horizontal lines and forms of the river, riparian edge and canyon edge. By rerouting river access trails to provide less erosion prone grades, all action alternatives would reduce steep, vertical lines and improve the scenic quality of the river corridor.

Tumalo Canal ACEC – The density of trail routes within the Tumalo Canal ACEC would be reduced, and most of the proposed trail system would be located on existing canals or roads in the area. The few portions of new trail in the area would be limited to moderately difficult singletrack pedestrian or mountain bike trails, which would not be visible from adjacent trails due to their set back on basalt outcroppings/ridges.

Not visible from KOPs

State Highway 126 at Deep Canyon - The Class 2 jeep routes in Deep Canyon would not be visible to motorists travelling on State Highway 126, due to the existing road cut and highway grade alignment. Even if these views were visible, the viewing distance of approximately ½ mile would makes the existing road identified as an all-motor trail in each alternative and any new rock crawl routes substantially unnoticeable, given the highly varied pattern of basalt rock outcroppings, juniper stands, and shrubs found in the area.

Little Buckhorn Canyon – No trails are proposed in this Canyon located north of State Highway 126 and east of Buckhorn Road.

Buckhorn Canyon – The majority of trails proposed in this area are located above the canyon rim, with a maximum of 3 crossing routes in the canyon, one or two located at the top of the canyon, another located approximately 2 to 2 ½ miles away at the bottom of the canyon.

East slope of CBRA adjacent to 101st Street – the only trails proposed in this area are pedestrian trails (Alternative 3). These trails would be located on the lower portion of the slope and would not be highly visible or attract attention from the casual observer. All OHV trails in all alternatives are located above the canyon rim and would not be visible from State Highway 126 or surrounding areas.

VRM Class 3 Areas

Seen from KOPs

Views from State Highway 126 east of Deep Canyon would not be significantly affected by trail or

road development in the CBRA. Trails would generally be located several hundred feet away from the State Highway, and the flat to gently rolling terrain would make any new trails difficult to see and be largely unnoticeable. One section of OHV trail is located on the north side of the highway, between ¾ and 1 ¼ miles west of Barr Road. This route would be located on an existing powerline maintenance road, and is partially screened by vegetation located between the powerline corridor and the highway.

Trailheads

Final trailhead development will retain old growth junipers and additional young juniper within and adjacent to the trailheads. Trailhead design will include wood pole or split rail entry fences, fence anchor points (cribs) using native rock, gravel parking areas, and signs designed specifically for the CBRA that use rough timbers or juniper limbs and basalt rock as structural elements to blend with the setting (see Figures in Appendix 1). Colors of all facilities will be chosen to blend in with the surrounding landscape, using a color that repeats the darker, more recessive color scheme of the surrounding soils and/or vegetation. Additional steps to minimize the visual effect of trailhead developments are shown in Table 63.

Table 63: Trailhead Visibility and Mitigation Measures

Trailhead	VRM Class	Visibility from KOP	Mitigation
Barr North	4/3	Partially visible, depending on vegetative screening. Viewing distance of 1/8 to ¾ mile.	Retain Juniper between KOP and site to screen views. No vegetative treatment within 1/8 mile of trailhead until Trailhead development occurs, then vegetation removal done in phases to ensure adequate screening is retained (See Appendix 4)
Cascade View	4/3	Partially visible, depending on vegetative screening. Viewing distance of 1/8 to ½ mile.	Retain Juniper between KOP and site to screen views. No vegetative treatment within 1/8 mile of trailhead until Trailhead development occurs, then vegetation removal done in phases to ensure adequate screening (See Appendix 4).
Buttes	2	None	Trailhead is located on mid-slope/bench area and not visible from KOP. Trailhead would not be visible from Cline Falls Highway. Junipers retained around site until after trailhead development to allow for shade and selective thinning (See Appendix 4)
Juniper	4	None	Site not visible from KOP. Trailhead design will retain/ incorporate largest old growth juniper trees. Relocation of entry road would consolidate road intersections to one location on Cline Falls Highway.
Maston	4	None	Site not visible from KOP. Trailhead will be located north of Newcomb Road and east of small ridge and juniper woodland, screening views from nearby residences.
Tumalo Canal	4	Yes	VRM boundary revised to follow Barr Road. Trailhead would be located in heavily disturbed area. Large juniper trees will be retained within trailhead as well as along Barr Road to partially screen views of Barr Road and Trailhead from the designated hiking trail.
Fryrear Canyon	4	None	Site not visible from KOP. The trailhead is located mostly out of view of Fryrear Road. Design of trailhead will incorporate large old growth trees and basalt rock outcrops.
Buckhorn	4	None	Retain Juniper between KOP and site to screen views. No vegetative treatment within 1/8 mile of Trailhead until Trailhead development occurs, then vegetation removal done in phases to ensure adequate screening.
Jaguar Road	2	None	Minor trailhead, no restroom, small parking area would replace existing berms and boulders piled on site.
Riverview	2	None	Minor trailhead, no restroom, small parking area would be located in previously disturbed area (excavated pit area).
McKenzie Canyon	4	None	Minor trailhead, no restroom, small parking area
Sabrina	4	None	Minor trailhead, no restroom, small parking area
Deep Canyon	4/3	Partial	Minor trailhead, no restroom, small parking area

Right of Way Grants

No Action Alternative

No new or amended ROW grants, or ROW corridors would be issued or designated under the No Action Alternative, resulting in no effects.

Effects Common to All Action Alternatives

ROW corridors

ROW corridors are generally based on existing roads, many of which are currently used as driveways and property access. The vast majority of ROW corridors proposed in the CBRA alternatives are located within VRM Class 4 areas. These narrow, relatively short native surface or gravel roads would be consistent with the management goals for VRM Class 4 areas. Short, single wood pole powerlines along these short stretches of access road, on flat ground, would also not create a high or moderate visual contrast. None of these ROW corridors are located on slopes in excess of 15 percent. Only one route would be located in an area designated as VRM Class 2, a 1,300 foot long corridor located along the edge of the Tumalo Canal ACEC and adjacent to the east edge of Thornburgh Resort. This road corridor would not be visible from Key Observation Points, and would not be visible from the interpretive trails proposed in the ACEC. The ROW road, if ever developed, would be located directly adjacent to private property, thus minimizing fragmentation and consolidating any visual effect with the adjacent private development. This route occurs on flat ground and opportunity exists to partially screen views of this road by retaining some juniper east of the ROW road to make a narrow access road substantially unnoticeable and retain the existing character of the landscape.

Alternatives 2 – 4

There are approximately five ROW grants considered in each Alternative. These include access roads to several parcels north of State Highway 126 and different options for access to several parcels located in the southwest corner of the CBRA.

Alternative 2

<u>Parcels 41 (north of State Highway 126) and Parcel 42 (VRM Class 2)</u>

The ROW grant for these parcels would use an existing road that leaves the State Highway and crosses the upper, eastern bench of Deep Canyon in a northeasterly direction (See Map 12, Cline Buttes ROW Parcels 39 – 42). These are located in an area designated as VRM Class 2. Due to topography and vegetative screening, this ROW road would not be visible from State Highway 126 westbound. For eastbound travelers, the road is not visible due to the highway grade and the fact that the ROW descends as it leaves the highway's edge. A single pole (wood pole) powerline may be routed from the existing powerline along the edge of the highway and follow the proposed ROW route. One or two wood poles may be visible from the highway for eastbound motorists. Views of these poles would be extremely brief in duration and would match the existing powerline, which is set back from the roadway and partially screened by vegetation and landform. The use of wood poles will help the line blend in with the surrounding landscape, and given the short duration of view, and presence of partial screening, the level of change to the characteristic landscape would be low.

Parcels 41 (south of State Highway 126) and parcel 40 (VRM Class 2)

The ROW roads for these parcels would be located immediately south of the State Highway, using existing unimproved roads and portions of the relic State Highway grade. Portions of these ROW roads would be visible from the highway, although the direction of view would be perpendicular to highway and limited in duration. The development of a short stretch of gravel road would generally match the existing condition, which includes a short stretch of gray colored asphalt paving of the old highway grade. This ROW road would be partially screened from the highway views, by retention of juniper along the north side of the ROW road (see Appendix 4). Given the grade and alignment of the State Highway, the attention of most travelers is on Deep Canyon to the north of the highway.

Parcels 48 and 49 (VRM Class 3 and 4)

Alternative 2 uses the existing ROW for Parcel 49 for access to both parcels (See Map 11, Cline Buttes ROW Parcels 48 -49), therefore effects would occur for scenic resources. The existing ROW road is on flat ground, and is visible for a matter of seconds to motorists on the State Highway.

Parcels 28 – 32 (VRM Class 4)

Alternative 2 uses the existing ROW road for access to these parcels. The ROW road is not visible from Key Observation Points and uses an existing road for the majority of the route. While motorists currently use a portion of the gravel ROW road to parcel 20, then follow an unimproved route around the east end of this parcel, the existing ROW grant for parcels 28 – 32 provide for construction of a new road segment between Dusty Loop and the southeast corner of parcel 20 (See Map 10). The presence of three improved roads to the north of Dusty Loop at this location would make these routes a dominant visual element; however, given the many driveways along this stretch of Dusty Loop and the narrow, gravel surface of these ROW roads does reduce the contrast to a level consistent with the area's VRM Class 4 standard.

Alternative 3

Parcels 41 (north of State Highway 126) and Parcel 42 (VRM Class 2)

Alternative 3 uses a combination of existing and newly constructed roads for access to parcel 42 and 41. Within VRM Class 3 areas, the route uses an existing road. Instead of using a steeply pitched existing road to descend into the eastern bench of Deep Canyon, a short stretch of new road would be constructed that has a gentler slope and connects to the southeast corner of the parcel.

Only a short stretch of this ROW road would be visible from State Highway 126, and this portion of the route would follow an existing powerline ROW road set back approximately 200 feet from the highway. Given the flat topography in the area, the gravel ROW road would not be a highly apparent feature. Trees would be left between the existing powerline and the highway (See Vegetation Management Practices, VRM Class 3 Areas) which will help screen views of this ROW road. The portions of the ROW road within VRM Class 2 areas would not be visible from State Highway 126.

Parcels 41 (south of State Highway 126) and Parcel 40

This ROW road would use a portion of the relic highway grade that parallels State Highway 126. The existing route is located about 1/8 mile from the highway and is not noticeable. A short stretch of the ROW road would be visible from the highway for westbound travelers, near the location of the existing wire gate that marks the intersection of the relic highway and the current State Highway 126. This portion of the ROW road would be visible for less than 10 seconds and partially screened by juniper trees retained along the highway for this purpose. The remainder of the ROW road to parcel 40 is not

visible from the State Highway, including about 3/8 of a mile of new construction on a flat bench to the east of parcel 40. This new construction would be located in an area designated as VRM Class 4.

Parcels 48 and 49 (VRM Class 3 and 4)
The portion of this ROW located in VRM Class 3 areas would use the existing ROW road (see description of Alternative 2, above). The new construction for this alternative would be located in VRM Class 4 areas. While few trees exist between the highway and the south edge of parcel 48, the viewing distance of ¼ mile and the flat topography combine to make a gravel road in this location an unobtrusive visual element.

Parcels 28 – 32 (VRM Class 4)
The ROW road alignment in this alternative uses existing roads which are not visible from KOPs. The use of gravel on some sections of this road will borrow from the existing gray color of the basalt rimrock along the ROW road.

Alternative 4

Parcels 41 (north of State Highway 126) and Parcel 42 (VRM Class 2)

Same as Alternative 2

Parcels 48 and 49 (VRM Class 3 and 4)

For Parcel 48, see Alternative 2.

For Parcel 49, the ROW road would use an existing powerline ROW road adjacent and parallel to State Highway 126, then use a newly constructed road across the CBRA. The new road construction would not be visible from the State Highway and would be located in an area designated as VRM Class 4.

Parcels 41 (south of State Highway 126) and Parcel 40

Same as Alternative 2

Parcels 28 – 32 (VRM Class 4)
For this alternative, a short stretch of new road would be constructed from the end of Plainview Road east to the subject parcel. This road would be located on gently sloping to flat ground, and would not be visible from KOPs.

Cumulative Effects

While the CBRA would remain a predominantly undeveloped and natural appearing area, over time the continued development of private inholdings and adjacent land will slightly increase the dominance of built features. For trail users on public lands, this effect is partially mitigated by locating trails further away from private property boundaries. The dominance of built features would be further mitigated by a variety of project design features for visual resources (See Appendix 4), such as leaving juniper to screen views of trailheads and designing vegetation treatments to partially retain screening vegetation and avoid linear edges of contrasting vegetation between public and private lands.

4.6 Heritage

Vegetation Management

No Action
Without the fuels reduction there is a higher risk of loss of cultural resources due to wildfire, firefighting efforts, and increased exposure of artifacts to collection from visitors to the area. The lack of planning time for stopping a wildfire as compared to the planning associated with vegetation treatment results in higher potential for damage to cultural resources.

Action Alternatives
The proposed project activity locations are in or adjacent to 26 heritage resources that are unevaluated for eligiblity or determined eligible for the NRHP. All 26 are in locations with potential juniper thinning activities with six of them being within inner WUI bands that may warrant shrub treatment also. Heavy equipment operations (for thinning, mowing, soil rehab, etc..), fire line construction, and pile burning can affect prehistoric and historic sites by redistributing artifacts, breaking the brittle obsidian, and increasing the accessability and visibility of the artifacts making them more suceptable to unauthorized removal. Some types of sites such as canal structures, juniper structures, and historic debris often include wooden or other combustable artifacts that could be destroyed or damaged by fuel treatments or by fire of any kind. Cultural resource surveys and project design features for visual resources and special management areas (See Appendix 4) would prevent effects to heritage resources.

Transportation/Recreation

No Action
Without designated use areas, recreationists would continue to do their own developments, which can result in damage and destruction of archaeological, historical, and cultural sites and locations.

Action Alternatives
Five eligible or unevaluated sites are either intersecting or adjacent to proposed trail locations. Another two unevaluated sites are in or adjacent to a rock crawl area. Project design features would prevent effects to heritage resources.

Right of Way Grants

No Action
Not designating rights of way to private inholdings within CBRA as part of this plan would result in separate analyses and decisions as requests for such rights of way come in from the various land owners. As such, any analysis and protection of cultural resources would occur at that time.

Alternatives 2 and 3
No significant or unevaluated cultural resources are present in the proposed locations. There will be no direct or indirect effects to cultural resources.

Alternative 4
One unevaluated prehistoric site is present in a proposed ROW under this alternative. A site evaluation will need to be completed to determine if it should be protected or not. If the site is significant, a mitigation plan to protect the site or a data recovery plan to recover data that would be lost would need to be completed and implemented prior to construction of the ROW road.

4.7 Old Growth Juniper Woodlands

Since the old-growth juniper woodlands, including the understory plant species, are considered an entire ecosystem and are managed as such, the discussion of effects will include the direct, indirect and cumulative effects to the trees and associated plants.

Alternative 1

Under the No Action alternative old-growth juniper woodlands would not be directly affected by proactive vegetation management treatments or recreation and transportation developments (including ROWs). Routine land management programs such as fire suppression and law enforcement would continue. Current trends for recreation use would continue, although the development of user created, non-motorized trails may accelerate due to cross-country use and the spread of the motorized trail system. Changes to old-growth ecosystem condition, structure, and composition would continue as described in Chapter 1 – Purpose and Need, and Chapter 3 - Affected Environment.

Without vegetation management, juniper seedlings would continue to establish and compete with the larger old-growth trees for water, space, and nutrients. Greater density and competition from young juniper would make large, old trees more vulnerable to damage/mortality from insects, disease, drought, and wildfire. Higher densities of juniper would also displace understory shrubs, bunchgrasses, and forbs, resulting in reduced old-growth woodland diversity. Less understory ground cover would allow increased losses of soil to wind and water erosion, and further indirect long-term effects to the vegetative ecosystem.

Higher juniper densities could create conditions conducive to high-intensity crown fire which would threaten life and property and result in severe consequences to ecosystem and watershed function. Crown fires would result in fire killing many old growth trees.

Under Alternative 1, travel within CBRA would continue to be managed based on the UDRMP motorized trail system. The higher number of motor vehicle access points and road densities in Alternative 1 would tend to enable illegal wood cutting, dumping, and expansion of parking/staging areas.

Action Alternatives (Alternatives 2 – 4)

Vegetation Management

Mechanical Treatments

Mechanical treatments would, to some degree, mimic the natural role of fire which, though infrequent in old-growth juniper woodlands, historically contributed to ecological diversity by creating variable tree densities and gaps in the woodlands. Thinning young juniper would relieve competition for limited soil, water and nutrients and thus increase the health and longevity of the remaining trees.

Mechanized equipment affects vegetation and soils in old-growth juniper woodland ecosystems. The degree and extent of these effects would vary based on resource objectives, prescription, type of equipment, and pretreatment composition, condition, and structure of the plant community.

Trees and vegetation can be damaged by direct contact with equipment used for mechanized treatments. Commercial harvest, in particular, can damage residual trees and other vegetation. Heavy

equipment used in thinning would cause some soil compaction and displacement with corresponding effects on plant survival and growth. These direct effects would be moderated with low-impact equipment, seasonal or soil moisture restrictions, designated skid trails, and closely monitoring operations. Compaction could be reversed on some sites by scarifying skid trails, temporary roads and landings. Compaction diminishes gradually over time through natural processes such as freeze and thaw action, root penetration and other biotic activity.

Old-growth trees would benefit from reduced competition and susceptibility to insects, disease, and wildfire. Young trees selected for retention would eventually develop old-growth characteristics and provide fill-in for historic harvest and illegal removal, and replacements for natural old-growth tree mortality over time. The ecological response of the understory plant community to juniper and brush cutting/removal would vary across a variety of sites and treatment techniques. Treated areas would be expected to show an increase in perennial forbs and grasses within 3 years of treatment.

Off-site removal of vegetation would result in a net export of nutrients and organic matter. This effect could be mitigated by leaving in place the fine material (small branches and foliage) where most of the nutrients are concentrated.

If perennials are sparse, or if exotic annuals are abundant before treatment, juniper reduction and associated ground disturbance could exacerbate the weed situation. Site evaluation by a team of specialists would determine appropriate location of treatment units, prescriptions, and methods to minimize the threat of weeds. With mitigation, weed occupation is expected to be minimized and short-term. With full plan implementation of controlled motorized travel, road closures, site rehabilitation, and future treatments, the presence of annual exotics would be expected to gradually decline and be replaced with native shrubs and bunchgrasses.

Prescribed Fire

Juniper, even large old trees, are susceptible to damage and mortality from fire. Old tree structure with large crowns, much dead wood in the boles and branches, branches hanging down nearly to the ground, and a large build-up of duff and litter under the crown, allows fire to easily overtake the largest of trees. Therefore, the only prescribed fire use in old-growth juniper treatment areas would be pile burning or swamper burning of slash in the inter-space areas between trees. Old-growth juniper in the pumice sands of Central Oregon attained their advanced age, in part, due to the infrequent occurrence of fire on these sites. Fire historically did not carry well on these sites due to the high amount of bare ground and few fine fuels between the trees to carry fire from one tree to the next. Using historic range of variability as a management guide, it would be inappropriate to allow prescribed broadcast fire in most of the old-growth juniper woodlands. Broadcast burning should also be limited on these pumice soils, due to the presence of exotic annuals and their high capacity for spreading and dominating on these sites after fire.

Due to the concentration of fuels, prescribed pile/swamper burning cause intense heating of the soil in the localized area directly beneath the pile. All vegetation, seed reserves, and organic matter in the pile burn area would be consumed. Soil properties would change, resulting in delayed recolonization by native vegetation for several years. Although this is a severe impact to vegetation and soil, the extent is limited to less than 1% of the treatment surface area. Exotic annuals such as cheatgrass, mustards, and thistles would be able to germinate and thrive on these burn spots, easily out-competing native grasses and shrubs in the localized impact area. This could be mitigated by seeding native vegetation in the burn areas.

Effects on soil and vegetation can be less with swamper burning compared to pile burning since this type of prescribed fire reuses burn areas by continually feeding designated spot fires with surrounding slash as the fires are burning, until the surrounding slash is consumed. This type of burning limits both the size and number of burn spots, although duration is increased.

Some crown scorch of old trees could occur if there is inadequate room to locate piles between trees in a relatively dense stand. Pile burning could be used to intentionally create juniper snags by piling slash around selected large, but younger trees, and using fire to kill the tree.

Transportation/Recreation and Right of Way Grants

All action alternatives would create a travel management system of designated roads and trails for motorized and non-motorized use. The effects between the alternatives on old-growth juniper woodlands would be directly proportional to the number of miles of roads and trails allowed under each alternative. All action alternatives reduce route densities and limit access points within the planning area when compared to Alternative 1, the no action alternative. Alternatives 2-4 decommission some existing routes, incorporate existing routes, and create some new recreation routes and ROWs to create a functioning travel management system and minimize user conflict. Since any new or rerouted roads and trails would meander and be designed to go in between old-growth trees, direct effects from tree removal would be minimal. While effects on trees is minimal, travel routes have direct effects on the understory plant community within the old-growth juniper ecosystem. Understory plant species are unable to grow in travel routes due to soil compaction and contact with users. Disturbed roads and trails are susceptible to the introduction and spread of invasive plant species which compete with native plants. By reducing road densities and access points in the action alternatives compared to the no action alternative, negative effects are being minimized.

Cumulative Effects

Active vegetation management over the last 80-plus years on public lands in CBRA has reduced the old juniper component. In some areas such as old homestead sites and range restoration projects, all or most of the trees were removed and converted to grass or shrubland. Other areas were thinned with a variety of treatments, including prescribed fire and firewood cutting. Illegal tree cutting and human-caused wildfire also negatively affected old-growth juniper woodlands. Old-growth woodlands were affected directly by removing large old trees, and indirectly through ecosystem disturbance. Many of these treatments resulted in additional motorized access and the spread of weeds. These effects have been continual and cumulative since the arrival of European settlers in Central Oregon.

There are 35,031 acres of private land within and immediately adjacent to (within one mile) the CBRA. Thirty-four percent of these acres are no longer occupied by native vegetation; they are now either urban or agricultural lands. Of the 35,031 acres of private land, 47% is juniper woodlands. Portions of Eagle Crest Resort and the proposed Thornburgh Resort are within the CBRA. It is expected that other parcels of private land will be developed in the future. With the development of private land, the total acres of old-growth juniper woodlands within the CBRA boundary will decrease, and human pressures on BLM lands adjacent to private lands will increase.

The proposed ODOT material site/quarry (Site N) is approximately105 acres in size. A small portion of the proposed site is old growth-juniper woodland. If Site N is developed, the old-growth juniper woodlands within the site boundary could be disturbed. This effect is minimal when all juniper-woodland acres within the CBRA are considered.

Alternative 1 would have the greatest potential for adverse cumulative effects on old-growth juniper woodlands when considered with actions on private land, the travel management direction, and the lack of vegetation management. In addition to having the highest route density of all the alternatives, there are 12.62 miles of State and County routes within the planning area. The high number of open travel routes provides for increased ecosystem disturbance and spreading of weeds which contribute to the decline of ecological condition. The increasing amount of young juniper and lack of restoration treatments would also cause decline in ecological condition of old-growth juniper woodlands.

The action alternatives (Alternatives 2-4) for vegetation, recreation and transportation management are expected to maintain and improve the condition of old-growth juniper woodlands. The range of proposed travel route densities is relatively similar across the action alternatives and would result in similar cumulative effects. All action alternatives have an additional 12.62 miles of State and County routes within the planning area. All action alternatives have a lower density of travel routes than Alternative 1, decreasing potential for human disturbance and the spread of weeds. Vegetation management, including the removal of young juniper, is expected to improve ecological health of old-growth juniper woodlands and protect old growth juniper trees from insects, disease, and wildfire.

4.8 Shrub-Steppe Habitats

Shrub-steppe habitats historically do not support stands of old growth juniper. These habitats are higher producing sites than old growth juniper woodlands; therefore, they support a denser shrub and herbaceous component that will carry fire. As a result, shrub-steppe habitats historically were frequently subjected to fire which would remove young juniper from the site.

Alternative 1

Under the No Action alternative, no active vegetation management would occur in the shrub-steppe of CBRA, and travel and recreation would continue to be managed under direction of the UDRMP. No changes would be made to existing ROWs and use patterns would remain the same. As a result, these areas would continue to be subjected to western juniper encroachment and current use patterns related to recreation and travel.

Juniper competes with native shrub-steppe vegetation for water, sunlight, space, and nutrients (Barrett, 2007). In Central Oregon water is very limiting. Juniper canopies intercept rainfall preventing soil recharge and use by understory plants. Juniper also has the ability to transpire water during any month of the year. Conversely, native shrubs, grasses and forbs are dormant from late fall through early spring; which is when Central Oregon receives most of its annual precipitation. In a healthy shrub-steppe winter precipitation is stored in the soil for future use by the native vegetation. However, since juniper can use water any time of the year it inhibits soil recharge by using that water during the dormant period.

The majority of the shrub-steppe dominated with young juniper is still in the early to mid-phases of stand closure, which means they often support an understory of shrubs and herbaceous vegetation. This has implications for future changes that will occur within these in the next 30 to 50 years. In the absence of disturbance or management, the majority of these landscapes will become closed woodlands resulting in the loss of understory plant species and greater costs for restoration (Miller et al. 2008). The shrub component is generally lost first followed by native grasses and forbs. Loss of the native

understory vegetation in interspaces reduces organic inputs for soils, diminishes infiltration rates, and increases overland flow resulting in accelerated erosion (Miller et al, 2005).

When shrub-steppe becomes dominated by juniper, they become more susceptible to woodland type crown fires. These fires differ from historic fire patterns on shrub-steppe and result in the negative effects described in Soils and Old Growth Juniper Woodlands sections of this chapter.

Under the UDRMPs motorized trail system there are no designated routes for non-motorized use or designated trailheads. This resulted in a high density of user-created roads and trails throughout CBRA. Resulting negative effects on soils such as compaction and accelerated erosion create inhospitable conditions for native vegetation. User-created roads and trails disturb the soil surface and sometimes kill native vegetation, making the area more prone to invasive plant species which compete with native plants. Vehicles are also vectors for transporting noxious and exotic weed seeds into the shrub-steppe.

Alternative 1 has the highest density of roads and trails and highest number of access points when compared to the action alternatives. Area occupied by travel routes have altered soil conditions that are not conducive to native plant growth, effectively decreasing the area occupied by shrub steppe vegetation. These areas are also highly disturbed and susceptible to invasive plant species. With more area being influenced by travel routes in Alternative 1 than in Alternatives 2-4, Alternative 1 would have the most negative impacts from the transportation system and ROWs of all the alternatives.

Action Alternatives (Alternatives 2 – 4)

Vegetation Management

Mechanical Treatments

Under the action alternatives, active vegetation management would be used to reduce fire fuel loads and improve ecological health in shrub-steppe. As stated in the action alternatives, ecological health determinations will be based on the historic climax plant community described in the NRCS ecological site descriptions.

The types of mechanical treatments and resulting effects of equipment would be the same as the thinning described in the Old Growth Juniper Woodlands section of this chapter. However, the measures by which ecological health is measured will be different between the old growth juniper woodlands and the shrub-steppe. With the removal of encroaching juniper from the shrub-steppe, resources such as water, nutrients, sunlight, and space would be made available to native shrubs and herbaceous plants. It may take several years following treatment to see a visible response (Miller et al., 2007).

Expected responses after mechanical treatments include:

- Increased vigor and recruitment of shrubs, deep rooted perennial grasses, and forbs.
- Increased species diversity among deep rooted perennial grasses, and forbs.
- Improved ecological function on site by having a site with a variety of plants that contribute different amounts and type of litter, and have different rooting patterns and depths that aid in infiltration and percolation.
- Reduction of bare ground in the interspaces due to increased plant densities resulting in improved infiltration, reduced overland flow, and trapping of sediments resulting in less erosion.

Reduction of shrub cover as a part of a vegetation management strategy would occur when cover exceeds expected levels in the NRCS ecological site descriptions. A mower could be used to mechanically reduce the shrub component. Shrubs would be removed from the areas that come in direct contact with the mower. This treatment allows the creation of a mosaic pattern across the site, effectively reducing shrub cover without eliminating the shrub component. Litter is left on the soil surface as a result of mowing. This litter adds nutrients to the soil, slows overland flow, and can provide safe sites for the establishment of herbaceous vegetation. The removal of shrubs also frees resources such as nutrients, water, and space to be utilized by other plants. As a result of reducing the shrub cover, vigor of the remaining shrubs would increase and forbs and deep-rooted perennial grasses would become a larger component on the site, similar to results seen after removal of encroaching juniper.

Mowing can also remove small juniper on a site. However, some small trees would be missed, especially if a mosaic pattern of shrub reduction is desired. Mowing also does not ensure that all green leaf material is removed. This means the small juniper can continue to grow.

Any disturbance caused by mechanical treatments creates the risk of generating open sites for undesirable plants. Sprouting plants like rabbitbrush are invigorated by disturbance. The resulting increase in nutrients, water, and sunlight following treatments also allows invasive annual grasses like cheatgrass and medusahead to flourish. Their establishment can hinder the establishment of deep rooted perennial grasses (Barret, 2007). Areas with a high density of rabbitbrush and/or invasive annual grasses on site prior to treatment are at greatest risk of increasing undesirable plants post-treatment. Seeding high risk sites could help mitigate the establishment of undesirable plants by providing a large seedbank of desirable plants to capture the newly released resources on the site immediately following treatment.

Prescribed Fire

Fire is considered the main factor that historically prevented juniper from growing in shrub-steppe (Miller, 2005). Juniper, especially young juniper, is very susceptible to fire. Shrub-steppe are higher producing sites than old growth juniper woodlands; therefore, they support a denser shrub and herbaceous component that would carry fire. As a result, shrub-steppe historically was subjected to frequent fires that would remove young juniper from the site.

Prescribed fire can be an effective tool to remove encroaching juniper in shrub-steppe. Desirable results as described in the mechanical treatments section are obtainable through prescribed broadcast burning on sites where juniper is very small or has not started to dominate the site. This means the shrub and herbaceous components on site are healthy and would provide the needed ground and ladder fuels as well as be a seed source for regeneration post fire (Miller, 2007).

In shrub-steppe, mechanical treatments are preferred over prescribed broadcast burning on sites with higher densities of large trees, where the understory has begun to die-off due to competition with encroaching juniper. Without the fine and ladder fuels provided by the understory, it is difficult to get a fire to carry through the site. To get fire to carry through a site like this a portion of the trees may have to be cut mechanically to provide ladder fuels. If juniper densities are high, there is the risk of a crown fire which would burn hotter and potentially kill the remaining shrub and herbaceous components left on site and have negative impacts on soils. As shrubs and herbaceous plants begin to die-off due to juniper encroachment, bare ground increases in the interspaces between plants. This, as well as the potential loss of the shrub and herbaceous components of a site to fire, makes these sites more susceptible to undesirable plants. The same concerns associated with undesirable plants described

in the mechanical treatment section apply to sites that are treated with prescribed burns. Young et al. (1987) describe the "phenotypic plasticity" as another advantage cheatgrass has over perennial plants. After a wildfire or control burn the normally self-pollinating cheatgrass plants are more likely to cross-pollinate filling the environment with cheatgrass plants exhibiting hybrid vigor. Vigorous cheatgrass plants are better adapted to efficiently utilize nutrients and soil water than native plants after a wildfire.

Prescribed pile burning or prescribed swamper burning could be used in conjunction with mechanical treatments to reduced fuel loads on site. Due to high recreation use and close proximity of communities in CBRA; large fuel loads associated with juniper cuts present a fire hazard. One way of reducing the fire hazard is to burn the tree boles and slash with prescribed pile burning or prescribed swamper burning. Both options pile debris and localize fire to those piles within the treatment area. Prescribed pile burning results in multiple small piles throughout the site that burn for short durations, while prescribed swamper burning has a limited number of piles that are fed until the debris is consumed resulting in long duration fires. When these piles are burnt, the underlying soil is subjected to intense heating resulting in sterilization. These areas are easily invaded by exotic annuals. However, these negative impacts are limited to the localized burn areas.

In areas away from main roads and homes some slash may be lopped and scattered on the ground as litter to provide nutrients and organic matter to the soil, and act as safe sites for plants, and slow overland flow of water.

Transportation/Recreation and Right of Way Grants
Under all the action alternatives a travel management system would be created to control recreation and travel use in CBRA. As opposed to the No Action alternative, all users except for pedestrians would be limited to designated roads and trails. Access to roads and trails would also be limited to trailheads and staging areas.

In all action alternatives existing routes would either be decommissioned or incorporated into the travel management system, and some new routes are created. The incorporation of existing travel routes into the travel management system is beneficial to shrub-steppe by restricting disturbance caused by recreation and travel to already disturbed areas and limiting new ground disturbance for the creation of new trails and ROWs.

Decommissioned routes within the shrub-steppe are returned to shrub-steppe by removing human travel disturbance. These areas may take time to re-establish shrub-steppe vegetation due to changes in soil properties as a result of compaction and disturbance caused by motorized vehicles. The presence of increaser species such as cheatgrass and rabbitbrush may further slow establishment of more desirable native plants. It is common to find plant species known to be favored in disturbed in close proximity to travel routes (Munger et al., 2003). Cheatgrass and rabbitbrush are commonly found along roads and trails in the Cline Buttes planning area.

If a decommissioned route requires ripping or berm creation to disguise the route and prevent further use, mitigation in the form of seeding may be required to reestablish desired shrub-steppe vegetation. Active ground disturbance is detrimental to desirable native plants present on site and favors increaser species which are commonly already in higher concentrations around travel routes. Seeding these areas would assist the establishment of desired shrub-steppe vegetation.

In the action alternatives, some new route creation for recreation and ROWs is necessary to create a functioning travel management system and minimize user conflict. New route creation takes acres out

of functioning shrub-steppe. In some situations a new route is created to replace multiple routes which are in turn decommissioned. This results in a net gain of shrub-steppe.

All action alternatives limit public access points into the CBRA. The creation of designated staging areas and trailheads would facilitate the use of designated routes and discourage user-created routes. Designated access points located in the shrub-steppe result in a loss of acreage in that. While the proposed designated access points may be larger than existing access points, the number of access points would be greatly reduced. By concentrating access to designated areas, non-designated access points located within the shrub-steppe would be returned to shrub-steppe vegetation, mitigating the loss of acres to designated access points. The non-designated access points would take time to reestablish shrub-steppe vegetation for the same reasons reestablishment is slow for decommissioned routes.

The introduction and spread of invasive plant species is a threat to the shrub-steppe. Vehicles and animals are known vectors for invasive plant species introduction and dispersal. Limiting access in CBRA to a designated trail system would minimize exposure of shrub-steppe to invasive plant species, thereby contributing to the improved vegetative condition in this type.

All action alternatives (Alternatives 2-4) result in a reduction of total miles of roads and routes within the shrub-steppe in CBRA as opposed to the no action alternative (Alternative 1). Fewer miles of roads and travel routes translate into fewer acres of shrub-steppe exposed to human disturbance resulting from recreation and travel activities. Refer to Table 66 for a breakdown of road and route mileages within the shrub-steppe by alternative and route type.

Table 65: Total Miles of Roads and Travel Routes in Shrub-Steppe Habitat

Alternative	State & County Roads	Motorized Routes	Non-Motorized Routes	All Roads & Routes
Alternative 1	9.38	58.36	45.48	113.22
Alternative 2	9.38	48.45	38.06	95.89
Alternative 3	9.38	47.95	36.29	93.89
Alternative 4	9.38	56.23	33.80	99.41

Cumulative Effects

There are 35,031 acres of private land within and immediately adjacent to (within one mile) the CBRA. Thirty-four percent of these acres are no longer occupied by native vegetation; they are now either urban or agricultural lands. Of the 35,031 acres of private land, 14% is shrub steppe. Portions of Eagle Crest Resort and the proposed Thornburgh Resort are within the CBRA. It is expected that other parcels of private land will be developed in the future. With the development of private land, the total acres of shrub steppe within the CBRA boundary will decrease, and human pressures on BLM lands adjacent to private lands will increase.

The proposed ODOT material site/quarry (Site N) is approximately105 acres in size. A portion of the proposed site is shrub steppe. If Site N is developed, the shrub steppe within the site boundary could be disturbed. This effect is minimal when all shrub steppe acres within the CBRA are considered.

Alternative 1 would have the greatest potential for adverse cumulative effects on shrub steppe when considered with actions on private land, the travel management direction, and the lack of vegetation management. Historic management in CBRA has contributed to the downward trend of the ecological condition of sites associated with the shrub-steppe. Historic overgrazing by livestock which reduced

fine fuels, changed plant community structure, and reduced competition from herbaceous species; in combination with active fire suppression led to extreme juniper encroachment into the shrub steppe. Without vegetation management juniper will continue to expand into the shrub steppe resulting in continued decline of ecological health of the shrub steppe within the CBRA. A high density of open travel routes in CBRA also contributed to this downward trend. Alternative 1 has the highest density of travel routes when compared the action alternatives. In addition to routes on BLM administered lands, there are 9.38 miles of State and County routes within the planning area. The high number of open travel routes provides for increased ecosystem disturbance and spreading of weeds which contribute to the decline of ecological condition.

The action alternatives (Alternatives 2-4) for vegetation, recreation and transportation management are expected to maintain and improve the condition of shrub steppe. The range of proposed travel route densities is relatively similar across the action alternatives and would result in similar cumulative effects. All action alternatives have 9.38 miles of State and County routes within the planning area, in addition to routes on BLM administered lands. All action alternatives have a lower density of travel routes than Alternative 1, decreasing potential for human disturbance and the spread of weeds. Vegetation management, including the removal of young juniper, is expected to improve ecological health of the shrub steppe in the CBRA.

4.9 Recreation

The analysis of recreation effects is based on the zoning and guidance contained in the UDRMP that is specific to the Cline Buttes area (UDRMP, pg. 115-118). The analysis of effects is also based in part on the concepts of ride time, trail difficulty, separation of different user types, and dispersal of trail users. These factors affect the quality of the recreation experience and sustainability of the proposed recreation infrastructure and opportunities. The ability of the BLM and partners to communicate recreation and resource information, to provide educational and interpretive information, and the degree of public knowledge of the CBRA and allowed recreation uses is also considered as part of the recreation analysis.

BLM lands in Central Oregon were designated as the High Desert Special Recreation Management Area in the UDRMP. This designation recognizes the intense recreation use and demands as well as the need for increased recreation management to achieve specific recreation opportunities for the public. The CBRA typifies this wide range of recreation demands and management needs.

Vegetation Management

Alternative 1
Under Alternative 1, there would be no vegetation treatments, therefore no direct effects to recreation use would occur. The use of vegetation treatments to help close undesired routes would not be readily available, and while the CBRA would retain the greatest density of routes and higher levels of user conflicts, this is mostly attributable to the trails and transportation decisions made in the UDRMP, not a direct result of Alternative 1 vegetation management decisions.

Alternatives 2 - 4
All action alternatives may present some user conflicts during individual treatments. These could include the sight and sound of vegetation treatments, as well as some level of hindrance or temporary closure of

certain trails or use areas. These would be limited in duration and scale, and effects could be minimized by informing trail users in advance of the location and timing of treatments, as well as scheduling the more disruptive treatments during periods of lower recreational use (weekdays, summer season).

Mitigation would include development of travel mgt plans for individual treatments, limits on vehicle use on steeper slopes, identification of existing and proposed trails/trail corridor prior to vegetation treatments, and measures to remove and/or scatter cut junipers away from the immediate view of designated trails. Appendix 4 provides general CBRA-wide mitigation as well as measures specific to certain areas (VRM Class 2 and 3 areas, Deschutes River Canyon, Tumalo Canal ACEC, etc.) to mitigate both short-term and long-term effects on recreation uses. Vegetation treatments may be used to help close or hide undesignated routes, providing better conditions for trail users and helping to separate uses by trail or by area. Measures for retaining junipers specifically to provide shade and screening for trailheads, and to retain juniper to help maintain the curvilinear nature of OHV trails are also identified for all action alternatives.

Transportation/Recreation

Alternative 1

Trail Use

This alternative would provide the highest degree of shared use between motorized and non-motorized trail use. With the largest mileage of motorized trails spread over the greatest area, and no designated trails for non-motorized uses, user conflicts between different trail user types would be greatest of all alternatives. Popular use areas such as the buttes and canyons would likely see the highest use by all types of visitors, with resulting conflicts and diminished quality of recreation experiences. It is likely that additional user-created, hiking, equestrian and mountain bike trails would occur in certain areas, particularly in areas that are somewhat separate from the motorized trail system.

The 164 miles of motorized/shared use trails and multitude of access points provides for the greatest dispersal of trail users, and over a full weekend's worth of OHV riding for all users. The mileage of trails and the high number of undesignated, unmaintained access points and user-created staging areas would tend to encourage out of area visitation and camping associated with OHV and equestrian group use.

Alternative 1 would provide the greatest amount of shared use between motorized trail uses (jeeps, motorcycles, quads) on the same trails. The quality of the trails and the diversity of riding experiences would be poor, since no maintenance standards would exist and narrower trails would be widened over time through use by all types of vehicles. This would degrade the trail experience for motorcycles and quad users, as well as for many non-motorized uses (hiking, mountain biking, equestrian). Motorcycle riders and Class II users would lack any trails tailored to their particular use. The motorized route system would be a higher-speed system than other alternatives, with less difficult, straighter trails being the norm. Thus, the ride time would be less than expected for such a large mileage trail system.

Alternative 1 would provide no maintained or designated trails for non-motorized trail use. Existing routes outside of the 164 mile motorized trail system would continue to be used for non-motorized trail use. No separation of uses would occur on these routes, and the mix of horses, mountain bikes and pedestrians on routes without any maintenance or design standards would result in poor trail conditions

over time, particularly on higher use routes and steeper terrain. Non-motorized trail use (including mountain bicyclists and equestrians) could occur cross-country, which offers a much greater degree of freedom and exploration than alternatives 2-4. However, the conflicts and confusion over use of these routes and user conflicts between different users would be high. To minimize conflicts, trail users would likely continue the development of additional trails to meet their own needs, particularly in areas that are somewhat separate from the motorized trail system (see Chapter 2, No-Action Alternative – Recreation, for a description of these general areas). The likelihood of user-created trails would also increase the incidence of trespass on private land by trail users.

Alternative 1 would provide no trails for pedestrian use only. Trail use in the Tumalo Canal ACEC would be shared among horses, mountain bikes and pedestrians on a non-designated network. Use of existing routes in the Deschutes River Canyon would likely continue to be predominately pedestrian traffic, due to the steep terrain that tends to limit equestrian and mountain bike use. However, the concentration of pedestrian use trails only in the canyon would result in an unmet need for easy to moderate pedestrian trails in the CBRA.

Noise/Trespass

Conflicts between trail users and adjacent property owners would be highest under this alternative, due to the location and extent of the motorized route system and the high number of access points that would make visitor contact and noise level testing of OHVs more difficult (see Table 66). This alternative has the greatest amount of trails located close to private property, the greatest number of dead-end routes at private property boundaries, and the greatest number of separate parcels affected due to the extent of the motorized trail system. In addition, this alternative has the highest decibel limit (99db) for OHV use. Alternative 1 also has the greatest amount of public motorized use on homeowner maintained ROW roads; with approximately 65% of homeowner maintained ROW roads open to the public as part of the motorized trail system.

Conflicts resulting from these conditions would be more prevalent during the winter, Motorized use levels typically drop significantly during the summer, when public land visitors have many other options for trail riding (See Cumulative Effects section). Due to longer daylight hours, trail use tends to occur later in the evening during the summer.

Alternative 1 proposes no new road or trail construction, therefore no noise impacts, even short term, would occur due to construction from this alternative.

Table 66: Route Density in Proximity to Private Property (miles/square mile)

	Density of routes within 1/8 mile of private property	Density of routes within 1/4 mile of private property
Alternative 1 (all routes)	7.01	6.65
Alternative 1 (designated roads and trails for motorized use)	2.98	3.22
Alternative 2 (designated roads and trails for motorized use)	0.37	1
Alternative 3 (designated roads and trails for motorized use)	0.34	0.96
Alternative 4 (designated roads and trails for motorized use)	0.57	1.25

Access

For detailed information on access changes, see the Transportation/Access Section. Alternative 1 would provide the highest number of public access points of any alternative. While this unfettered access allows for a variety of dispersed recreation uses, it will also contribute to the increasing numbers of conflicts between users and increases the existing problems of dumping, resource damage and private property trespass. Overall, the provision of over 200 public access points in this alternative will lead to poorer quality recreation experiences for most visitors over time.

The Red Cinder ROW road (Maston area) would be open to general public use, which may result in user conflicts and increase the difficulty of managing the area for hiking, equestrian and mountain bike use. Likewise, the radio communication site road on the buttes would remain open to public motor vehicle use, and likely result in trail use conflicts.

Commercial use/Organized Group Use

Any authorization of trail-dependent commercial or organized group use (i.e., mountain bike guide trips, advertised club rides, outfitter/guide use) could only occur only on the designated trail system. For alternative 1, this means that all commercial or organized group use would be restricted to the OHV/shared use trail system. While the OHV trail system is not closed to non-motorized uses, alternative 1 would reduce opportunities for commercial/organized group use in particular CBRA areas of interest, including the Maston and Tumalo Canal ACEC areas. Administration of commercial/organized group use would cause greater conflicts than all other alternatives, since portions of the CBRA OHV/shared use trail system might be closed temporarily to run an event.

Interpretive/Educational Use

The large number of public access points, the lack of designated trailheads, and the lack of a designated trail system for non-motorized use combine to make interpretive and educational use difficult. In alternative 1, the focus area for interpretation would remain the Tumalo Canal ACEC; however the lack of access controls, designated interpretive/pedestrian trails, and the designated OHV trails adjacent and south of the Tumalo Canal ACEC may affect the usefulness of the area for interpretation and the quality of the recreation experience.

Dispersed Recreation Use

Alternative 1 provides for the greatest ease of access for dispersed recreation use, as a result of the widespread entry points for full size vehicles. Easy vehicle access would tend to preserve opportunities for target shooting, hunting, geocaching, sightseeing, and other uses throughout the widest range of locations in the CBRA. However, in some cases, the frequency of access would diminish the recreation experience by increasing conflicts, or by encouraging poor quality settings, such as areas of concentrated dumping of garbage and abandoned vehicles.

Degree of Public Knowledge/Availability

Alternative 1 may tend to increase the area's use by OHVs to a greater degree than for non-motorized trail use, by virtue of the designation and publication of the UDRMP OHV/Shared use trail system. With no separate, designated trail system for non-motorized use, the availability of trail maps, signs and trailheads for this use would be much lower and the demand for non-motorized trail opportunities in the area would be unmet. User groups and businesses may fill the void and produce their own maps of an informal non-motorized trail system, but to what extent that would provide a balanced knowledge and availability of opportunities is unclear.

Effects Common to All Action Alternatives

Alternatives 2-4 contain many common recreation uses and effects. The analysis is based on trail standards and implementation strategy outlined in Appendix 1, Trail Standards.

Trail Use

All action alternatives would provide a high degree of variety for trail based recreation activities and a significant increase in designated and maintained trails, both motorized use and non-motorized use, in the Redmond/north Deschutes County area. The contribution of additional mileage would be most significant for non-motorized trail use, as most of CBRA has been well used as a motorized trail system in the past. Each alternative would provide a mix of shared use trails combining OHV and non-motorized users; separate trails for different types of OHVs; and a large amount of non-motorized use trails. Infrastructure and improvements in all action alternatives would provide a variety of options with regards to difficulty levels, loop distance, and degree of sharing with other trail users. Directing use to specific areas and trailhead entry points would reduce user-created trails and associated resource impacts, and require users (except pedestrians) to stay on designated trails. Some users may be reluctant to stay on designated routes and increased use of signs, maps, visitor contact and law enforcement would be required. The variety of trail opportunities provided would appeal to a broader spectrum of the community, both in terms of trail user type, age levels, and skill levels. Planned and engineered trails that follow specified trail standards would enhance the recreation experience.

User conflicts may occur on any shared use trail system if users have opposing beliefs, attitudes and expectations. The use of trailheads, designated trails, maps and signs will help educate users of different types on trail rules and regulations, appropriate trail behavior, etiquette towards other users, and minimizing environmental impacts.

Provision of designated trailheads would concentrate users and parking in selected locations and reduce random parking and spread of impacted areas or parking on private property, which is a regular occurrence in the area.

Although all action alternatives reduce the amount of motorized trail miles in the CBRA, they all provide for a weekend's worth of riding on a diverse set of trail types, and utilize varied terrain and scenic opportunities. On the whole, all action alternatives reduce the amount of highly challenging terrain by greatly reducing or eliminating OHV trails on the buttes and reducing trail miles available in the canyons. To varying degrees, the alternatives balance this by providing trails in some portions of the canyons and by providing technical rock crawling/Class II routes in select locations. The OHV trail system provides adequate trail miles and loop opportunities to disperse users and to provide a system that functions without a high likelihood that riders would create additional routes. The shorter trail systems in Central Oregon, such as Henderson Flats, have experienced these problems, due to their open landscape and short ride durations for visitors (Amar, 2008).

All action alternatives provide for a high degree of trail separation between motorized and non-motorized use in the following areas: Tumalo Canal ACEC, Maston Area, and the Plateau between Deep Canyon and Mckenzie Canyon. Between these three areas, there is a mix of pedestrian only trails, equestrian trails, mountain bike trails and shared non-motorized trails. The provision of trails in these areas provides a significant increase in pedestrian, bicycle and equestrian trail opportunities in a non-motorized, quiet setting.

All action alternatives call for a large amount of vegetation management actions, particularly fuels projects in WUI zones. All action alternatives somewhat reduce the conflicts between vegetation

management and trail use by relocating trails away from private properties. Proposed vegetation management treatments identify the need to retain trees and shrubs in proximity to motorized use trails (in areas where there are no other controlling features such as rock outcrops), to assist in creating meandering, slower speed routes and to help keep riders/drivers on designated trails. Vegetation management activities will have an effect on trail users, however these would be temporary and of short duration as trail users move through an area. Vegetation management actions will help to close unwanted routes and provide for a more defensible and maintainable trail system in the long term (see Appendix 4 for project design features for vegetation management that apply to recreation).

Noise/Trespass

All action alternatives reduce the likelihood of trespass and noise conflicts by eliminating motorized use trail dead-ends at private property boundaries and reducing the miles of motorized use trail adjacent to private property. All action alternatives reduce the density of motorized use trails within 1/8 mile of private property by a minimum of 80%. The density of motorized use trails within ¼ mile of private property is reduced by a minimum of 60% in all action alternatives (see Table 66). Wherever feasible, OHV trails are located to use topographic screening between private property and the trail route.

All action alternatives also greatly reduce the use of ROW roads as OHV trails. At a minimum, alternatives 2-4 allow public motorized use on only 5% of homeowner maintained roads, compared to 65% in Alternative 1. This further reduces conflicts between trail use and property owners.

All action alternatives institute a decibel level limit that is lower than the current State of Oregon standard. An OHV sound limit of 96 db would be applied throughout the management area, and would be the most stringent regulation of its kind in Central Oregon. The combination of route location, density, access controls and stricter noise limits would decrease social conflicts due to noise and private land trespass.

Access

The provision of designated trails would reduce the ability of landowners to ride mountain bikes or horses cross country from their property, unless a designated trail leads to/from their property. In the case of motorized trail use, all action alternatives require local residents to travel to a designated OHV trailhead to access to trail system. All action alternatives greatly reduce the number of informal, public access points for trail use in the CBRA. However, this effect would not constitute a significant reduction in recreation opportunities, as it involves going from well over 100 access points to a manageable number of locations, dispersed throughout the CBRA. For mountain bike and equestrian use, all action alternatives identify a wide range of local or subdivision level access points that connect to the designated, non-motorized trail system. No limitations occur for pedestrian use, thus all adjacent private properties retain recreational access to the CBRA. The change in access management for the CBRA may create demands for new or improved bike lanes, paved shoulders or trail corridors along County roads, as people seek to access CBRA trails from nearby subdivisions and communities.

The replacement of the small, existing trailhead at Fryrear Road with a larger trailhead located further south would improve access to the CBRA for most recreationists, particularly equestrians dependent on horse trailer parking.

All action alternatives provide separate trailheads for equestrian and mountain bike use for the Buttes area, in order to more effectively separate these use types on the more technical, steeper trails in this area.

Access controls would tend to preclude unauthorized use of the trail systems and maintain user separation, which in the long run, will help assure quality trail conditions and foster greater public ownership and volunteer stewardship of trails, since the likelihood that a particular trail is used inappropriately or damaged by misuse would be much lower.

All action alternatives contain seasonal trail/area closures for specific routes in the Fryrear Canyon, Dry Canyon, and Deep Canyon areas on the west edge of the CBRA. A similar seasonal closure applies to the middle portion (Jaguar Road access) of the Deschutes River Canyon. For the canyons on the west edge of the CBRA, while there would be a slight decrease in trail miles available, bypass routes have been designed to retain connectivity and use of the larger trail system. For the Deschutes river canyon, a bypass route is available to retain trail use at the north end of the Maston area. While the middle portion of the canyon would be seasonally closed, this restriction would be balanced by keeping the southern portion of the river canyon (Riverview trailhead and Newcomb Road trailhead) available year-round. The seasonal closure on this section of river would apply to land based use, not to float use on the river.

Most of the trailheads themselves would be closed to camping. In general, the level of camping use in the CBRA is low, and out of area trail users would likely use other camp facilities or stay at local hotels. This would likely be more difficult for out of area equestrian visitors. While this use in the area is fairly low, these users may elect to camp in dispersed locations near the trailheads or use the OHV/ shared use trailheads which allow camping. Provision of primitive horse camps could be considered in the future, although all action alternatives tend to manage the CBRA as more of a day use area than an overnight camping experience.

Commercial use/Organized Group Use
Unlike Alternative 1, all action alternatives would provide much greater flexibility in authorizing outfitter/guide use and organized group use. By designating an extensive non-motorized trail system, all action alternatives greatly increase the miles available for commercial or group use for these activities and enable this use without conflicts with OHV trail management. All action alternatives include non-motorized trail mileage in the Maston, Buttes and Central areas, which provides options for permitting group, event or commercial use in one area without affecting informal public use of the trail system in other areas.

The size of the trailheads may limit the size of organized/group use in the CBRA. Authorization of large group uses and events would occur on a case by case basis, under the guidelines of the UDRMP. The trailhead capacities represent a conservative approach that does somewhat restrict large group events. This represents a starting point upon which the BLM can authorize smaller group activities and gauge their success and adapt decisions on an annual basis. The potential exists to use areas adjacent to several trailheads (Maston and Tumalo Canal Trailheads) as temporary or event parking.

Interpretive/Educational Use
The provision of designated trailheads in all action alternatives provides for greater opportunities for interpretive information. All proposed trailheads will include several information kiosks. In addition, all action alternatives provide for designated, pedestrian only trails in the Tumalo Canal ACEC, which will be used as part of an interpretive trail system. Other designated trails could have interpretive signs and interpretive efforts could also dovetail with vegetation management activities in the CBRA. As discussed above, the increased opportunities for commercial or group use would foster interpretive/ educational services by other organizations with particular expertise in the field (e.g., COCC, Bend Metro Parks, High Desert Museum and various Outfitter/Guides).

Dispersed Recreation Use
All action alternatives limit motor vehicle access by the general public to a select number of designated trailheads (2 to 3 locations). While the alternatives vary in the spread of the motorized trail system, they all provide some degree of motorized access to the area north of State Highway 126 and the area between Barr Road and Cline Falls Highway. By requiring motor vehicles to start at trailheads located at Barr Road and Buckhorn Road, drive time to certain areas would be increased for some recreationists. Access to Deep Canyon would be more difficult and represent a reduction in easily available target shooting opportunities; however, most of the past use of Deep Canyon for dispersed recreation use has relied on private land trespass.

Degree of Public Knowledge/Availability
The designation of trailheads and trail systems would increase the public's knowledge of recreation opportunities in the CBRA. Separation of different trail uses would likely increase the availability of recreation opportunities by reducing perceived or actual conflicts. The presence of a well designed trail system and recognized access points would increase visitors' appreciation of the natural environment. Other benefits include quality of life, opportunities for exercise, and the means for stewardship and environmental education and partnerships. Community assistance with monitoring, volunteerism, CBRA patrols, trail, fence and sign maintenance, and education and interpretation would benefit both the community and BLM.

Alternative 2

Trail Use
Alternative 2 would provide two trailheads for OHV use, Barr North and Buckhorn Trailheads, so dispersal of users would be less than other alternatives. Alternative 2 provides the least varied terrain for OHV use of all alternatives, with fewer miles of trails in canyon areas and no motorized trail access on the buttes. While there would be no access to the Buttes, the use of portions of Buckhorn Canyon, and a portion of Deep Canyon immediately south of State Highway 126 would provide opportunities for varied terrain, albeit at a smaller scale. The lack of highly challenging terrain is somewhat compensated by the design of the trail system, which uses rockier, narrower and winding trails of moderate or difficult ratings and several technical rock crawling areas. Given less challenging terrain for the OHV system, the ride time per mile of trail would likely be lowest of all action alternatives, but generally still a weekend's worth of riding for all but the most advanced motorcycle riders.

Alternative 2 requires the greatest amount of shared use between mountain bike and equestrians of all Action Alternatives. While separate trails would be used in the Maston and Buttes areas, the large, dispersed non-motorized use trail system in the southern and western portion of the CBRA would be shared between pedestrian, equestrian and mountain bike use. The majority of this system occurs on existing roads that are wide and level – so user conflicts would not be expected to be high. Some user conflicts may occur between mountain bicyclists and equestrians in the canyons on the western edge of the CBRA, although this alternative provides many miles of trails that separate these use types and allow user choice regarding how much shared trail use they want to experience.

For the small trail segments that use the relic canal system in the southern portion of the CBRA, user conflicts would be managed by providing a separate horse trail offset approximately 50 feet from the canal, and routing bicycle and pedestrian use on the canal berm. By providing a non-motorized, shared use system in the western and southern portions of the CBRA, this alternative provides non-motorized trail connectivity between the east and west sides of the CBRA to a greater degree than the other action

alternatives (i.e., both horses and mountain bikes have options for going from east to west in the CBRA in this alternative, without route sharing with OHVs).

The trail system routes horse and mountain bike use to the west and south of the pedestrian/interpretive trail system in the Tumalo Canal ACEC. This trail system layout would provide slightly less varied trail experiences for these user groups, but would also tend to decrease conflicts between these trail uses and the pedestrian trail use in the Tumalo Canal ACEC.

Non-motorized trails in the Maston Area would include a mix of shared, separated and parallel trails for non-motorized use. Shared use would occur on powerline maintenance roads where route width and visibility would minimize trail use conflicts. The remainder of the trail system would be separate or parallel trails, which would avoid conflicts between different trail use types and help maintain trail treads for specific uses.

For alternative 2, Deep Canyon north of State Highway 126 would provide for a varied and challenging non-motorized trail system, including both the bottom of the canyon and the plateau to the northwest. The majority of the narrower canyons located south of the CEC powerline (Fryrear and Dry Canyons) would be part of an expansive non-motorized, shared system.

Access

Alternative 2 would provide the smallest number of OHV trailheads and the least amount of shared trailhead facilities between motorized and non-motorized use. This would decrease conflicts between these different user groups. The OHV trailheads would be open for camping in alternative 2, and this would tend to maintain the area's desirability as a destination for OHV use both for local and out of area riders. It is likely that these trailheads would also serve non-motorized uses for camping during the summer, when OHV use would be low. Only one trailhead (Tumalo Canal) serving non-motorized uses would be available for camping. While the demand for camping among equestrians is likely somewhat low currently, this demand may increase as the area becomes more well-known.

Alternative 2 provides a moderate level of Deschutes River access, focused on the south end of the Maston Area. The red cinder ROW road would be closed to public motor vehicle use. This would make access to the Deschutes River more difficult at the north end of the Maston area, and may increase public use of the river trail at Eagle Crest Resort. However, access to the river at the south end of the Maston area would be made easier due to construction of the Riverview trailhead and a secondary trailhead at Newcomb Road.

Access to the Buttes would be closed for motorized vehicles and mountain bike use of the technical, downhill trails would be made more difficult by eliminating vehicle shuttle use to the tops of the buttes. For mountain bike use, this would tend to increase the difficulty level of the downhill trails, by making it much harder to access with heavier, high-travel suspension bicycles. Access points to these trails from Thornburgh and Eagle Crest Resorts were chosen to limit the availability of high elevation connections between resort roads and CBRA mountain bike trails. This would also tend to preclude the amount of shuttle vehicle use within the resorts.

No trail access would be provided at Fryrear Road/AG Warren (aka Jordan) Road. The lack of access at this location would require visitors to travel approximately 1 mile south to the new trailhead, at which point trail users could reconnect to desired trail routes. For local residents, this may increase the demand for paved shoulders or separate pathways alongside the County maintained Fryrear Road.

Alternative 3

Trail Use
OHV use would be the most dispersed in this alternative, with three trailheads. The better dispersal of motorized trail users from the south and north ends of Barr Road would likely provide a slightly less crowded trail system. However, conflicts between motorized and non-motorized trail uses would be moderately high, due to close proximity of OHV trail system and non-motorized trails in the southern portion of the CBRA and the use of the Tumalo Canal Trailhead by both motorized and non-motorized trail use types (see discussion of interpretation/education below).

The OHV/shared use trail system would include routes in Deep Canyon north of State Highway 126 and in Dry Canyon. As such, this alternative does provide a high degree of challenging and scenic terrain for OHV trails. The use of the Dry Canyon route would increase user conflicts, although most of the canyon trails on the west edge of the CBRA would be equestrian trails and separated from the motorized use area by a grazing allotment fence.

Alternative 3 would provide the least challenging trail routes for Class II OHV's (jeeps), with technical, rock crawling routes limited to one area near the existing Barr Road cinder pit.

Alternative 3 provides for very little shared trail use between equestrians and mountain bikes, which may allow for fewer conflicts and higher quality trail experiences, although this alternative reduces the amount of trails miles for mountain bikes over alternative 2. This lack of trail miles would occur in the southern and western portion of the CBRA, which have historically not been a high use are for mountain bicycling. The miles of trail available for horse use would be very high and provide a large variety of terrain and trail use opportunities. Alternative 3 provides greater mileage of horse trails than all other alternatives, including a slight increase in equestrian trail mileage in the Tumalo Canal ACEC. Like the mountain bike trail proposed in alternative 4, this equestrian trail may introduce user conflicts if equestrian use strays off this route and onto the pedestrian only, interpretive trails in the ACEC.

Access
Alternative 3 would provide three OHV trailheads. The trailhead located at the south end of Barr Road would be shared by all user types. The concentration of all user groups in this trailhead may increase conflicts and lower the quality of the recreation experience, although the trailhead would be designed with separate parking areas or pods to help minimize this situation. The Barr North and Buckhorn Trailheads would remain open for camping use, and this would help meet the needs of out of area visitors, particularly OHV riders from the west part of Oregon or Washington. Provision of some camping would likely benefit equestrians as well, although this Alternative would be less suitable for equestrians than alternative 2, which provides a separate camping location. The Tumalo Canal ACEC would be closed to camping in this alternative.

Access to the Buttes would be closed for motorized vehicles and mountain bike use of the technical, downhill trails would be made more difficult by eliminating vehicle shuttle use to the tops of the buttes. For mountain bike use, this would tend to increase the difficulty level of the downhill trails, by making it much harder to access with heavier, high-travel suspension bicycles. Access points to these trails from Thornburgh and Eagle Crest Resorts were chosen to limit the availability of high elevation connections between resort roads and CBRA mountain bike trails. This would also tend to preclude the amount of shuttle vehicle use within the resorts.

Alternative 3 would provide the lowest ease of access to the Deschutes River. Both the red cinder ROW road and the Newcomb Road ROW would be closed to public motor vehicle use. Under this alternative, use levels in the Deschutes River Canyon would be lower and provide a more primitive recreation experience. With a hike/bike of over a mile to reach the river from trailheads located off Cline Falls Highway, the use of trailheads on the east side of the river (Jaguar Road and Riverview Trailheads) would be higher than any other alternative. Public use of the existing river trail at Eagle Crest Resort would likely be higher in response to the more lengthy access trails on BLM lands. With both access roads to the Deschutes River closed to public motor vehicle use, the potential for bicycle use of these roads would go up and some conflicts with homeowner use of these roads may occur.

CBRA access would be retained at the existing access point from State land on Fryrear Road, although this access would be limited to pedestrian only, and closed seasonally. In general, the effect would be similar to other action alternatives, with most visitors traveling south to the new trailhead.

Interpretation/Education
The shared use of the South Barr Trailhead may impact the recreation experience for visitors to the Tumalo Canal ACEC. High levels of activity and sounds of OHV use at the trailhead may detract from the interpretive experience at the trailhead or along the pedestrian trail adjacent and east of Barr Road.

Alternative 4

Trail Use
Alternative 4 would provide the least dispersed motorized trail system of any alternative, with use concentrated in the northern portion of the CBRA. With a less dispersed trail system and slightly fewer, large trail loops, crowding and user conflicts on this system may be greater than the other action alternatives. Although the extent of the motorized trail system is smaller, this alternative provides the most challenging terrain, with several technical rock crawling areas, trails located in Deep Canyon both north and south of State Highway 126, and access to the buttes for motorcycles and quads, using the communication site ROW road on the east slope of the buttes.

While Deep Canyon is available for motorized use, Dry Canyon and Fryrear Canyon are managed for hiking and equestrian use, which provides for some separation of uses in this popular area.

While this alternative does provide the greatest amount of separation between motorized and non-motorized trails west of Barr Road, the combination of all user types on the buttes is likely to generate a high amount of user conflict, both between trail users and between public land users and neighbors. To a degree, this conflict is balanced by providing fewer horse trails on the buttes, since the greatest safety concern is the conflict between equestrian and motorized uses on the steep terrain. This loss of horse trails on the buttes is somewhat compensated by a much larger horse trail system in the area west of Barr Road.

Alternative 4 provides the greatest amount of pedestrian only trails, with additional pedestrian trail miles provided on the buttes and in the Maston area. While all alternatives provide pedestrian only trails, and all provide a very high mileage of non-motorized use trails, this alternative would best meet the increasing demand for hiking and running trails.

Alternative 4 provides a mountain bike trail route through the Tumalo Canal ACEC, which provides the best trail connectivity for mountain bike travel from east to west across the CBRA and around the buttes

themselves. Like the horse trail proposed in Alternative 3, this route may introduce user conflicts if mountain bike use strays off this route and onto the pedestrian only, interpretive trails in the ACEC.

Maston area trails tend to concentrate equestrian use on roads, so for this alternative, there would be slightly less diversity to the equestrian trail experience in this area.

Access
In alternative 4, no trailheads would be available for overnight camping. This would decrease the area's utility for out of area visitation by OHV enthusiasts, who would have to find other locations to camp or stay in local hotels when visiting the area. This may decrease the areas suitability for out of area visitation by equestrians as well.

Compared to the other action alternatives, alternative 4 provides a moderate level of river access, balanced between the north and south ends of the Maston Area.

Alternative 4 provides for a separate, pedestrian only trail system at the northeast portion of the Maston Area, served by a trailhead located off the Red Cinder ROW road. Motor vehicle use on the Red Cinder Road would be the highest of all alternatives, and result in user conflicts between motorized and non-motorized trail uses in the Maston Area and a general difficulty in managing the Maston Area as closed to motor vehicles (UDRMP designation). The ease of access to the river at the north end of the Maston Area would be balanced by the closure of the ROW road (Newcomb Road) to public motor vehicle use at the south end of the Maston area. This would increase the access hike to the river from about ¼ to ½ mile to several miles from the Maston Trailhead. This would likely increase the use of river access points at Jaguar and Riverview Trailheads on the east side of the river.

The Buttes trailhead on the Cline Buttes Rock Pit Road would be used by hiking, mountain bike and motorized trail uses. The combined use of this trailhead may increase user conflicts between different user groups. Motorized access to the top of the buttes would likely result in continued conflicts due to vandalism at the radio communication site and the VORTEC (FAA) site.

See alternative 2 description of access and effects at Fryrear Road/A.J. Warrin Road.

Rights of Way

Alternative 1
Alternative 1 would not result in new ROWs being authorized in the CBRA. Existing ROWs would be used as public roads and trails to a greater extent in this alternative that all action alternatives. The use of these ROWs as recreational routes, particularly for motor vehicles, is discussed as an effect to ROW holders in Section 4.11 of this EA.

Effects Common to All Action Alternatives
By limiting use to designated trails and located these routes away from the majority of existing ROWs, conflicts with ROW holders are minimized in all action alternatives.

Development of road ROWs does create intersections with designated trails, where trail users cross motor vehicle routes. Most ROW roads carry a relatively low volume of traffic, and those identified as new ROWs in this EA generally serve one or few parcels. Many ROWs are closed to public motorized use in the action alternatives, and their value and usefulness for hiking, equestrian and bicycle use would be slightly improved due to fewer user conflicts.

All Action Alternatives allow for paving of the Cline Buttes Rock Pit Road, which would make access to the proposed buttes trailhead easier for the public.

Cumulative Effects

Elements considered in cumulative effects include proposed development within and adjacent to the CBRA, the recreation emphasis (trails) zoning for BLM lands in Central Oregon (UDRMP), potential development of an ODOT rock quarry (Site N) in the CBRA, and existing or proposed trail systems on other jurisdictions in Central Oregon.

Motorized Use Trails

Regional Opportunities

All alternatives would provide for additional OHV trail opportunities and help disperse use outside of the Millican Plateau area, which currently is the only designated and maintained OHV trail system that is reliably open in the winter in Central Oregon, and receives visitation from both local and out of area/ out of State riders. The Millican Plateau trail system includes approximately 100 miles of designated trail.

Currently there are designated and maintained OHV trails on approximately 82,866 acres (21%) of the BLM administered lands in Central Oregon. However, approximately 65% of this acreage (Millican Valley OHV Area) is closed to OHV use between 5 to 8 months of the year. This includes a 5 month winter closure of the North Millican Area, when the OHV riding and driving experience is at its best (and local USFS lands or OHV trail systems on the west side of the State have poor riding conditions or are closed outright).

Locally, up to 80% of the East Fort Rock OHV trail system (USFS) is unrideable during the winter (Amar, 2008), and other small mileage, USFS managed OHV areas such as Henderson Flats, Edison, and Green Mountain Trail are seasonally closed or unrideable due to snow. While the East Fort Rock trail system can provide some good year-round riding conditions during mild winters, this is dependent on conditions from year to year. Winter conditions at East Fort Rock may leave some of the northernmost routes rideable, but their use is constrained by the trailheads and staging areas being covered in snow.

The current demand for winter riding opportunities in Central Oregon, both locally and from out of area visits has placed high demands on the Millican Plateau area. Providing a full weekend's ride worth of designated OHV trail miles in Cline Buttes would help to reduce crowding and unsafe riding conditions during the winter in the Millican Plateau trail system. Providing a weekend's worth of trail miles for OHV use in Cline Buttes would help reduce use pressure in Millican Plateau and reduce maintenance costs and the development of additional user-created trails in both the Millican Valley and Cline Buttes areas.

The level of demand for particular OHV trail facilities is also dependent upon what local trail use areas or types of trails are provided by the Deschutes and Ochoco National Forests through their travel management planning process, as well as future trail planning done by the BLM. Future implementation of travel management direction in the UDRMP will further reduce OHV trail opportunities in Central Oregon, both by reducing the overall acreage available for OHV trails by

about 50% and reducing the trail miles in the North Millican OHV area to meet UDRMP standards. It is uncertain what the long term effect of the USFS Travel Management Plan process will be; however, the change to a "Closed unless Designated Open" route status will likely reduce the miles available for OHV use, though likely increasing the quality and diversity of trails available.

With the largest of the USFS OHV trail systems not available during the winter, seasonal closures in the BLM South and North Millican OHV areas, and the overall reduction in acres available for OHV trail systems, there will continue to be a high demand and need for winter OHV opportunities which is partially met by all action alternatives for the CBRA.

ODOT Site N

The proposed land transfer for a mineral material/hard rock quarry site (Site N) includes approximately 1.2 miles of existing designated OHV/shared use trails. All action alternatives increase the mileage of OHV routes in this area by between 1 and 1 ¼ miles. These routes form parts of short loops or provide access to play area opportunities. If the material site is approved, these trail routes could be closed periodically during periods of site use by ODOT without seriously affecting the functioning of the trail system at large. All action alternatives include trails running between the proposed Site N and Barr Road, a route using the existing CEC power line corridor located south of Site N, and bypass routes around the northeast side of the proposed material site, all of which would provide for connectivity of trail loops during periods where temporary trail closures due to Site N operation occurs. No developed recreation sites are located within ½ mile of the 105.8 acre proposed Site N for any alternative so effects on picnic areas, campgrounds or other recreation facilities would not occur.

The CBRA plan proposes to fence both sides of Barr Road and route OHV visitors to a trailhead located approximately ¼ mile south of State Highway 126. This would preclude the use of Barr Road as an OHV trail route and lessen any conflicts between Site N traffic and OHV use. Restrictions on operation of Site N during holiday weekends (UDRMP, 2005) will further minimize impacts between OHV traffic and traffic generated by Site N. As part of the review process for Site N authorization, BLM has proposed that the site would not be used on Saturdays or Sundays, and that between November and March, no off-site hauling would occur. These provisions would reduce conflicts between Site N use and motorized trail use, which occurs more frequently during the winter and early spring months. Over the long term, Site N development could provide recreation benefits for OHV use by providing opportunities for technical/trials riding and rockcrawling through retention of cut faces and boulders in certain areas.

Thornburgh Resort Development

Issues related to the planned development of Thornburgh Resort on OHV use were identified and mitigated during the Deschutes County approval process. Conditions of approval for the resort development included funding for OHV trail systems and decommissioning of non-designated routes, as well as funding for trailhead construction. Access points to the BLM trail system from Thornburgh Resort have been identified in the CBRA plan and none of these access points are designated for motorized trail use.

Non-motorized Use Trails

Regional Opportunities

Population growth, demographic changes and economic conditions have been cited as factors in the need for trail opportunities located close to urban areas in Central Oregon. The city of Redmond has recently completed a 2030 Parks Master Plan update, which included a trails master plan. This

plan proposes an additional 23.8 miles of trails, and identifies longer term trail connections to BLM administered lands. More recent proposals have been made to develop non-motorized trails on BLM administered land immediately east of Redmond. While these trails will provide opportunities close to home for Redmond residents, they do not provide for significant mileage or challenging terrain for mountain bikes or equestrian use. All CBRA action alternatives provide significant and complimentary trails to the proposed trail systems in Redmond. Additionally, both Eagle Crest Resort and the proposed Thornburgh Resort have significant miles of non-motorized trails (e.g., Eagle Crest has approximately 25 miles of trail, including bike paths, bike lanes and a short section of hiking only trail), although these are not open to general public use.

BLM administered lands near the CBRA include the Northwest and Tumalo Recreation Areas. Although these areas are much smaller than the CBRA, and have greater constraints on trail development due to higher wildlife emphasis designations in the UDRMP, they are both identified for future non-motorized trail designation in the future. Coupled with the non-motorized trail designations in Cline Buttes, these areas will provide a significant amount of winter trail miles, located in easily accessible locations for Central Oregon residents and visitors.

The BLM currently has approximately 56 miles of designated, non-motorized trail within the Prineville District. The vast majority (50 miles) of this occurs within the Badlands WSA. While non-motorized trail use occurs throughout BLM administered lands, including heavy use of a user-created, non-authorized trail system on Horse Ridge, areas with designated trails are likely to see greater increases in use in the future as they become better known. With the possible exception of trails along rivers, the greatest demand for non-motorized trail use on BLM administered lands in the area occurs during the winter. Dependence on designated and maintained trails is likely much higher for mountain bike use, where trail design and maintenance is more critical to increase the season of use by preserving a firm trail tread. While mountain bike use on most BLM administered lands is limited by seasonal conditions, equestrian use generally occurs on a more year-round basis.

All action alternatives would more than triple the total miles of designated, non-motorized trails on BLM administered lands in Central Oregon. This increase would be most relevant to the community of Redmond, which is located close to the CBRA and unlike, Bend, does not have easy access to USFS trail systems. While the Redmond Parks Master Plan calls for additional development of trails within the UGB, total trail mileage is only 25 miles. Therefore the CBRA is expected to provide a major increase in close to home trail opportunities for Redmond area residents.

Current legislative efforts have resulted in the designation of the 32,000 acre Oregon Badlands Wilderness. As noted previously, this area currently contains the majority of BLM designated, non-motorized trails. Wilderness designation has closed the area to mountain bike use, and although pedestrian and equestrian use is more popular in the Badlands, this closure would increase demand for mountain bike trails in CBRA, particularly during the winter when most other mountain bike use areas are under snow. Wildlife concerns regarding deer and elk winter range, and sage grouse habitat may affect planning and future designation of an approved trail system in Horse Ridge, which would also tend to increase the importance of maintained mountain bike trail opportunities at Cline Buttes.

The UDRMP calls for non-motorized trail development in the Tumalo and Northwest Recreation Areas, located to the northwest and southwest of CBRA. Of these two areas, the Tumalo Recreation Area already receives a moderate amount of equestrian and hiking use. Unlike the CBRA, both of these other Recreation Areas are designated entirely as "Primary Wildlife Emphasis," which may result in fewer trail miles designated in these areas, and a greater likelihood of seasonal closures. The provision of non-motorized trails in CBRA and these other two nearby areas would provide a diversity of non-

motorized trail opportunities and allow flexibility in managing trail use to achieve wildlife management objectives in the areas designated as Primary Wildlife Emphasis. The provision of a diverse range of non-motorized trail opportunities may also help disperse use and better achieve wildlife management objectives in other areas, particularly areas that have extensive, user-created trail systems like the Horse Ridge Area. From a regional perspective, development of non-motorized trails in Alternatives 2-4 would provide a greater range of recreation opportunities year-round in Central Oregon.

ODOT Site N

Potential development of ODOT's Site N Rock Quarry proposal is not expected to affect or be affected by non-motorized trails in the CBRA. The closest non-motorized trail is located ½ mile from the proposed site, on the opposite side of Barr Road. Some non-motorized trail use of the A.J. Warrin Road may occur to the north of Site N; however this is approximately 1 ¼ miles away from the site.

In all action alternatives, trailheads have been located off Barr Road at the edge of the CBRA, in order to limit the amount of vehicle travel on Barr Road. This also limits the amount of traffic conflicts between Site N use and recreation access. The portion of Barr Road between the proposed Site N and State Highway 126 is identified as the primary haul route by ODOT. The majority of visitors to the Barr Road North Trailhead would be turning south from the highway and then west into the trailhead, thus limiting crossing traffic between Site N traffic and trailhead entry off Barr Road.

The equestrian trailhead (Cascade View Trailhead) for the Buttes area is located off Eagle Boulevard, and thus would not be greatly affected by any traffic generated by Site N.

Restrictions on operation of Site N during holiday weekends (UDRMP, 2005) will further minimize impacts between non-motorized trail use and traffic generated by Site N. As part of the review process for Site N authorization, BLM has proposed that the site would not be used on Saturdays or Sundays, and that between November and March, no off-site hauling would occur. BLM has also placed conditions on Site N authorization that no truck traffic would be allowed south of Site N through the CBRA. This would eliminate effects to the Tumalo Canal Trailhead and the interpretive trails and other non-motorized use trails in the southern portion of the CBRA, including trail routes that cross Barr road.

Thornburgh Resort Development

The planned Thornburgh Resort development includes trail systems on resort property, similar to the approximately 25 miles of trails on Eagle Crest Resort. Based on field observations and inventories done over the past several years, most resort guests and visitors appear to use these trail systems instead of public lands, while resort residents are more likely to use both resort trails and those on surrounding public lands. Input received from Thornburgh Resort and Division of State Lands during the CBRA plan process indicated that neither entity has objections to non-motorized trail use through State Lands leased by Thornburgh Resort in order to accomplish trail loops around the northern butte. Trail plans common to Alternatives 2 – 4 identify the route approved by Thornburgh Resort that utilizes an existing road adjacent to the southern boundary of Eagle Crest Phase 3. The use of this trail link maintains trail connectivity and increases the available trail miles and loop choices for pedestrian, mountain bike and equestrian use. Deschutes County conditions of approval and mitigation measures applied by BLM in the Thornburgh Resort ROW EA (USDI, 2007) provide for construction and signing of trail crossings of ROW roads and provision of trailheads to concentrate and manage non-motorized trail use impacts of resort development. The presence of both resorts would tend to increase the use of non-motorized trails on the buttes, although opportunities for trail use, particularly bicycling and pedestrian trails are not in short supply on destination resort property.

4.10 Wildlife

Introduction

This section describes the effects of the alternatives, including the no action alternative and anticipated activities on species of focus and source habitats. Species of focus discussed in this section are mule deer, Rocky Mountain elk, golden eagles and prairie falcons. Source habitats discussed are old growth juniper woodland, shrub-steppe and riparian. The assessment of source habitats allows us to display effects on groups of wildlife species where effects would be similar, rather than repeating similar information for a large number of individual species.

Executive Order (EO) 13186 (2001) titled "Responsibilities of Federal Agencies to Protect Migratory Birds" directs BLM to:

- Integrate bird conservation principals, measures, and practices into agency planning processes.
- Restore and enhance habitat of migratory birds as practicable.
- Ensure that analysis evaluates the effects of actions on migratory birds, especially species of concern.

Executive Order further states that environmental analysis of Federal actions, required by NEPA or other established environmental review processes, evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern. With the exception of the prairie falcon, this analysis incorporates effects to migratory birds primarily through the analysis of effects to source habitats. The UDRMP/FEIS (2004) used Partners-In-Flight (PIF) Conservation Strategy for Landbirds in the Columbia Plateau of Eastern Washington and Oregon (March, 2000) (PIF Strategy) to integrate bird conservation principals, measures, and practices into the planning process. This planning effort continues to use the PIF Strategy to identify focal species, source habitats and management recommendations to enhance habitat or mitigate negative effects. Table 46 identifies focal species found in the PIF Strategy which also have the potential to occur in the project area. UDRMP guidelines, such as, seasonal closures, distance buffers and desired habitat patch sizes were acquired from the PIF Strategy.

Hiding and thermal cover is important for mule deer and ODFW often requests that vegetation treatments provide for a minimum of 40 percent cover in the La Pine migration corridor. This provides for reasonable indices of measure to evaluate and compare the alternatives in relation to providing cover habitat for deer and elk.

Existing and potential future conditions of wildlife source habitats and habitats for wildlife species of focus were evaluated using a variety of models and indices. In cases where habitat models were unavailable or did not overlap with the criteria available, analysis of impacts was based on literature references, personal communications with experts, or modifications of existing models based on professional judgment of BLM specialists.

In an effort to simplify the effects comparisons we used the UDRMP guidelines, when available, as indicators to measure and compare the difference between the alternatives.

Brief descriptions and several tables have been compiled to help compare the effects of each alternative on the four species of focus and three source habitats. These descriptions and tables compare, across the alternatives:

Mule Deer

- Comparisons of the changes in the travel route densities;
- Comparisons of the changes in amounts of human influences due to linear travel routes and includes both motorized and non-motorized travel routes (Mule Deer Habitat Disturbance Index),
- Comparisons of the changes in amounts of juniper hiding cover versus shrub-steppe foraging habitat

Rocky Mountain Elk

- Comparisons of the changes in the travel route densities;
- Comparisons of the changes in the habitat effectiveness, and
- Comparisons of the changes in amounts of hiding cover versus foraging habitat

Golden Eagle

- Comparisons of the changes in amount of human travel routes located within ½ mile of nests (season of use included)

Prairie Falcon

- Comparisons of the changes in amount of human travel routes located within ¼ mile of nests (season of use included)

Old Growth Juniper Woodlands

- Comparisons of the changes in amounts of human influences due to linear travel routes (including both motorized and non-motorized travel routes),
- Comparison in the amount of acres available for thinning of young juniper and other restoration treatments

Shrub-Steppe Habitat

- Comparisons of the changes in amounts of human influences due to linear travel routes (including both motorized and non-motorized travel routes),
- Comparison in the amount of acres available for thinning of young juniper and other restoration treatments

Riparian

- Comparison in the amount of miles of river riparian habitat available for thinning of young juniper

The UDRMP directs management to provide habitats that support wildlife and maintain a high or moderate level of wildlife use for primary and secondary wildlife emphasis areas, and to provide habitat that contributes to species occurrence and distribution in the general wildlife emphasis areas. The UDRMP directs management activities to advance toward habitat effectiveness guidelines, not to necessarily meet or exceed them (page 56).

Because of the fragmented land ownership pattern, the amount of private landowner in-holdings and the amount of existing motorized travel routes (State, County and private) that BLM does not administer, there are limits to BLM's ability to fully achieve all UDRMP wildlife management guidelines while meeting all other direction for multiple resource management programs. The UDRMP recognizes this by including Objective W-4d – Jurisdictional Limitations (UDRMP, page 56) where it states "provide habitat conditions that move toward primary or secondary wildlife management emphasis to the extent practicable within jurisdictional limitations."

Assumptions

- Other than ROW holders and administrative use, motor vehicle use only occurs on the BLM interim road system identified in the UDRMP. All other travel routes were considered to be non-motorized travel routes.
- Juniper woodlands are of sufficient density to provide suitable hiding cover for deer and elk.
- Under the action alternatives, old growth juniper woodlands that have been thinned of young junipers would continue to provide suitable hiding cover for deer and elk because most areas will contain adequate densities of older juniper trees, and most old growth woodlands occur in large patches and would provide suitable cover when an animal is located farther away from a trail.
- In calculating the cumulative effects to wildlife and wildlife habitats all private, State and County lands within the planning area boundary were included and the area within one mile of this boundary because wildlife move across ownership boundaries and would be influenced by BLM activities and the adjacent lands. As you move farther than one mile from the planning area the effects of this project are not meaningfully measurable.
- The effects of the proposed plan decisions for deer and elk are only assessed for the winter season (on winter range) when human disturbances have the potential to be most detrimental.
- The effects for the proposed plan decisions for golden eagles and prairie falcons are only assessed for the breeding season (within close proximity to nest sites) when (and where) human disturbances have the potential to be most detrimental.
- Effects to golden eagle and prairie falcon foraging habitats are adequately assessed through the source habitat assessments because they consider several influencing factors such as motorized, non-motorized and fragmentation in areas across the planning area.
- ROW access routes for private landowner access are considered open routes for this analysis even though they may only be used by the ROW permit holder
- Site N is approximately 105 acres in total size although only as much as 5-10 acres would be in use at any one time. Operations at Site N would include drilling, blasting and extraction of source material; crushing and screening; material storage; batching of asphalt; transportation of material off site. Site N would not be in operation continuously and would only be used for public highway construction and maintenance purposes. On a large project, crushing, batching and hauling activities may last 6-9 months. It is feasible that several hundred truck trips per day would be generated from this site during the peak paving season. A typical ODOT aggregate site is used for larger projects once every 5 to 10 years, but due to the strategic location of this site and the increasing demand for high quality aggregate materials in the Central Oregon area, this site may see more frequent use. In between major projects, the site remains available for other uses including recreation.

Habitat Fragmentation

The BLM-administered public lands in the project area are arranged in a loose ownership pattern resulting in a high edge to area ratio. For example, there are approximately 32,000 acres of BLM lands in the planning area that if arranged in a contiguous circle would result in 50 square miles with a 25 mile circumference. This circle of BLM land would have a 2:1 area (acres) to edge ratio (property line boundary). Because of the existing loose land ownership pattern, the CBRA **exterior** boundary is approximately 107 miles resulting in a 1:2 area to edge ratio, but this only includes the outside boundary, and therefore the ratio is not captured completely. When the different private land in-holdings (**interior** boundaries) are added, there are approximately 157 miles of property boundary resulting in a 1:3 area to edge ratio. When the edges created by public roads are captured as boundaries (25 miles of bisecting State and County roads) there are approximately 207 miles of "management edge" for BLM lands in the planning area and resulting in a 1:4 area to edge ratio.

Guidelines under Objectives W-4a and W-4b in the UDRMP (pp 55 and 56) for Primary and Secondary Wildlife Emphasis Area address habitat fragmentation by providing direction to maintain, where possible, large (1,000 to 2,000 acres) and moderate (400 to 800 acres) un-fragmented habitat patches. The UDRMP does not provide a guideline for un-fragmented habitat patches for General Wildlife Emphasis Areas, nor does it provide a description for suitably-sized small habitat patches. In the UDRMP, Objective W-4d recognizes there are some situations where BLM has jurisdictional limitations under conditions caused by fragmented landownership patterns.

In the Planning area there is one Primary Wildlife Emphasis Area which is made up of 4,090 acres and one Secondary Wildlife Emphasis Area that is made up of 4,194 acres. These areas are too small in size to allow enough flexibility to provide for moderate to large un-fragmented habitat patches and provide for other resource management objectives (e.g., recreation) that are identified for these areas in the UDRMP. The proposed CBRA Plan makes efforts to minimize fragmentation, within the existing jurisdictional limitations, and the following analysis is provided to compare the different alternatives to the existing situation.

Fragmentation of all habitats due to linear travel routes in the Cline Buttes Planning Area was analyzed by comparing the amount (acres) of habitat that fall into suitable sized patches of habitat to the amount that fall into areas deemed too small and unsuitable as habitat patches. All habitat types were grouped together as one for this analysis. This analysis identified three suitable habitat patch sizes (small, medium and large) based on guidelines from the UDRMP for Primary and Secondary Wildlife Emphasis Areas and the USDA Handbook No. 553, Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington (Thomas et.al., 1979). The analysis was done based on two scenarios: 1) habitat patches created by all travel routes (motorized and non-motorized), and 2) habitat patches created by motorized travel routes only. Private land was not included in this analysis except for each parcel's location and its effect on BLM's ability to manage for suitable habitat patch sizes.

Tables 68 and 69 show the ratio of the planning area that is comprised of habitat within patches large enough to meet the small habitat patch size compared to the area that is too fragmented to make suitable patches. These tables display the information for each Wildlife Emphasis Area and by alternative.

Table 67 displays habitat fragmentation based on all travel routes in the planning area. All action alternatives would provide a larger portion of the planning area that meets suitable patch size requirements when compared to alternative 1. The increases in areas of suitable patch size in the action alternatives would be most notable in the Primary and Secondary Wildlife Emphasis Areas. Alternative 2 would provide the greatest increase in area meeting suitable patch size requirements in the Primary Wildlife Emphasis Area, with an increase of 22 percent when compared to alternative 1. Alternative 3 would provide the greatest increase in the Secondary Wildlife Emphasis Area, with an increase of 19 percent when compared to alternative 1. Alternative 1 would provide the least amount of area meeting patch size requirements across the entire planning area and in all Wildlife Emphasis Areas.

Table 67: Ratio of Fragmentation by all Routes (Suitable Patch Sizes versus Small Patches)

Geographic Area	Alternative 1/ No Action	Alternative 2	Alternative 3	Alternative 4
Entire	36:64	47:53	45:55	46:54
Primary	30:70	52:48	44:56	47:53
Secondary	40:60	56:44	59:41	55:45
General	36:64	45:55	42:58	44:56

Table 68 displays habitat fragmentation based on motorized travel routes only. All action alternatives would provide a larger portion of the planning area that meets suitable patch size requirements when compared to alternative 1. All action alternatives would provide a decrease of three percent in area representing suitable patch sizes in the Primary Wildlife Emphasis Area when compared to the no action alternative. However the action alternatives would provide increases in acres of suitable patches for the Secondary and General Wildlife Emphasis Areas when compared to the no action alternative. Alternative 3 would provide a 23 percent increase over alternative 1 in the Secondary Wildlife Emphasis Area, and alternative 4 would provide a 15 percent increase over alternative 1 in the General Wildlife Emphasis Area. Of the action alternatives, alternative 2 would provide the most area meeting suitable patch size requirements across the entire planning area. Alternative 1 would provide the least amount of area meeting patch size requirements across the entire planning area and in the Secondary and General Wildlife Emphasis Areas, but would provide more area meeting suitable patch size requirements than the action alternatives in the Primary Wildlife Emphasis Area.

Tables 70 and 71 show the percentage of the planning area in each patch size categorized by Wildlife Emphasis Area and by alternative. Table 69 displays habitat fragmentation based on all travel routes in the planning area, non-motorized and motorized. All action alternatives would provide a greater percentage of planning area in medium and large patches when compared to alternative 1. Alternative 1 would provide the greatest fragmentation across the planning area. In the Primary Wildlife Emphasis Area, all action alternatives would provide the greatest increase in medium patches when compared to alternative 1, and alternative 2 would provide the greatest increase (15 percent).

Table 68: Ratio of Fragmentation by Motorized Roads and Trails (Suitable Patch Sizes versus Small Patches)

Geographic Area	Alternative 1/ No Action	Alternative 2	Alternative 3	Alternative 4
Entire	55:45	67:33	65:35	64:36
Primary	82:18	79:21	79:21	79:21
Secondary	58:42	74:26	81:19	75:25
General	49:51	63:37	60:40	64:36

Table 69: Fragmentation of All Habitats in the CBRA (Motorized and Non-motorized Routes)

Geographic Area	Patch Size	Alternative 1/ No Action	Alternative 2	Alternative 3	Alternative 4
Entire Planning Area	Small	31%	31%	26%	36%
	Medium	5%	9%	5%	6%
	Large	0%	7%	14%	4%
	Too Fragmented	64%	53%	55%	54%
Primary	Small	30%	37%	34%	36%
	Medium	0%	15%	10%	11%
	Large	0%	0%	0%	0%
	Too Fragmented	70%	48%	56%	53%
Secondary	Small	40%	37%	31%	52%
	Medium	0%	19%	0%	3%
	Large	0%	0%	28%	<1%
	Too Fragmented	60%	44%	41%	45%
General	Small	30%	29%	24%	34%
	Medium	6%	7%	4%	5%
	Large	0%	9%	14%	5%
	Too Fragmented	64%	55%	58%	56%

In the Secondary Wildlife Emphasis Area, the action alternatives would provide a higher percentage of the planning area categorized as suitable patches when compared to alternative 1. Alternative 2 would primarily provide medium size patches, an increase of 19 percent, alternative 3 would primarily provide large size patches, an increase of 28 percent and. Alternative 4 would primarily provide small size patches, with an increase of 21 percent. In the General Wildlife Emphasis Area all action alternatives would provide more area in large patches when compared to alternative 1, and alternative 3 would provide the greatest increase (14 percent).

Table 70 displays habitat fragmentation based on motorized travel routes only. All action alternatives would provide a greater percentage of the planning area in large patches when compared to alternative 1. Alternative 1 would provide the greatest fragmentation across the planning area. In the Primary Wildlife Emphasis Area alternative 1 would provide the greatest percentage of the planning area categorized in suitable patch sizes. All action alternatives would provide a decrease of three percent for large patch sizes when compared to the no action alternative. In the Secondary Wildlife Emphasis Area, the action alternatives would provide a higher percentage of the planning area categorized as suitable medium and large patches than alternative 1, and alternative 3 would provide the lowest level of fragmentation and greatest increase (31 percent) in large patches. In the General Wildlife Emphasis Area, all action alternatives would provide considerably more area in large patches when compared to alternative 1 and alternative 4 would provide the greatest increase (28 percent).

Table 70: Fragmentation of All Habitats (by Motorized Use Roads/Trails)

Geographic Area	Patch Size	Alternative 1/ No Action	Alternative 2	Alternative 3	Alternative 4
Entire Planning Area	Small	21%	13%	11%	8%
	Medium	11%	10%	9%	10%
	Large	23%	44%	45%	46%
	Too Fragmented	45%	33%	35%	36%
Primary	Small	8%	8%	8%	8%
	Medium	0%	0%	0%	0%
	Large	74%	71%	71%	71%
	Too Fragmented	18%	21%	21%	21%
Secondary	Small	20%	11%	5%	13%
	Medium	10%	19%	13%	13%
	Large	28%	44%	63%	49%
	Too Fragmented	42%	26%	19%	25%
General	Small	23%	14%	13%	11%
	Medium	13%	10%	9%	12%
	Large	13%	40%	38%	41%
	Too Fragmented	51%	37%	40%	36%

Summary of Effects

Vegetation Management
Vegetation treatments typically affect wildlife by changing the suitability of the habitat for a particular species. Changes in plant species composition, structure and abundance can help maintain, improve, degrade or make habitats unsuitable for various wildlife species. Treatments can also change how one wildlife species uses the habitat. Vegetation management practices could reduce the amount of cover, which is important during breeding seasons, hot temperatures or periods of inclement weather and hunting seasons.

There are two alternatives for vegetation management, alternative 1 (No Action) and the proposed action which is common to all action alternatives. Because there are only two vegetation management approaches, this analysis will provide a description for these two approaches by grouping alternatives 2, 3 and 4 together and describing the effects in the Common to All Action Alternatives section. The analysis will display how these two management approaches would potentially affect the type of habitat that would be available for the species of focus and source habitats. There are two main types of habitats that could change under these approaches: shrub-steppe and juniper woodland habitats.

The vegetation management direction in alternative 1 would manage for habitats in their current condition and within their current distribution. In general this alternative would be favorable for wildlife associated with juniper woodland source habitats by maintaining the largest amount and widest distribution of juniper woodlands in the planning area, and would be unfavorable for wildlife associated with shrub-steppe and riparian habitats by allowing the continued encroachment of young juniper into these areas. Alternative 1 would manage the area "as is" with no organized effort to maintain good condition habitats or restore degraded areas. This alternative would provide the greatest amount of hiding cover for deer and elk, but could decrease the abundance of forage.

The proposed action would manage for habitats toward their historic condition and distribution, manage toward restoring degraded habitats and would be consistent with the direction outlined in the UDRMP (2005). In old growth juniper woodlands and shrub-steppe habitats, managing habitats under this alternative would increase the health and abundance of shrubs, grasses and forbs and increase their distribution (amount of area occupied, in acres), and would decrease the amount and distribution of young juniper. The proposed action would be favorable for golden eagles, prairie falcons and wildlife dependant on shrub-steppe source habitats and would decrease the amount (acres) of juniper habitat for wildlife that use woodlands. However, management direction common to alternatives 2, 3 and 4 would also promote the health of juniper woodland plant communities, benefiting a large number of species associated with juniper woodlands. Thinning young juniper in old growth woodlands would help maintain and improve the health of the older trees and promote the abundance and diversity of associated under-story vegetation which would also benefit wildlife species diversity. Healthy old growth juniper woodlands that have abundant and diverse under-story vegetation provides for greater wildlife species diversity than dense juniper woodlands with little under-story vegetation and low plant species diversity (Miller, 2000). Mule deer and elk would both gain improved habitat components such as forage while the amount of juniper cover would decrease.

The Final Environmental Impact Statement for the UDRMP (USDI, BLM, January 2005) provides additional effects descriptions.

Travel Management

The existing road network on and adjacent to the planning area is extensive. As a result, there are various road associated factors that can negatively affect habitats and populations of wildlife. Bureau of Land Management resource management programs such as forestry, recreation, lands and minerals often affect the environment in similar ways, including removing habitats for site developments and road and trail construction, and by causing disturbances related to motorized travel access. For example, activities that rely on some form of transportation, such as vegetation management and utility developments, typically use roads for access and can have considerable effects on wildlife habitats by long term elimination of vegetation in roads and rights-of-ways. Deer, elk and raptors are especially vulnerable to road effects. Other indirect effects often result from increased human use of areas that would not be as accessible without the presence/addition of a transportation system. Some wildlife species are also attracted to the presence of humans. For example, habitats fragmented by roads typically support higher densities of brown-headed cowbirds (*Molothrus ater*); common ravens (*Corvus corax*) and American crows (*Corvus brachyrhynchos*) as they often forage along roads, feeding on animals injured or killed by vehicles. Table 71 (Gaines et al., 2003) provides a classification scheme used to describe the effects of road and trail use on wildlife resources.

Several mitigation measures have been applied to the alternatives to minimize the negative effects of human activities facilitated by developed travel routes. Protection buffers, placement of travel routes, seasonal use restrictions and the use of existing travel routes are several methods used to minimize negative impacts on wildlife and their habitats.

Recreation

The travel management direction in Alternatives 2, 3 and 4 would be an improvement over the current situation by decreasing the amounts of travel routes and decreasing fragmentation of the habitats. Alternatives 2, 3 and 4 would also improve the situation for wildlife by limiting motorized, equestrian and bicyclists to designated routes and providing an organized and informed recreation setting. By limiting most human travel to designated routes, wildlife will be able to better predict human actions and adapt to human presence (Knight et. al., 2001). Currently there is a high amount of human travel routes (7.5 miles/mi.^{2}), numerous amounts of access points, and the public continues to create new travel routes further increasing fragmentation of wildlife habitats, spreading weeds and disturbing wildlife during sensitive periods. In order to compare alternative 1 with Alternatives 2-4, the interim motorized travel routes (roads) identified in the UDRMP were considered the only motorized travel routes available and the remaining existing travel routes were considered to be non-motorized travel routes. However, people currently drive motorized vehicles on most of these "non-motorized" travel routes.

Rights of Way

These motorized travel routes generally do not receive the high amount of use compared to other open routes. However, because they are present to provide homeowner access, these routes get constant use throughout the year in areas where there otherwise might not be a travel route. If these routes are driven slowly and drivers consistently do not stop along their way, wildlife can become accustomed to the activity because it is predictable.

Table 71: Effects on Wildlife from Human Use Associated with Roads and Trails

Road and Trail-Associated Actions[1]	Disturbance Type[2]	Reaction Activity[3]	Expected Effects
Hunting and trapping	3	Harvest	Mortality from hunting or trapping as facilitated by road and trail access
Poaching	3	Harvest	Increased illegal take of animals as facilitated by trails and roads
Collisions	3	Harvest	Death or injury resulting from a motorized vehicle running over or hitting an animal
Negative human interactions	3	Harvest	Increased mortality of animals (euthanasia or shooting) owing to increased contact with humans, as facilitated by road and trail access
Movement or barrier or filter	2	Habitat modification & Disturbance	Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near a road or trail or road or trail network
Displacement or avoidance	1	Disturbance	Spatial shifts in populations or individual animals away from a road or trail or road or trail network in relation to human activities on or near a road or trail or road or trail network
Habitat loss and fragmentation	2	Habitat modification	Loss and resulting fragmentation of habitat owning to the establishment of road or trails, road or trail networks, and associated human activities
Edge effects	2	Habitat modification	Changes to habitat microclimates associated with the edge induced by roads and trails
Snag or downed log reduction	2	Habitat modification	Reduction in density of large snags and downed logs due to their removal near roads as facilitated by road access
Collection	2	Harvest	Collection of live animals for human use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access
Route for competitors and predators	2	Habitat modification	A physical, human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
Disturbance at a specific site	1	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and young rearing
Snow compaction	3	Habitat modification	Direct mortality associated with animals being crushed or suffocated as a result of snow compaction from snowmobile routes or groomed ski trails
Physiological response	1	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

[1]Based in part on Wisdom et al., 1999.
[2]Disturbance type 1 occurs when an animal sees, hears, smells or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior. Disturbance type 2 is when habitat is changed in some way. Disturbance type 3 involves human actions in which there is direct and damaging contact with the animal (Liddle, 1997).
[3]Knight and Cole, 1995.

Comparison of Alternatives

Mule Deer

Motorized Route Density

The UDRMP provides specific guidelines for managing motorized route densities in mule deer winter ranges in primary (1.5 miles/mi^2) and secondary (2.5 miles/mi^2) wildlife emphasis areas. Table 72 displays road densities throughout the planning area and by route jurisdiction (BLM versus State and County).

Alternative 4 provides the lowest BLM motorized route density, followed closely by alternatives 3 and 2, respectfully. Alternative 1 would provide almost one mile per square mile more than Alternative 4. There is no winter range in the primary emphasis area. In the secondary wildlife emphasis area Alternatives 2 and 4, respectfully, provide the lowest motorized route densities and are below the primary emphasis guideline of 1.5 mi/mi^2. In the secondary wildlife emphasis area Alternative 1 is the only alternative that would provide motorized densities above 2.5 mi/mi^2 and consistently provides for almost 2 mi/mi^2 more than any action alternative. Alternative 2 would provide for the lowest BLM motorized route density in the Deep Canyon area and is below 1.0 mi/mi^2. In the general wildlife emphasis area all alternatives would provide for nearly the same motorized route density with a range of 0.5 miles between the high and low.

Including the State and County Routes, it shows that BLM has the capability to manage for motorized route densities consistent with UDRMP guidelines in mule deer winter range within the secondary wildlife emphasis area. Alternative 1 is the only alternative that would provide for motorized route densities above 2.5 mi/mi^2.

Table 72: Mule Deer Winter Range Motorized Route Densities (Miles/Sq. Mile)

Route Jurisdiction	Geographic Area	Alternative 1 / No Action	Alternative 2	Alternative 3	Alternative 4
BLM Routes	Entire	3.51	2.76	2.75	2.66
	Primary	n/a	n/a	n/a	n/a
	Secondary	3.44	1.46	1.52	1.48
	General	3.54	3.15	3.12	3.02
	Deep Canyon	1.43	0.71	2.48	2.42
State and County	Entire	0.3	n/a	n/a	n/a
	Primary	n/a	n/a	n/a	n/a
	Secondary	0.29	n/a	n/a	n/a
	General	0.31	n/a	n/a	n/a
	Deep Canyon	0.49	n/a	n/a	n/a
State, County and BLM	Entire	3.82	3.06	3.05	2.96
	Primary	n/a	n/a	n/a	n/a
	Secondary	3.74	1.76	1.81	1.77
	General	3.84	3.46	3.43	3.33
	Deep Canyon	1.91	1.19	2.97	2.91

Mule Deer Winter Habitat Disturbance Index

The UDRMP does not provide specific guidelines for managing non-motorized route densities in mule deer winter range or for managing both motorized and non-motorized densities combined. However, the UDRMP directs management to provide habitats that support wildlife and maintain a moderate level of wildlife use for secondary wildlife emphasis areas, and in the general wildlife emphasis areas the UDRMP states "provide habitat that contributes to species occurrence and distribution." In order to assess an estimate of human influence of all travel routes we developed and used the Mule Deer Winter Habitat Disturbance Index. This model was developed from methods described in Gaines (2003) and considers both motorized and non-motorized travel routes.

Over the entire planning area, the mule deer disturbance index indicates that BLM proposed routes in all alternatives would have a moderate level of human influence on mule deer winter range in all emphasis areas. Alternative 1 would consistently provide for the highest level of human influence while Alternative 2 most often provides for the lowest level when considering the entire planning area. In the Deep Canyon area, Alternatives 1 and 2 respectfully, would provide for low levels of human influence based on BLM-administered routes and nearly low when considering all travel routes. Alternative 1 would provide a nearly high level of human influence in the secondary emphasis area, while all action alternatives would almost provide a low level (66-69%). In the secondary wildlife emphasis area, Alternative 2 concentrates trail routes in the western canyon areas while providing larger un-fragmented habitat patches in the northeastern area and near a golden eagle nest. Table 73 displays the influences of motorized and non-motorized travel routes on mule deer throughout the planning area and by route jurisdiction (BLM versus State and County).

Table 73: Mule Deer Winter Habitat Disturbance Index (Low, Moderate and High, and Percentage Score)

Route Jurisdiction	Geographic Area	Alternative 1 / No Action	Alternative 2	Alternative 3	Alternative 4
BLM Routes	Entire	Mod (56.20%)	Mod (61.64%)	Mod (61.31%)	Mod (61.55%)
	Primary	n/a	n/a	n/a	n/a
	Secondary	Mod (51.78%)	Mod (68.91%)	Mod (66.31%)	Mod (66.34%)
	General	Mod (57.55%)	Mod (59.43%)	Mod (59.79%)	Mod (60.09%)
	Deep Canyon	Low (72.84%)	Low (72.11%)	Mod (61.20%)	Mod (62.02%)
State and County	Entire	Low (96.41%)	Low (96.41%)	Low (96.41%)	Low (96.41%)
	Primary	n/a	n/a	n/a	n/a
	Secondary	Low (96.69%)	Low (96.69%)	Low (96.69%)	Low (96.69%)
	General	Low (96.32%)	Low (96.32%)	Low (96.32%)	Low (96.32%)
	Deep Canyon	Low (94.37%)	Low (94.37%)	Low (94.37%)	Low (94.37%)
State, County and BLM	Entire	Mod (54.36%)	Mod (59.05%)	Mod (58.62%)	Mod (58.97%)
	Primary	n/a	n/a	n/a	n/a
	Secondary	Mod (50.58%)	Mod (66.21%)	Mod (63.61%)	Mod (64.14%)
	General	Mod (55.51%)	Mod (56.88%)	Mod (57.10%)	Mod (57.40%)
	Deep Canyon	Mod (68.07%)	Mod (67.21%)	Mod (56.36%)	Mod (56.61%)

Alternative 1 would provide for the lowest amount of miles of ROWs for private landowners to access their property of all alternatives for the project area and within each wildlife emphasis area. For the action alternatives, Alternative 2 would provide the lowest amount of ROWs miles for private landowner access in mule deer winter range. Of the action alternatives, Alternative 3 would provide the lowest ROW miles in the secondary emphasis area and Alternative 4 would provide for the lowest in the Deep Canyon area. Table 74 displays the proposed ROWs for each wildlife emphasis area by alternative.

Table 74: Rights-of-Ways in Mule Deer Winter Range (miles)

Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Entire project	6.16	10.99	11.07	12.78
Primary	n/a	n/a	n/a	n/a
Secondary	1.32	2.23	1.84	2.23
General	4.84	8.76	9.23	10.55
Deep Canyon	1.17	1.46	1.46	1.34

Vegetation Management

Alternative 1 would manage for nine percent (1,279 acres) foraging habitat and 91 percent (13,761 acres) juniper cover, which would provide for the greatest amount of cover and the least amount of shrub-steppe foraging habitat of the two alternative approaches. Alternative 1 would manage 79 percent (4,952 acres) of shrub-steppe habitats to be dominated by young juniper and allow young juniper to continue to expand its distribution into additional shrub-steppe habitats.

Vegetation management common to all action alternatives would thin young juniper from old growth woodlands and restore up to 79 percent of the historical shrub-steppe habitats that are currently dominated by young juniper. This approach would manage for at least 59 percent of the area with juniper hiding cover and move toward providing 41 percent of the area in shrub-steppe foraging habitats. Table 75 displays the forage to cover ratios for each wildlife emphasis area by alternative.

Table 75: Mule Deer Cover and Forage Ratios (acres and percent)

Wildlife Emphasis	Alternative 1		Alternative 2	
	Forage	Cover	Forage	Cover
	Shrub-Steppe	Old Growth and Young Juniper	Shrub-steppe and Young Juniper	Old Growth Juniper
Primary	n/a	n/a	n/a	n/a
Secondary	4% (140 ac)	96% (3,367 ac)	25% (866 ac)	75% (2,641 ac)
General	10% (1,140 ac)	90% (10,393 ac)	47% (5,366 ac)	53% (6,167 ac)
Entire	9% (1,279 ac)	91% (13,761 ac)	41% (6,231 ac)	59% (8,809 ac)

Cumulative Effects

Private lands also play a role in managing for healthy deer herds. Fencing, urban development and some agricultural practices are a few examples of actions on private lands that can have negative effects on deer and their habitats. Water developments, certain agricultural practices and limiting human access to private lands are a few examples of actions on private lands that help contribute to suitable habitat for deer.

State and County roads add 0.3 mi/mi^2 of motorized routes (roads) across the entire planning area. These roads add about 3.5 percent human influence to mule deer winter range, but do not hinder BLM's ability to meet UDRMP motorized route guidelines. State and County roads add the highest density (0.49 mi/mi^2) in the Deep Canyon area. When considering all road ownerships in the secondary wildlife emphasis area, route densities for all action alternatives are below the UDRMP guideline of 2.5 mi/mi^2. However, in the secondary wildlife emphasis area, alternative 1 would provide for 0.94 mi/mi^2 more than the RMP guideline.

There are numerous motorized travel routes located on private lands in mule deer winter range. Eagle Crest Resort contains a high density of roads. Portions of Highway 126, Fryrear Road, Barr Road and Cline Falls Highway are located within and immediately adjacent to the project area negatively affecting deer winter range. There are four miles of roads per square mile of winter range on private, State and County lands in and immediately adjacent to (within one mile) the planning area, which result in a moderate level of human influence in mule deer winter range. The road density and route influence index provides for an average assessment across all private lands but often roads are concentrated in specific areas such as around housing developments.

There are approximately 18,618 acres of deer winter range located on private lands within and immediately adjacent to (within one mile) the planning area. On private, State and County lands within the analysis area, 3,938 acres (21 percent) of natural plant communities have been converted for agriculture and 304 acres (2 percent) for urban developments. Some agricultural practices can provide forage for deer. Approximately 77 percent of the private lands within the analysis area provide native plant communities offering cover and or foraging opportunities for wintering mule deer. An undetermined amount of these native plant communities are located on small acreage home sites that may or may not be conducive to mule deer use. Table 76 displays the different cover types available on private land within the analysis area.

Table 76: Cover Types on Private Lands in Mule Deer Winter Range

Land Type	Acres / Percent (%)
Agriculture	3,938 / 21%
Shrub-Steppe	3,207 / 17%
Juniper Woodland	11,157 / 60%
Urban	304 / 2%
Riparian	12 / <1%

Additionally, there is a new destination resort (Thornburg) being developed in the planning area that would negatively affect 1,699 acres of deer winter range. This resort would decrease the amount of natural habitats, add more human travel routes, and increase the number of people using the area, and increase traffic on existing roads. The resort would be responsible for mitigating the negative effects to wildlife and their habitats. The wildlife mitigation would help improve the condition of existing native habitats on and off-site, but would not increase the amount (acreage) of deer winter range. Recently within the planning area, BLM transferred approximately 200 acres to DSL and these lands could eventually be developed for human uses. There are other undeveloped private lands in the area that are in the planning process to have homes built, and some are part of the proposed ROW actions.

Mineral development within the area identified as "Site N" could occur within the near future and would have direct negative effects on 105 acres of deer winter range in the general wildlife emphasis area. Mining activities, including transporting materials would have additional indirect negative effects off-site along travel corridors and immediately adjacent to the active mining site (10 acres). All action alternatives would provide a dense trail system around this general area providing the area with high human activity.

Close to the planning area in the Tumalo and Northwest recreation areas there are 12,537 acres of BLM lands located in deer winter range that are allocated to a primary wildlife emphasis. These areas provide favorable conditions for wintering mule deer and connectivity for deer moving across the region to other winter range.

Cumulative effects of combined activities of Alternative 1 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in deer habitat quality and in the amount of suitable habitat. This expected decline would be due to the continued increase in the amount and distribution of young juniper, the uncontrolled increasing amounts of motorized and non-motorized travel routes, the increasing use of these routes across the planning area and the increasing human population in the local area. Without developing an organized recreational setting, the current and increasing numbers of visitors will continue to create additional travel routes resulting in increasing fragmentation of deer winter range. Also, this alternative would not provide adequate direction for restoring healthy plant communities that would benefit mule deer foraging opportunities. Without an improvement in forage plants, deer winter range conditions will decline and coupled with increasing human disturbances, deer will find it more difficult to locate suitable food and cover in the planning area. Because of the existing high level of fragmentation, additional developments within and immediately adjacent to the planning area will decrease this area's suitability for deer to occupy and move across.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in deer habitat quality and in the amount of suitable habitat on BLM-administered lands. This would be especially noticeable in the secondary wildlife emphasis area, and in the general wildlife emphasis areas in the central part of the planning area located west of Barr Road and south of the CEC power line ROW, and in the Deep Canyon area. This expected result would be due to decreased density of motorized travel routes in the secondary wildlife emphasis and Deep Canyon areas; providing an organized trail system; limiting trail riders to a designated trail system; decreasing habitat fragmentation and increasing suitable sizes and distribution of habitat patches for deer to occupy and move across the planning area. Additionally, Alternative 2 would provide management direction to improve the health of old growth juniper woodlands and the quality of forage plants while maintaining suitable amounts of juniper hiding cover.

However, the cumulative effects are expected to result in a decrease in the amount of suitable habitat on BLM-administered lands in the areas north of Highway126 adjacent to Buckhorn Road and in the area around Site N due to an increase in the amount of trails. This alternative would result in the maintenance of less suitable habitat conditions in the Buttes area because of the continued dense travel route system and fragmented ownership with both developed and developing private lands. This decrease is also due to the creation of designated trailheads in these areas and the increased amount of use that trailheads create in the immediate area. As the Thornburg destination resort becomes developed, the adjacent BLM areas will become less suitable because of increased human activities.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in deer habitat quality and in the amount of suitable habitat on BLM-administered lands across the planning area. This would be especially noticeable in the secondary wildlife emphasis area, in some of the general wildlife emphasis area, such as in the central part of the planning area located west of Barr Road and south of the Power-line ROW, and in the very northeastern area on both sides of Buckhorn Road. This expected result would be due to decreasing the density of travel routes in these areas, providing an organized trail system, limiting trail riders to the designated trail system and decreasing habitat fragmentation and increasing the suitability in size and distribution of habitat patches for deer to occupy and move across the planning area. Additionally, Alternative 3 would manage the vegetation to improve the health of old growth juniper woodlands and shrub-steppe habitats and increase the quality of forage plants while maintaining suitable amounts of juniper hiding cover.

However, the cumulative effects are expected to result in a decrease in the amount of suitable habitat on BLM-administered lands in the Buttes area and the immediate area surrounding Site N. This decrease is due to the creation of designated trailheads in these areas, the increased or maintenance of a high density of trails and the potential mining activities at Site N. While some locations within these two areas may have a decreased trail density in comparison to the current situation, this will be off-set by the increased amount of use that trailheads will create in the immediate area. As the Thornburg destination resort becomes developed, the adjacent BLM areas will become less suitable because of increased human activities.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in deer habitat quality and in the amount of suitable habitat on BLM-administered lands across the planning area. This would be especially noticeable in the secondary wildlife emphasis area, and in the general wildlife emphasis areas in the central part of the planning area located west of Barr Road and south of the Power-line ROW. This expected result would be due to decreasing the density of travel routes in these areas, providing an organized trail system, limiting trail riders to a designated trail system, decreasing habitat fragmentation, and increasing the suitability in size and distribution of habitat patches for deer to occupy and move across the planning area. Additionally, Alternative 4 would manage the vegetation to improve the health of old growth juniper woodlands and shrub-steppe habitats and increase the quality of forage plants while maintaining suitable amounts of juniper hiding cover.

However, the cumulative effects are also expected to result in a decrease in the amount of suitable habitat on BLM-administered lands in the northern part of the secondary wildlife emphasis area, the Buttes area, and the immediate area surrounding Site N. This decrease is due to the creation of designated trailheads in these areas and/or the increased density of trails and potential mining activities. While some locations within these two areas may have a decreased trail density in comparison to the

current situation, this will be off-set by the increased amount of use that a trailhead will create in the immediate area. As the Thornburg destination resort becomes developed, the adjacent BLM areas will become less suitable because of increased human activities.

Rocky Mountain Elk

Motorized Travel

The UDRMP provides specific guidelines for motorized route densities for elk winter ranges in primary (1.5 miles/mi^2) and secondary (2.5 miles/mi^2) wildlife emphasis areas. Table 77 displays motorized route densities for the alternatives throughout the planning area and by route jurisdiction.

Within the entire planning area, Alternative 4 would provide the lowest BLM motorized route density, followed closely by alternatives 3 and 2, respectfully. Alternative 1 would provide over 1.5 miles per square mile more than Alternative 4 and is the only alternative that would provide motorized densities above 2.5 mi/mi^2 in the secondary wildlife emphasis area. In the primary wildlife emphasis area all action alternatives would provide the same route density with Alternative 1 providing slightly less (0.3 mi/mi^2). This is partially due to the low amount of winter range in this emphasis area, and the location of any road segment would downgrade the habitat effectiveness. In the secondary wildlife emphasis area, Alternatives 3 and 2, respectfully, provide the lowest motorized route densities and Alternative 4 would provide slightly higher road density than Alternative 2. All action alternatives would provide motorized route densities below the secondary emphasis guideline of 2.5 mi/mi^2 when looking at either just BLM routes or all jurisdictional routes. In the secondary wildlife emphasis area Alternative 1 is the only alternative to provide more than the UDRMP guideline. In the general wildlife emphasis area the action alternatives provide for nearly the same density with a range of 0.27 miles between the high and low. Alternative 2 would provide for the lowest BLM motorized route density in the Deep Canyon area (0.6 mi/mi^2) of the general wildlife emphasis area.

Table 77: Elk Winter Range Motorized Route Density (Miles/Sq. Mile)

Route Jurisdiction	Geographic Area	Alternative 1 / No Action	Alternative 2	Alternative 3	Alternative 4
BLM Routes	Entire	3.91	2.45	2.47	2.38
	Primary	0.23	0.27	0.27	0.27
	Secondary	3.21	2.06	1.27	2.11
	General	4.14	2.64	2.82	2.55
	Deep Canyon	2.21	0.6	2.74	2.5
State and County	Entire	0.55	0.55	0.55	0.55
	Primary	0.8	0.8	0.8	0.8
	Secondary	0.38	0.38	0.38	0.38
	General	0.57	0.57	0.57	0.57
	Deep Canyon	0.48	0.48	0.48	0.48
State, County and BLM	Entire	4.46	3	3.02	2.93
	Primary	1.04	1.07	1.07	1.07
	Secondary	3.59	2.44	1.65	2.48
	General	4.81	3.21	3.38	3.12
	Deep Canyon	2.68	1.07	3.21	2.97

Habitat Effectiveness

The UDRMP provides specific guidelines for habitat effectiveness related to motorized routes for elk winter ranges in primary (70 percent) and secondary (50 percent) wildlife emphasis areas. Table 78 provides a complete list of habitat effectiveness scores for each alternative by emphasis area and includes State and County routes.

For all alternatives, BLM-proposed motorized routes would result in low habitat effectiveness across the entire planning area for elk winter range. However, across all wildlife emphasis areas all action alternatives would increase the habitat effectiveness in comparison to the existing condition (Alternative 1). In the primary emphasis area all alternatives would provide habitat effectiveness scores below the secondary emphasis guideline of 50 percent. All action alternatives would increase the habitat effectiveness for the primary emphasis area, but only to 46.6 percent, considerably short of the 70 percent primary emphasis goal. This is mostly due to the location of Cline Falls highway and the low amount of winter range in this emphasis area. In the secondary wildlife emphasis area Alternative 3 would meet the guideline of 50 percent habitat effectiveness and Alternative 4 is close when considering only BLM routes. However, when State and County roads are included in the analysis, Alternative 4 provides the highest at 35.6 percent. Alternative 2 would provide the highest habitat effectiveness of all alternatives when considering only BLM routes (42 percent) and all jurisdictional routes (37 percent).

Alternative 1 would provide for the lowest mileage of rights-of ways for private landowner access of all alternatives and for each wildlife emphasis area. For the action alternatives, Alternative 4 would provide the lowest mileage of ROWs. All action alternatives would provide the same amount in the primary wildlife emphasis area, but Alternative 3 would provide the lowest in the secondary and Alternative 4 would provide the lowest in the general wildlife emphasis area and in the Deep Canyon area of the general wildlife emphasis area. Table 79 displays the ROWs for each wildlife emphasis area by alternative.

Table 78: Elk Habitat Effectiveness

Route Jurisdiction	Geographic Area	Alternative 1 / No Action	Alternative 2	Alternative 3	Alternative 4
BLM Routes	Entire	26.37%	33.63%	33.31%	37.44%
	Primary	44.03%	46.59%	46.59%	46.59%
	Secondary	27.53%	41.06%	51.16%	47.39%
	General	25.13%	31.54%	29.34%	35.12%
	Deep Canyon	39.19%	42.21%	27.48%	29.98%
State and County	Entire	57.89%	57.89%	57.89%	57.89%
	Primary	34.68%	34.68%	34.68%	34.68%
	Secondary	61.89%	61.89%	61.89%	61.89%
	General	58.53%	58.53%	58.53%	58.53%
	Deep Canyon	53.63%	53.63%	53.63%	53.63%
State, County and BLM	Entire	23.87%	28.45%	27.97%	31.52%
	Primary	33.88%	33.88%	33.88%	33.88%
	Secondary	24.03%	29.90%	32.09%	35.63%
	General	23.25%	27.87%	26.88%	30.64%
	Deep Canyon	27.36%	36.89%	24.32%	24.33%

Table 79: Rights-of-Ways in Elk Winter Range (miles)

Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Entire project	16.71	26.55	29.41	25.87
Primary	0.48	0.57	0.57	0.57
Secondary	1.32	2.23	1.84	2.23
General	13.74	21.72	24.45	21.21
Deep Canyon	1.17	2.03	2.55	1.86

Vegetation Management

Alternative 1 would manage for 11 percent (2,585 acres) of foraging habitat and 89 percent (20,465 acres) of juniper cover, which would provide for the greatest amount of cover and the least amount of shrub-steppe foraging habitat of the two alternative approaches. Alternative 1 would manage 50 percent (2,584 acres) of shrub-steppe habitats to be dominated by young juniper and allow young juniper to continue to expand its distribution into additional shrub-steppe habitats. In all wildlife emphasis areas this alternative would provide at least 86 percent of each emphasis area with dense juniper woodland hiding cover.

Vegetation management common to all action alternatives would thin young juniper from old growth woodlands and restore up to 50 percent of the historical shrub-steppe habitats that are currently dominated by young juniper. This approach would manage for at least 78 percent of the area with juniper hiding cover and move toward providing 22 percent of the area in shrub-steppe foraging habitats. All action alternatives would provide at least 60 percent of each wildlife emphasis area in juniper woodland cover. While this vegetation emphasis would improve the health and quality of elk forage, it would also decrease hiding cover that would be important for elk cover in an area with high human visitation. Table 80 displays the forage to cover ratios for each wildlife emphasis area by alternative.

Table 80: Elk Cover and Forage Ratios (acres and percent)

Wildlife Emphasis	Alternative 1		Alternative 2	
	Forage	Cover	Forage	Cover
	Shrub-Steppe	Old Growth and Young Juniper	Shrub-steppe and Young Juniper	Old Growth Juniper
Primary	14% (187 ac)	86% (1178 ac)	15% (202 ac)	85% (1164 ac)
Secondary	7% (280 ac)	93% (3896 ac)	36% (1505 ac)	64% (2671 ac)
General	9% (2117 ac)	91% (21200 ac)	40% (9271 ac)	60% (14046 ac)
Entire	11% (2585 ac)	89% (20465 ac)	22% (5169 ac)	78% (17881 ac)

Cumulative Effects

Private lands also play a role in managing for healthy elk herds. Fencing, urban sprawl, splitting of large ranches into smaller acreage home-sites and some agricultural practices are a few examples of actions on private lands that can have negative effects on elk and their habitats. Water developments, certain agricultural practices and limiting human access to private lands are a few examples of actions on private lands that help contribute effective habitat for elk.

Elk management efforts by Oregon Department of Fish and Wildlife will also limit elk use of this area because the agency is de-emphasizing elk in this area due to agricultural impacts and complaints. The ODFW uses liberal hunting regulations (e.g., long hunting seasons) to minimize crop damage on private lands immediately adjacent to the planning area (Glen Ardt, ODFW Biologist, personal communication).

There is a high amount (4.6 mi/mi^2) of motorized travel routes located on private lands in elk winter range resulting in low habitat effectiveness (22%). Eagle Crest Resort contains a high density of roads and portions of Highways 126 and 20, Fryrear, Buckhorn and Barr Roads and Cline Falls Highway, also run through the project area negatively affecting elk winter range within and immediately adjacent to the planning area.

State and County roads add .55 mi/mi^2 of motorized routes over the planning area. State and County route densities are low enough that BLM could meet motorized route density guidelines. However, these existing roads limit the habitat effectiveness to 58 percent before any other BLM travel route is considered. State and County roads reduces the habitat effectiveness most (35%) in the primary wildlife emphasis area. This area has a small amount of winter range and is located within one mile of Cline Falls Highway. As a result, BLM does not have the ability to meet the UDRMP habitat effectiveness guideline (70 percent). State and County roads have the least affect (62% HE) on elk winter range in the secondary wildlife emphasis area providing BLM the ability to achieve the UDRMP HE guideline (50%). The ability for this area to hold elk is also limited by ODFW's direction for de-emphasizing elk presence.

There are approximately 29,136 acres of elk winter range located on private lands within and immediately adjacent to (within one mile) the planning area. On private, State and County land in the analysis area, 9,343 acres (32 %) of natural plant communities have been converted to non-habitat, such as roads, urban development and agricultural fields.

Additionally, there is a new destination resort (Thornburg) being developed that would negatively affect 2,095 acres of elk winter range. This resort would decrease the amount of natural habitats, add more human travel routes, and increase the number of people using the area, and increase traffic on existing roads. The resort would be responsible for mitigating the negative effects to wildlife and their habitats. Some of these efforts would help improve the condition of existing native habitats on and off-site, but would not increase the amount (acreage) of available elk winter range. There are other undeveloped private lands in the area that are in the planning process to have homes built, and some are part of the proposed ROW actions.

Table 81: Cover Types on Private Lands in Elk Winter Range

Land Type	Acres / Percent (%)
Agriculture	8,197 / 28%
Shrub-Steppe	4,334 / 15%
Juniper Woodland	15,414 / 52%
Urban	1,146 / 4%
Riparian	45 / 1%

Mineral development within the area identified as "Site N" could occur within the near future and would have direct negative effects on 105 acres of elk winter range in the general wildlife emphasis area. Mining activities, including transporting materials would have additional indirect negative effects off-site along travel corridors and immediately adjacent to the active mining site (10 acres). All action alternatives would provide a dense trail system around this general area providing the area with high human activity.

Close to the planning area in the Tumalo and Northwest recreation areas there are 12,537 acres of BLM lands located in elk winter range that are allocated to a primary wildlife emphasis. These areas provide favorable conditions for wintering elk and connectivity for elk moving across the region to other winter range.

Cumulative effects of combined activities of Alternative 1 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in elk habitat quality and in the amount of suitable habitat on BLM-administered lands. This expected decline is due to the continued increase in the amount and distribution of young juniper that will decrease the quality of forage, continued creation of additional motorized and non-motorized travel routes and increasing use of these routes by people across the planning area due to a lack of an organized effort, potential development of Site N by the Oregon Department of Transportation, continued development of private lands for human occupancy (e.g., Thornburg Destination Resort), and elk population management efforts by ODFW to decrease elk presence in this area will likely result in increased hunting pressure.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in elk habitat quality and in the amount of suitable habitat on BLM-administered lands in the planning area, especially in the central (west of Barr Road and south of the CEC powerline (ORE 012676, Map 5) of the general wildlife emphasis area and the area further south and east moving toward and including the primary wildlife emphasis area. This expected result is due to the vegetation management approach of thinning young juniper from dense old growth stands and from shrub-steppe habitat areas and restoring degraded areas, decrease in the amount of human travel routes, locating some routes parallel and close together to minimize fragmentation, increasing in the number and sizes of unfragmented habitat patches, and limiting trail riders to designated routes.

However, these improvements would likely only allow elk to occupy the area temporarily; using it mostly as connectivity habitat for elk to move between other winter ranges with less human disturbances. This is due to continued increasing developments on private lands within and immediately adjacent to the planning area and the limited number of large habitat patches that would afford elk enough security to stay long term within the planning area.

The cumulative effects of Alternative 2 are also expected to result either in the maintenance of low quality habitat or in a decrease in elk habitat quality and in the amount of suitable habitat on BLM-administered lands in the Buttes area, the area north of Highway126 and adjacent to Buckhorn Road, and the area around Site N. This decrease is due to maintained high density or increased density of trails and the creation of designated trailheads in those areas, and the possibility of mining activity at Site N.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in elk habitat quality and in the amount of suitable habitat. This would be especially noticeable in the

secondary wildlife emphasis area where it would provide for the lowest motorized and non-motorized route densities. This and the moderate to large patches of unfragmented habitats located east of the secondary emphasis area and south of the powerline ROW that would provide elk the opportunity to occupy and use the area.

The overall reduction in all types of travel routes, the low motorized travel route densities in key habitat areas and the vegetation restoration emphasis should help improve the existing conditions for elk. However, these improvements would not likely be sufficient for elk to use much of the planning area because of the continued increasing developments on private lands and the limited number of large habitat patches that would afford elk enough security to stay.

The cumulative effects of Alternative 3 would likely provide sufficient improvements to allow elk to occupy the area for short periods of time using it mostly as connectivity habitat to move between other winter ranges with less human disturbances.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in elk habitat quality and in the amount of suitable habitat. This would be especially noticeable in the secondary wildlife emphasis area where it would provide for the lowest motorized and non-motorized route densities. This and the moderate to large patches of unfragmented habitats located east of the secondary emphasis area and south of the power line ROW would provide elk the best opportunity to occupy and use the area. The overall reduction in all types of travel routes, the low motorized travel route densities in key habitat areas and the vegetation restoration emphasis should all improve the existing conditions for elk. However, these improvements would not likely be sufficient for elk to use most of the planning area for long periods of time because of the increasing developments on private lands and the limited number of suitable sized habitat patches that would afford elk enough security to stay.

The cumulative effects of Alternative 4 would likely provide sufficient improvements to allow elk to occupy the area for short periods of time, using it mostly as connectivity habitat to move between other winter ranges with less human disturbances.

Golden Eagles

Travel Routes

In all action alternatives, all trails in the primary wildlife area that are located within ¼ mile of the concentration area of four eagle nests off of Jaguar Road would be closed seasonally to protect nesting eagles. The proposed trailhead and parking area at the end of Jaguar Road would have a gate installed to facilitate the closure. There are at least seven known eagle nests in this territory. Four of them are located in a cluster on BLM administered land and close to the Jaguar Road access point. The remaining three nests are located within ¼ mile of this cluster on private land. There would be a small amount of trails located within ½ mile of these nests but never within ¼ mile of the most recently active nests. There would be approximately two miles of non-motorized trails and a ¼ mile ROW within ½ mile of the Awbrey Falls historic nest site that are not proposed to be seasonally closed. However, golden eagles have not been observed at the Awbrey Falls territory during recent monitoring.

By seasonally closing access at Jaguar Road and providing year-round access at the Red Cinder Road, Newcomb Road (west side of Deschutes River) and at the Quarry Road on the east side (see Maps

6 – 8), most human activities should be directed away from the center of this eagle territory. Also, there would be a low amount of trails west of the river and within ½ mile of this cluster of eagle nests. These trails are over ¼ mile away and located topographically out of view of the eagle nests and prominent perch sites near the canyon rim and should not affect nesting eagles.

Of all alternatives, Alternative 2 provides the lowest amount of roads and trails within ½ mile of all eagle nests within the analysis area and Alternative 1 would provide the highest. All action alternatives would reduce the mileage of roads and trails by at least 8 miles in comparison to Alternative 1. The action alternatives would seasonally close between 5.3 and 8 miles of travel routes within ½ mile of nests to minimize disturbance during nesting season. Seasonal closures are fairly consistent across all action alternatives by closing all routes within ¼ mile of recently active eagle nests. Alternative 2 consistently reduces the highest amount of roads and trails within ½ mile of eagle nests for each wildlife emphasis area, and having no miles of open routes (seasonally) in the Secondary Wildlife Emphasis Area. Also, Alternative 2 would limit pedestrians seasonally to designated roads or trails with no cross country travel permitted near eagle nest sites to further protect nesting birds (see Map 7). Miles of travel and seasonally closed roads and trails located within ½ mile of eagle nests for each alternative are displayed in Tables 83 - 86.

For all action alternatives, approximately 8.4 to 10 miles of BLM administered travel routes located within ½ mile of nest sites would be open during the nesting season. However, most of these trails are located out of view of the nest because old growth woodlands and/or topography provide visual screening and/or are at least ¼ mile away. All action alternatives would seasonally close all trails located within ¼ mile of an active eagle nest.

All action alternatives would decrease the amount of trails open during nesting season within ½ mile of nests by 16 to 17.9 miles as compared to Alternative 1. Alternative 2 would provide the least amount of trails open during nesting season within ½ mile of eagle nests in all wildlife emphasis areas, with a total of 8.45 miles open across the entire planning area. Alternatives 2 and 4 would provide no miles of open routes within ½ mile of eagle nests within the Secondary Wildlife Emphasis Area. However, Alternative 4 would provide the highest miles of open routes in the Primary and General Emphasis Areas.

Alternative 2 would provide the best situation for the Deep Canyon area by moving most trails away from the eagle nests and the canyon rim. Alternative 1 would provide the least protection for nesting eagles by having all trails open during the nesting season within ¼ to ½ mile of active nests. Alternatives 3 and 4 would provide similar conditions for nesting eagles where they seasonally limit all trails at lower elevations and some portions of the canyon rim, but these alternatives would allow trails along portions of the rim within ½ mile of eagle nests.

Rights of Way

Alternative 1 would provide the lowest amount of ROWs within ½ mile of golden eagle nests for each wildlife emphasis area. Alternatives 2, 3, and 4 would provide increases in the total amount of ROWs within ½ mile of eagle nests for private landowners to access their property. Across the planning area, alternatives 2 and 4 would provide the highest amount of ROWs and Alternative 3 would provide 0.3 mile less than the other action alternatives. All action alternatives would locate 0.25 miles of ROW within ½ mile of eagle nests in the primary wildlife emphasis area. Alternative 3 would provide no change to existing ROWs in the Secondary Emphasis Area while Alternatives 2 and 4 would provide a 0.3 mile increase. Table 86 displays the BLM ROWs within ½ mile of Eagle nests for each alternative in each geographic location.

Table 82: BLM Travel Routes within ½ Mile of Eagle Nests, Entire Planning Area

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	7.05	4.32	6.6	9.07
Non-motorized Routes	19.31	9.47	10.97	8.97
Total	26.36	13.79	17.57	18.04
Seasonally Closed	0	5.34	8.13	7.98
Open during nesting	26.36	8.45	9.44	10.06

Table 83: BLM Travel Routes within ½ Mile of Eagle Nests, Primary Wildlife Emphasis Area

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	1.18	1.62	1.62	1.62
Non-motorized Routes	9.85	4.98	5.57	6.04
Total	11.03	6.6	7.19	7.66
Seasonally Closed	0	1.41	1.41	1.41
Open during nesting	11.03	5.19	5.78	6.25

Table 84: BLM Travel Routes within ½ Mile of Eagle Nests, Secondary Wildlife Emphasis Area

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	1.16	1.28	0	2.02
Non-motorized Routes	3.87	0.68	3.03	0.55
Total	5.03	1.96	3.03	2.57
Seasonally Closed	0	1.96	2.72	2.56
Open during nesting	5.03	0	0.31	0

Table 85: BLM Travel Routes within ½ Mile of Eagle Nests, General Wildlife Emphasis Area

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	4.27	1.42	4.97	5.43
Non-motorized Routes	5.59	3.81	2.38	2.38
Total	9.86	5.23	7.35	7.81
Seasonally Closed	0	1.97	4.01	4.01
Open during nesting	9.86	3.26	3.34	3.8

Table 86: BLM ROWs within ½ Mile of Eagle Nests

Location	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Entire Plan Area	1.72	2.94	2.58	2.94
Primary WE	1.37	1.62	1.62	1.62
Secondary WE	0	0.29	0	0.29
General WE	0.35	1.03	0.96	1.03
Deep Canyon	0.35	1.03	0.96	1.03

Cumulative Effects

The BLM manages 41 percent (2,026.5 ac) of the habitat within ½ mile of all eagle nests within the planning area. There are approximately 2,492 acres of private lands within ½ mile of these eagle nests located within and immediately adjacent to the planning area. Approximately 35 percent of native habitat on private land within ½ mile of eagle nests has been converted for human uses (agriculture-840 acres and urban-40 acres). Approximately 63 percent of the private lands remain in native habitats such as shrub-steppe (1,500 acres), juniper woodlands (34 acres), and riparian areas (76 acres). Agriculture lands sometimes provide foraging opportunities for golden eagles. There are several dwellings located on private parcels close to the rim on the Deschutes River Canyon which increase exposure to golden eagle nests directly below and across the canyon. Within ½ mile, an individual nest in the Jaguar Road territory may have as many as 11 homes along the canyon rim, but never less than three.

On private, State and County lands within and immediately adjacent to the planning area there are an additional 17.7 miles of travel routes within ½ mile and four miles within ¼ mile of eagle nests (see Table 87). Most of these miles of routes are located in the primary wildlife emphasis area. There are no miles within ¼ mile of the eagle nest in the secondary wildlife emphasis area.

Alternative 1 would have the greatest potential for adverse cumulative effects on golden eagle habitats when considered with actions on other lands and the travel management direction. Cumulative effects of combined activities of Alternative 1 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in a decline of golden eagle habitat quality and the amount of suitable nesting and foraging habitats on BLM-administered lands. This expected decline would be due to high amounts of open year-round travel routes within close proximity (less than 1/8 mile) of all active nest sites, providing close and easy motorized access to the Deschutes River canyon and the associated nest sites, allowing cross-country travel by all trail users and the continued uncontrolled development and use of trails near all active nest sites. The lack of vegetation management, particularly the thinning of young juniper from shrub-steppe and old growth woodlands, would continue to limit foraging opportunities near nest sites and across the planning area.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the security of all active nest sites and increasing the amount of suitable foraging habitat on BLM-administered lands. This improvement would be due to a reduction in potential disturbances within ½ mile of nest sites by locating most trails farther than ½ mile from nests, implementing seasonal closures of trails within ¼ to ½ mile of the nests, decreasing the overall amount of travel routes within ½ mile of nests, limiting motorized, equestrian and mountain bike travel to designated routes and limiting pedestrian travel to designated travel routes seasonally. Also, the proposed vegetation management activities would improve the quality and increase the amount of suitable foraging habitats in the planning area.

Table 87: Miles of Roads within ½ Mile of Golden Eagle Nests on Private, State and County lands within and Immediately Adjacent to the Planning Area

Golden Eagles	Within ½ Mile of Nests	Within ¼ Mile of Nests
Entire Planning Area	17.66	3.97
Secondary	1.05	0
Primary	9.8	2.44
General	6.82	1.53

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the security of active nest sites and increasing the amount of suitable foraging habitat on BLM administered lands. This improvement would be due to a reduction in potential disturbances within ½ mile of nest sites by locating some trails over ½ mile away from nests, implementing seasonal closures of trails within ¼ to ½ mile of the nests, decreasing the overall amount of travel routes within ½ mile of nests and limiting motorized, equestrian and mountain bike travel to designated routes. Alternative 3 would limit motorized access near the Deschutes River by locating the trailheads areas farther from the river to eliminate close access which would reduce the number of visitors travelling to the canyon. Also, the proposed vegetation management activities would improve the quality and increase the amount of foraging habitats in the planning area.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the security of active nest sites and increasing the amount of suitable foraging habitat on BLM-administered lands. This expected improvement would be due to a reduction in potential disturbances within ½ mile of nest sites by locating some trails over ½ mile from nests, implementing seasonal closures of trails within ¼ to ½ mile of the nests, decreasing the overall amount of travel routes within ½ mile of nests, locating three trailheads away from eagle nest sites and limiting motorized, equestrian and mountain bike travel to designated routes. Also, the proposed vegetation management activities would improve the quality and increase the amount of foraging habitats in the planning area.

Prairie Falcons

Travel Routes

All action alternatives would seasonally close all travel routes within close proximity to or within the direct line of sight of prairie falcon nests with the exception of the Deschutes River South nest. All alternatives would allow a trail to be open year round that is located along side the Deschutes River and immediately under the Deschutes River South nest. The Deschutes River North nest also would have a portion of a trail open year round within ¼ mile of the nest, however, the trail segment that passes immediately next to the nest would be seasonally closed and the segment that is open would direct hikers away from the nest site. Because of the Deschutes Canyon's steep terrain, trails below the nests could not be located ¼ mile away.

Alternative 3 would limit motorized access near the Deschutes River by locating the trailheads areas farther from the river to eliminate close access which would reduce the number of visitors traveling to the canyon. Common to all action alternatives, the trail passing by the two falcon nests in Fryrear Canyon would be closed seasonally, while another trail within ¼ mile would be open year-round. The trail open year round, however, is located on the opposite side of a hill and out of sight of the nest.

Of all alternatives, Alternative 2 provides the lowest amount of travel routes within ¼ mile of all falcon nests within the planning area, and Alternative 1 would provide the highest. All action alternatives would seasonally close 2.05 miles of travel routes within ¼ mile of nests and reduce the overall miles of travel routes by at least 2.8 miles. For the planning area, all action alternatives would reduce the overall miles of travel routes within ¼ mile by 3.75 miles and reduce the miles of open routes during nesting season by at least 4.86 miles. Of the action alternatives, Alternative 2 would provide the lowest amount (2.42 miles) of travel routes open during nesting and Alternative 4 would provide the highest

(3.36 miles). Alternative 2 would consistently provide the lowest amount of travel routes open during nesting season within each wildlife emphasis area, while Alternative 4 would consistently provide the highest in each area. Alternatives 2 and 3 would not locate any trail above a falcon nest while Alternatives 1 and 4 would. Also, Alternative 2 would limit pedestrians seasonally to designated travel routes with no cross country travel permitted near falcon nests to further protect nesting birds. Miles of travel routes located within ¼ mile of falcon nests for each alternative are displayed in tables 89, 90 and 91. There are no known falcon nests located in the General Wildlife Emphasis Area.

Of the action alternatives, Alternative 3 would likely limit the number of people traveling to the Deschutes River and associated falcon nests most by locating the two trailheads in the Maston Allotment farther from the Deschutes River Canyon. These trailhead locations would require people to park their vehicles and travel over 1.5 miles to reach the Deschutes River and canyon area, which could decrease the amount of people traveling in close proximity of the falcon nests during the breeding season. This is especially important for the southern area where there are no seasonal closures on the

Table 88: BLM Travel Routes within ¼ Mile of Prairie Falcon Nests, Entire CBRA

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	0.74	0.74	0.74	0.74
Non-motorized Routes	7.48	3.73	3.83	4.67
Total	8.22	4.47	4.57	5.41
Seasonally Closed	0	2.05	2.05	2.05
Open during nesting	8.22	2.42	2.52	3.36

Table 89: BLM Travel Routes within ¼ mile of Prairie Falcon Nests, Primary Wildlife Emphasis Area

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	0.74	0.74	0.74	0.74
Non-motorized Routes	5.59	2.48	2.62	2.77
Total	6.33	3.22	3.36	3.51
Seasonally Closed	0	1.36	1.36	1.36
Open during nesting	6.33	1.86	2	2.15

Table 90: BLM Travel Routes within ¼ Mile of Prairie Falcon Nests, Secondary Wildlife Emphasis Area

Travel type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Motorized Routes	0	0	0	0
Non-motorized Routes	1.9	1.25	1.21	1.9
Total	1.9	1.25	1.21	1.9
Seasonally Closed	0	0.69	0.69	0.69
Open during nesting	1.9	.56	0.52	1.21

trails located below the nest site. Alternative 4 would provide the closest access points (trailheads) to the Deschutes River and associated falcon nest sites. While there would be some seasonal trail closures to minimize human disturbances to the falcons, the greater number of people visiting the area could increase the amount of disturbance to the falcons, especially the southern nest site where there are no seasonal closures for the trail located below the nest site. Also, alternatives 3 and 4 would allow pedestrian travel off of designated trails and therefore provide people the opportunity to walk along the canyon rim and above falcon nests. Alternative 2 would locate the northern, red-cindered road trailhead, adjacent to Cline Falls Highway and farther (over 1.5 mi) from the Deschutes River, but would locate the southern, Newcomb Road, trailhead within a short (approximately 0.25 mi) walk of the river and providing for easier visitation by the public. However, within falcon nesting areas, Alternative 2 would seasonally limit pedestrians to designated routes during the nesting season so people would not be allowed to hike off-trail and along the canyon rim above the nests.

Rights of Way

Common to all action alternatives, there are no proposed ROWs within a ¼ mile of prairie falcon nests.

Cumulative Effects

The BLM manages 75 percent (408 acres) of the habitat within ¼ mile of all falcon nests within the planning area. There are an additional 138 acres of private lands within ¼ mile of these falcon nests sites within and immediately adjacent to the planning area. Approximately 51 percent (71 acres) of private land within ¼ mile of nests is native habitat (43 acres shrub-steppe, 10 acres juniper woodlands and 18 acres riparian) and 49 percent has been converted for human uses (63 acres agriculture and 4 acres urban). Agriculture land sometimes provides suitable foraging habitat for prairie falcons.

Alternative 1 currently provides 0.74 miles of ROWs within ¼ mile of prairie falcon nests and there are no proposed ROWs in the action alternatives. The ROW occurs in the Primary Wildlife Area and approximately 1/8 mile away from the rim of the canyon and nest.

Two of the nests located along the Deschutes River Canyon have houses within ¼ mile. One of these homes is located on a private parcel where the owners have recently submitted to the county for a parcel re-adjustment to allow for the construction of two additional homes. Based on the proposed lot adjustment, the other parcels will be closer to the nest than the existing house. The canyon rim is a common location for homes to be built to view the Deschutes River Canyon.

On private, State and County lands within and immediately adjacent to the planning area there are an additional 1.6 miles of travel routes within ¼ mile of falcon nests. All of these travel routes are located adjacent to the BLM primary wildlife emphasis area. The BLM administers all lands within ¼ mile of the Fryrear Canyon nests, which are in the secondary wildlife emphasis area.

Alternative 1 would have the greatest potential for adverse cumulative effects on prairie falcon habitats when considered with actions on other lands and the proposed travel management direction. Potential cumulative effects of Alternative 1 would be expected to result in a decline in prairie falcon habitat quality and the number of suitable nesting sites. This decline would primarily result from having high amounts of open travel routes within ¼ mile of nest sites, providing close and easy recreational access to the river canyon and the associated nest sites, allowing cross-country travel and the continued uncontrolled development and use of trails near and above nest sites. The lack of vegetation management would contribute to a continuing decline in suitable foraging habitat over time.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the security of all active nest sites and increasing the amount of suitable foraging habitat. This expected improvement would be due to a reduction in potential disturbances within ¼ mile of nest sites by locating most trails over ¼ mile from nests, implementing seasonal closures of trails within ¼ mile of the nests, decreasing the overall amount of travel routes within ¼ mile of nests, limiting motorized, equestrian and mountain bike travel to designated routes and limiting pedestrian travel to designated travel routes seasonally. Also, the proposed vegetation management activities would improve the quality and increase the amount of suitable foraging habitats in the planning area.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the security of active nest sites and increasing the amount of suitable foraging habitat. This expected improvement would be due to a reduction in potential disturbances within ¼ mile of nest sites by locating some trails over ¼ mile from nests, implementing seasonal closures of trails within ¼ mile of the nests, decreasing the overall amount of travel routes within ¼ mile of nests, locating two trailheads farther from the river, and limiting motorized, equestrian and mountain bike travel to designated routes. Also, the proposed vegetation management activities would improve the quality and increase the amount of foraging habitats in the planning area.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the security of active nest sites and increasing the amount of suitable foraging habitat. This expected improvement would be due to a reduction in potential disturbances within ¼ mile of nest sites by locating some trails over ¼ mile from nests, implementing seasonal closures of trails within ¼ mile of the nests, decreasing the overall amount of travel routes within ½ mile of nests, and limiting motorized, equestrian and mountain bike travel to designated routes. Also, the proposed vegetation management activities would improve the quality and increase the amount of foraging habitats in the planning area.

Old Growth Juniper Woodlands

Travel Management

Table 91 displays the Route Influence Index for each alternative by wildlife emphasis area, and is further broken down by route jurisdiction. All action alternatives lower the influence of BLM travel routes by at least 10 percent. Alternative 1 would provide the highest levels of human influence due to travel routes. Alternative 4 would provide the lowest route influence (35.7 percent) for the entire planning area and in the Deep Canyon area (29.44%). Route influences in the Deep Canyon Area decreases by 24 percent with Alternative 4 in comparison to Alternative 1, and would provide the lowest level of human influence of 36.2 percent in the General Emphasis area. Alternative 3 would provide the highest (37.9 percent) level of human influence and Alternative 2 would provide the lowest in the Primary and Secondary Emphasis areas.

Rights of Way

Common to all action alternatives there would be an increase in ROWs miles ranging from 5.88 to 7.31. Alternative 2 and 3 would both provide the highest amount (21.35) of miles while Alternative 4 would provide the lowest amount (19.92). ROWs in the Primary Wildlife Emphasis Area would be consistent for all action alternatives at 5.06 miles. Alternative 3 would provide the highest amount (15.56 miles) in the General Wildlife Emphasis Area and the lowest amount (1.33) by 0.3 mile in the Secondary Wildlife Emphasis Area. Miles of ROWs per alternative and Wildlife Emphasis Area are displayed in Table 92.

Table 91: Old Growth Juniper Woodland Route Influence Index

Route Jurisdiction	Geographic Area	Alternative 1 / No Action	Alternative 2	Alternative 3	Alternative 4
BLM Routes	Entire	Mod (48.50%)	Mod (36.81%)	Mod (37.97%)	Mod (35.27%)
	Primary	Mod (44.99%)	Mod (30.72%)	Mod (35.10%)	Mod (33.98%)
	Secondary	Mod (46.11%)	Mod (30.30%)	Mod (32.31%)	Mod (31.71%)
	General	Mod (49.84%)	Mod (39.59%)	Mod (39.77%)	Mod (36.27%)
	Deep Canyon	High (53.42%)	Mod (32.54%)	Mod (33.72%)	Low (29.44%)
State and County	Entire	Low (5.33%)	Low (5.33%)	Low (5.33%)	Low (5.33%)
	Primary	Low (3.85%)	Low (3.85%)	Low (3.85%)	Low (3.85%)
	Secondary	Low (3.38%)	Low (3.38%)	Low (3.38%)	Low (3.38%)
	General	Low (6.08%)	Low (6.08%)	Low (6.08%)	Low (6.08%)
	Deep Canyon	Low (9.81%)	Low (9.81%)	Low (9.81%)	Low (9.81%)
State, County and BLM	Entire	High (50.55%)	Mod (39.96%)	Mod (41.26%)	Mod (38.84%)
	Primary	Mod (46.94%)	Mod (33.00%)	Mod (37.35%)	Mod (36.42%)
	Secondary	Mod (46.77%)	Mod (32.88%)	Mod (34.89%)	Mod (34.22%)
	General	High (52.18%)	Mod (43.07%)	Mod (43.47%)	Mod (40.34%)
	Deep Canyon	High (55.70%)	Mod (39.36%)	Mod (43.12%)	Mod (36.73%)

Table 92: Rights of Ways in Old Growth Juniper Woodlands (miles)

Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Entire project	14.04	21.35	21.35	19.92
Primary	3.63	5.06	5.06	5.06
Secondary	0.81	1.67	1.33	1.67
General	9.6	14.62	15.56	13.19
Deep Canyon	NA	0.51	0.76	0.5

Vegetation Management

Alternative 1 would maintain current conditions of old growth juniper woodlands which are in a declining state of ecological health due to the increasing number of young juniper and unrestricted human travel. The proposed action, which is common to all action alternatives, would allow for the thinning of young juniper within 20,273 acres of old growth woodlands to reduce the competition, increase plant and animal species diversity and help maintain and improve ecological health. Also, common to all action alternatives, there would be an effort to restore heavily impacted areas to reduce the amount and distribution of cheatgrass which should help maintain and improve the ecological condition of the woodlands.

Cumulative Effects

There are 35,031 acres of private land within and immediately adjacent to (within one mile) the CBRA. The native vegetation has been changed on 39 percent (five percent urban and 34 percent agriculture) of the private land within the analysis area. Native habitat comprises 61 percent of private land (47 percent juniper woodlands and 14 percent shrub-steppe). Route influence is high on shrub-steppe, urban, and riparian lands. Moderate route influence is present in the juniper woodlands and agriculture lands. Table 93 displays the route influence index on private lands by cover type. State and County travel routes would provide an additional 12.62 miles of routes in the entire planning area for all alternatives.

Table 93: Travel Route Influence Index of Private Land within One Mile of the CBRA

	Cover Type				
	Shrub-Steppe	**Juniper woodlands**	**Agriculture**	**Urban**	**Riparian**
Acres	4845.12	16457.05	11837.27	1619.58	271.68
Rating	High (50.75%)	Mod (47%)	Mod (33%)	High (81.41%)	High (62.74%)

Alternative 1 would have the greatest potential for adverse cumulative effects on old growth juniper woodlands when considered with actions on other lands, the travel management direction, and the lack of vegetation management. Potential cumulative effects of Alternative 1 would be expected to result in a decline in ecological health of old growth juniper woodlands. This would primarily result from the high amounts of open travel routes and continued cross-country travel that fragment the habitat and assist in spreading weeds. Also, the increasing amount of young juniper and the lack of habitat restoration treatments would contribute to a decline in the ecological condition of old growth juniper woodlands.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the health of older juniper trees and the overall condition of the old growth woodland habitats. This result would be expected due to the proposed thinning of up to 95 young juniper trees per acre within old growth juniper woodlands across the planning area. Decreasing the density of travel routes and limiting trail riders (motorized and non-motorized travelers) to a designated trail system would also contribute to the improved condition of old growth juniper woodlands by decreasing human travel route influence, habitat fragmentation, and spread of weeds, and increase patch sizes of old growth juniper habitat. A notable decrease in route influence would be most evident in the Primary Wildlife Emphasis Area where the travel management plan would result in a 14 percent decrease. A decrease would also be especially noticeable in the Secondary Wildlife Emphasis Area where route influence would decrease by 21 percent.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the health of older juniper trees and the overall condition of the old growth woodland habitats. This result would be expected due to thinning up to 95 young juniper trees per acre within old growth juniper woodlands across the entire planning area. Decreasing the density of travel routes and limiting trail riders (motorized and non-motorized travelers) to a designated trail system would also contribute to the improved condition of old growth juniper woodlands by decreasing human travel route influence, habitat fragmentation, and the spread of weeds, and increase patch sizes of old growth juniper habitat. A notable decrease in route influence would be most evident in the Secondary Wildlife Emphasis Area where the travel management plan would result in a 14 percent decrease. A decrease would also be especially noticeable in the Deep Canyon where route influence would decrease by 20 percent.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the health of older juniper trees and the overall condition of the old growth woodland habitats. This result would be expected due to thinning of up to 95 young juniper trees per acre within old growth juniper woodlands across the planning area. Decreasing the density of travel routes and limiting trail

riders (motorized and non-motorized travelers) to a designated trail system would also contribute to improved conditions of old growth juniper woodlands by decreasing human travel route influence, habitat fragmentation, and spread of weeds, and increase patch sizes of old growth juniper habitat. A notable decrease in route influence would be most evident in the Deep Canyon where the travel management plan would result in a 24 percent decrease. A decrease would also be especially noticeable in the Secondary Wildlife Emphasis Area where route influence would decrease by 15 percent.

Shrub-Steppe Habitats

Travel Management

All action alternatives would decrease the amount of route influence on BLM administered lands by a minimum of 1.34 percent and 4.47 percent maximum. Alternative 3 would provide the lowest amount (39.2 percent) of route influence across the entire planning area and Alternative 4 would provide the highest (42.33 percent). Alternative 2 would provide a decrease in route influence in all wildlife emphasis areas while Alternative 3 would increase route influence in the Primary Wildlife Emphasis Area by 0.39 percent and Alternative 4 would increase route influence by 0.69 percent in the Secondary Wildlife Emphasis Area. However, Alternative 4 would have the greatest impact in the Primary Wildlife Emphasis Area by decreasing route influence by 3.21 percent; 3.06 percent more than Alternative 2. In the General Wildlife Emphasis Area, Alternative 2 would provide the lowest route influence (38.90 percent) and Alternative 4 would provide the highest (42.22 percent). The route influence index for each alternative is displayed in Table 94 by wildlife emphasis area and route jurisdiction.

Table 94: Shrub-Steppe Route Influence Index

Route Jurisdiction	Geographic Area	Alternative 1 / No Action	Alternative 2	Alternative 3	Alternative 4
State and County	Entire	Low (6.44%)	Low (6.44%)	Low (6.44%)	Low (6.44%)
	Primary	Low (18.52%)	Low (18.52%)	Low (18.52%)	Low (18.52%)
	Secondary	Low (4.73%)	Low (4.73%)	Low (4.73%)	Low (4.73%)
	General	Low (6.14%)	Low (6.14%)	Low (6.14%)	Low (6.14%)
	Deep Canyon	Low (5.71%)	Low (5.71%)	Low (5.71%)	Low (5.71%)
BLM Routes	Entire	Mod (43.67%)	Mod (39.38%)	Mod (39.20%)	Mod (42.33%)
	Primary	Mod (38.22%)	Mod (38.07%)	Mod (38.61%)	Mod (35.01%)
	Secondary	Mod (44.48%)	Mod (42.73%)	Low (24.96%)	Mod (45.17%)
	General	Mod (43.80%)	Mod (38.90%)	Mod (41.55%)	Mod (42.22%)
	Deep Canyon	Mod (35.50%)	Low (28.42%)	Mod (40.99%)	Mod (40.42%)
State, County and BLM	Entire	Mod (47.15%)	Mod (43.56%)	Mod (42.67%)	Mod (46.64%)
	Primary	High (51.36%)	Mod (46.94%)	Mod (47.22%)	Mod (43.94%)
	Secondary	Mod (48.28%)	Mod (46.78%)	Low (29.67%)	Mod (48.70%)
	General	Mod (46.77%)	Mod (42.87%)	Mod (45.54%)	Mod (46.44%)
	Deep Canyon	Mod (39.80%)	Mod (32.98%)	Mod (45.30%)	Mod (45.20%)

Rights-of-Ways

Miles of ROWs proposed in the Shrub-steppe habitat are displayed for each alternative by wildlife emphasis area in Table 95. All action alternatives would increase the miles of ROWs in shrub-steppe habitat within the planning unit. Of the action alternatives, Alternative 2 would provide the lowest amount (7.28) of miles and Alternative 3 would provide the highest (9.02) in the entire planning area. ROWs would consistently increase by 0.11 miles in the Primary Wildlife Area for all action alternatives. In the Secondary Wildlife Emphasis Area, Alternative 3 would provide no change while Alternative 2 and 4 would increase mileage by a minimal 0.05 miles. The General Wildlife Emphasis Area would receive the greatest the impact of proposed ROWs by an increase of at least 2.84 miles in Alternative 2 and Alternative 3 would increase the miles the most by 4.63 miles**.**

Table 95: Rights of Way in Shrub-steppe Habitats (miles)

Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Entire project	4.28	7.28	9.02	8.2
Primary	0	0.11	0.11	0.11
Secondary	0.51	0.56	0.51	0.56
General	3.77	6.61	8.4	7.53
Deep Canyon	1.17	1.53	1.8	1.36

Vegetation Management

Alternative 1 would provide no change and therefore allow 76 percent of the shrub-steppe habitat to be converted into juniper woodlands. It would also allow for the continued spread of young juniper into the remaining 24 percent of shrub-steppe habitat not currently occupied by young juniper and the associated conversion of that shrub-steppe habitat into juniper woodlands. The action alternatives would maintain and increase the amount of existing shrub-steppe (acres) and improve ecological health by thinning up to 104 young juniper trees per acre on 8,487 acres of shrub-steppe habitat that is currently dominated by juniper woodlands.

Thinning young juniper from shrub-steppe habitats would decrease the amount (acres) of available habitat for species associated with juniper woodlands, but this action would benefit species that use shrub-steppe habitats.

Cumulative Effects

There are 35,031 acres of private land within and immediately adjacent to (within one mile) the Cline Buttes project area. Sixty one percent (21,573.85 acres) of the private land acres have remained as native habitat; shrub-steppe contributes 14 percent (4,845 acres) to this total and juniper woodlands contribute 34 percent (11,837 acres). Non-native habitat includes 5 percent (1,619.58 acres) of urban development and 34 percent (11,837.27 acres) of agriculture land (see Table 93). The overall route influence on these private lands is moderate to high. Route influence is high in shrub-steppe, urban and riparian areas. Agriculture and juniper woodlands have a moderate route influence. State and County travel motorized travel routes would provide an additional 9.38 miles of routes in the planning area for all alternatives.

Alternative 1 would have the greatest potential for adverse cumulative effects on shrub-steppe habitats when considered with actions on other lands, the travel management direction, and the lack of vegetation

management. Potential cumulative effects of Alternative 1 would be expected to result in a decline in the amount and ecological condition of shrub-steppe habitats. This would primarily result from the high amounts of open travel routes and continued cross-country travel that fragment the habitat and assist in spreading weeds. The increasing amount of young juniper and the lack of habitat restoration treatments would also contribute to a decline in the ecological condition of shrub-steppe habitats.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the ecological condition and increasing the amount (acres) of shrub-steppe habitats on BLM-administered lands. This result is expected due to thinning up to 104 young juniper trees per acre in juniper dominated shrub-steppe habitats and reducing the spread of young juniper into existing shrub-steppe habitats across the planning area. Additional benefits on shrub-steppe should come from decreasing the density of travel routes and limiting trail riders (motorized and non-motorized travelers) to a designated trail system which would decrease habitat fragmentation and the amount of human influence, and increase patch sizes of shrub-steppe habitat. The most noticeable change would occur in the Deep Canyon area with a 6.82 percent decrease in route influence, where the most of the area currently consists of shrub-steppe habitats.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the ecological condition and increasing the amount of shrub-steppe habitats on BLM-administered lands. This result is expected due to thinning up to 104 young juniper trees per acre from juniper dominated shrub-steppe habitat and reducing the spread of young juniper into existing shrub-steppe habitats across the planning area. Additional contribution to the expected benefits on shrub-steppe would come from decreasing the density of travel routes and limiting trail riders (motorized and non-motorized travelers) to a designated trail system routes which would decrease habitat fragmentation and the amount of human influence, and increase patch sizes of shrub-steppe habitats. The most noticeable change would occur in the Secondary Wildlife Emphasis area with an 18.61 percent decrease in route influence.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the ecological condition, and increasing the amount of shrub-steppe habitats on BLM administered lands. This result is expected due to thinning up to 104 young juniper trees per acre from within juniper dominated shrub-steppe habitats and reducing the spread of young juniper into existing shrub-steppe habitats across the planning area. Additional benefits for shrub-steppe habitats would come from decreasing the density of travel routes and limiting trail riders (motorized and non-motorized travelers) to a designated trail system which would decrease habitat fragmentation and the amount of human influence, and increase patch sizes of shrub-steppe habitats. The most noticeable change would occur in the Primary Wildlife Emphasis area with a 7.42 percent decrease in route influence.

Riparian

Vegetation Management

Two miles of the Deschutes River occur within the Cline Buttes project area on BLM administered lands. Over 50 percent of the riparian area currently has young juniper encroaching upon riparian vegetation. Alternative 1 would propose no change to current conditions which would allow the

continued encroachment of juniper in riparian areas leading to a decrease in shrub and other woody plant composition and a decline in ecological condition of the habitats. The proposed vegetation management, which is common to all action alternatives, would thin encroaching young juniper trees in order to maintain and improve the woody plant composition and riparian vegetation diversity and the overall ecological condition of the riparian habitats.

Cumulative Effects

There are 6 miles of the Deschutes River located along private lands within and immediately adjacent to the planning area. Approximately 33 percent of this area has young juniper encroaching upon the riparian zone.

The Deschutes River is a popular destination for people hiking year-round, fishing seasonally and playing in the water during the summer. Most of the river in the analysis area likely has hiking trails along its edge. For example, Eagle Crest Resort has a trail on most of their land along the Deschutes River and people travel from there down to the BLM.

Alternative 1 would have the greatest potential for adverse cumulative effects on riparian habitats when considered with actions on other lands, the lack of vegetation management and the continued unmanaged human travel within the riparian zone. Potential cumulative effects of Alternative 1 would be expected to result in a decline in shrub and other woody plants and the overall decline in ecological condition of riparian habitats. This would primarily result from the continued encroachment of young juniper, but the lack of an organized trail system would also allow unnecessary trampling of riparian vegetation.

Cumulative effects of combined activities of the Action Alternatives (2, 3 and 4) on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving the ecological condition and increasing the health, vigor and composition of the shrub and other woody plants within the river riparian zone. This result is expected due to thinning of young juniper trees that are growing within or immediately adjacent to the riparian areas. Additional benefits on riparian vegetation should come from decreasing the density of travel routes within the Deschutes River Canyon and limiting trail use to pedestrian only.

4.11 Transportation and Rights of Way

The following assumptions were used in the analysis of effects for transportation and ROWs for the CBRA alternatives:

- Traffic generated by trailheads is a minor addition to traffic volumes on local roads. Based on visitor counts and observations over the past decade, the most popular BLM trailheads in Central Oregon generally receive about 12 vehicles at any one time during peak use periods. Twenty vehicles is a typical maximum for these types of trailheads. Levels of use vary depending on the day of the week and season, and whether organized group use is occurring in an area.
- ROWs that have been granted in the CBRA are not exclusive use and have been used by the public without restriction in the past. ROW holders do not have an expectation that use or maintenance of ROW roads is based on their exclusive use.

Rights of Way

Alternative 1

Private Property Access

No ROW grants would be issued under the No Action alternative. This would result in an unmet demand for legal access to several private parcels along State Highway 126, most notably parcels 41 and 42, which have pending applications for ROW grants.

ROW Use and Maintenance

Alternative 1 would place the highest amount of motorized public use on ROW roads, and therefore would have the most frequent conflicts as more people would use these roads for recreation and public land access. This potentially would increase maintenance needs and conflicts with the ROW holders. Alternative 1 would not promote the public use of ROW roads, as designated trailheads would not be constructed in the CBRA and dispersed access throughout the CBRA would continue.

Alternative 1 would provide the greatest level of motor vehicle access to the Buttes. Conflicts over dust and truck traffic on the Cline Buttes Rock Pit Road would continue, due to the authorized truck traffic on this gravel ROW road and its proximity to Eagle Crest Resort.

Alternatives 2 - 4

All action alternatives provide legal access for private parcels that depend on roads crossing the CBRA and include all reasonably foreseeable future road ROW requests.

All action alternatives decrease public motorized use of ROW roads, providing an overall reduction in use or maintenance conflicts (see Recreation section). This would be accomplished in an adaptive manner, generally using signs but installing gates when necessary. BLM would work with affected ROW holders in gate placement and design to minimize effects to property owners. BLM would assume maintenance responsibility for homeowner maintained ROW roads that lead to designated trailheads, thus minimizing the effects on ROW holders. While all action alternatives would increase public use of the Cline Buttes Rock Pit Road (for access to the Buttes Trailhead), this use would be restricted to single vehicles without trailers.

All action alternatives provide designated trails within some of the mineral material sites in the CBRA. For material sites that are actively used, trails may be temporarily closed to avoid impacts to previously authorized material site use. For those sites not actively used, public use on designated trails, would not affect the future use of these sites.

All action alternatives provide for continued motor vehicle use in the Buckhorn Canyon mining claim. The designated trails would be located away from the active mine site and would decrease conflicts, reduce the potential for vandalism and material disturbance.

All action alternatives would make minor alignment changes in certain ROW roads to improve sight distance or intersection geometry, based on input from ODOT and Deschutes County Road Department during the planning process.

Alternative 2
Alternative 2 will increase public motor vehicle use of the Newcomb Road ROW which is located east of the County maintained road. This road is currently used by the public to access the Deschutes River. The location of a small designated trailhead at the east end of the ROW road may increase its use by the public. To mitigate the effects on homeowners that maintain this route, BLM would assume maintenance responsibility for the non-County portion of this road.

Alternative 2 decreases full size vehicle access to the Buttes and would reduce effects to the FAA navigation site on the south butte and the communication site on the middle butte.

Alternative 4
Alternative 4 would place the largest amount of public motor vehicle use on homeowner maintained ROW roads due to the location of trailheads at the east end of the red cinder road and Newcomb Road. This alternative would also designate the communication site ROW road on the buttes as a motorized trail. BLM would mitigate these effects by assuming maintenance of these roads.

Cumulative Effects
The new development of Thornburgh Resort, and continued development of Eagle Crest Phase 3 will increase traffic on the Eagle Boulevard ROW road. The traffic volumes on Eagle Boulevard going to the proposed Cascade View trailhead are expected to be minor, compared to the traffic generated by the destination resorts. The trailhead is proposed at the lower elevation, flatter portion of Eagle Boulevard to minimize traffic impacts. Intersection improvements done as a result of Eagle Crest and Thornburgh Resort approvals have mitigated any effects on ingress/egress from State Highway 126 at Eagle Boulevard.

The combined effect of increased transportation on ROW roads on the Buttes due to resort development and increased use of the buttes from trail development was addressed in both the Deschutes County Conditions of Approval for Thornburgh Resort and the ROW grant stipulations for both Thornburgh and Eagle Crest Resorts. Mitigations included in these decisions include trailhead development, placement and maintenance of signs for designated trail crossings on ROW roads, and closure of undesignated routes

Transportation

Alternative 1

Administrative Access
Alternative 1 does not rectify administrative access issues, such as lack of legal access for administrative access into Buckhorn Canyon or the Deep Canyon areas. As development occurs on many private inholdings in the CBRA, administrative access issues would increase without easements or alternate routes. Alternative 1 does provide the best network of administrative access routes with the dense network of both designated and non-designated routes.

State and County Roads
Alternative 1 does not relocate or consolidate access points or intersections between routes on BLM administered lands and public roads. Problems with public ingress/egress from State Highway 126 (Deep Canyon portion) would continue to occur and likely get worse under Alternative 1. Increased traffic volumes on Cline Falls Highway and on the red cinder road (ROW 21, Map 5) will exacerbate

traffic hazards at this poorly sited intersection. The poor intersection location at the existing Fryrear Trailhead would continue to be an issue as vehicles with trailers pull out of the trailhead onto a sweeping corner on Fryrear Road.

The CBRA would see increased traffic levels over time as more people learn about the area, but the use would be very small in comparison to traffic loads already occurring on State or County Roads. It is not expected that traffic volumes due to CBRA visitation under Alternative 1 would increase the demand for State or County road improvements.

Alternative 1 does result in greater likelihood of OHV use on Barr Road, which is a common occurrence between State Highway 126 and the existing Barr Road cinder pit material site.

Alternatives 2 -4

Administrative Access

All Action Alternatives provide for needed administrative access to the CBRA. In locations where legal road access is not available (e.g., Deep Canyon south of State Highway 126 and Buckhorn Canyon) and where access can be achieved through construction of short stretches of road, each action alternative provides for future administrative access if easements can't be obtained.

For all action alternatives, the designation of a transportation system with accompanying maintenance levels, and the closure of undesignated routes, will create a more orderly and maintained road system. For all action alternatives, an increased use of vehicles, other than full size trucks, will be required to maintain trails and provide administration of the area. All action alternatives increase the need for BLM to communicate with ROW holders, including utility companies, to provide ROW access through locked administrative access gates.

State and County Roads

While all action alternatives may concentrate ingress/egress at specific designated trailhead locations, the effect on local roads is relatively minor due to the low volume of traffic generated at trailheads, and by locating major trailheads off of well maintained County or State Roads. For the Buttes Area, both proposed trailheads are located off heavily used, improved ROW roads. Entry points to trailheads and trail crossings with public roads have been located and designed to minimize transportation impacts, including:

- Clearing of trees within the public road ROW adjacent to intersections to open sight lines and make ingress/egress safer;
- Minimizing grade changes between access roads and public roads to allow easier transition on and off public roads;
- Locating intersections at approved locations, based on field reviews by Deschutes County Road Department and ODOT during CBRA plan development;
- Closing the Juniper Trailhead to equestrian use/trailer parking to avoid having lengthy and slow moving vehicles entering and exiting Cline Falls Highway;
- Locating equestrian use and trailer parking at the Cascade View Trailhead, instead of the Buttes Trailhead, to avoid having lengthy and slow moving vehicles turning on and off the Cline Buttes Rock Pit Road and Cline Falls Highway; and
- Relocating the existing Cline Falls Highway/red cinder road intersection to provide better sight distance and intersection alignment with the Cline Buttes Rock Pit Road.

Each action alternative provides a wide variety of trailhead locations. By providing a dispersed selection of trailheads, recreation use would be better distributed throughout the area, thus limiting the traffic loads at each individual trailhead.

All action alternatives located trailheads at the edge of the CBRA on the north and south ends of Barr Road and the south end of Buckhorn Road. These locations mirror places that receive a high amount of visitor parking. These trailheads are located to minimize the needs for upgrades to Barr Road or increase maintenance needs for Buckhorn Road.

All action alternatives allow for paving of the Cline Buttes Rock Pit Road, based on the ROW holder's request. The paving of this road would eliminate effects of dust caused by traffic to the rock pit and the increase in traffic due to the designation of the Buttes Trailhead.

Traffic conditions on Fryrear Road would be improved for all action alternatives by relocating the Fryrear Trailhead to a location with adequate sight distance that has been field reviewed by Deschutes County Road Department.

Alternatives 2, 3, and 4
Transportation effects do not vary significantly between action alternatives. Alternatives 2 and 4 locate ROW road connections to State Highway 126 at or near the bottom of Deep Canyon. Alternatives 2 and 4 rely on these connections to the State Highway, because they provide for much shorter road distances on BLM administered lands. Alternative 3 provides options for these ROW connections to the east of Deep Canyon, which offers better intersection and traffic safety conditions. In all cases, ROW grants issued by BLM would be dependent on authorized approach permits from ODOT.

Cumulative Effects
All action alternatives avoid routing traffic over the majority of Barr Road and thus do not encourage improvements to this road. In addition, all action alternatives propose to fence Barr Road and eliminate its use as a high speed OHV route to the cinder pit material site. CBRA implementation would increase traffic for very short distances (approximately 1/8 mile) on the north and south end of Barr Road. The overall contribution to Barr Road traffic would be minor, in comparison to the traffic generated periodically by the proposed Site N rock quarry.

BLM received an August 2008 request for a transfer of lands known as the Barr Road Quarry (Site N) from the BLM to the Federal Highway Administration. The purpose of the transfer is for use of the site by ODOT as a hard rock quarry site on approximately 105.18 acres of land. As stated in the Revised Application for Title 23 Appropriation Barr Road Quarry (Site N), OR-09-127-4: "ODOT plans to add this 105.18-acre site to its network of material sites via federal land appropriation to allow for development of a long term source of high quality aggregate to be used for the construction, repair and maintenance of the State highway transportation system in this area. Due to the location of this source and the volume of high quality material available in this site, estimated at slightly more than 3 million cubic yards, ODOT would anticipate utilizing material from this site to meet the material needs of various current and future projects…"

According to ODOT, the site would not be in operation continuously. The duration of the site's use for a particular project depends on the size of the highway project. On a large project, crushing, batching and hauling activities may last 6 to 9 months. In between major projects, the site remains available for

other uses. According to ODOT a typical aggregate site is used for larger projects once every five to 10 years, but due to the strategic location of this site and the increasing demand for high quality aggregate materials in the Central Oregon area, this site may see more frequent use, and be sporadically used between major projects to meet the smaller material needs associated with maintenance activities. When in use, the site is expected to generate several hundred truck trips per day during the peak paving season. Barr Road would have minor improvements (blading) to improve the traveling surface for hauling. The route from Site N north to State Highway 126 is identified as the likely haul route.

The UDRMP provides guidance on development of mineral material sites (UDRMP, Pages 87 – 90). Any site development in Cline Buttes would be required to follow this direction, at a minimum. Additional stipulations or conditions might be included as part of Site N review and approval.

The analysis of transportation impacts assumes the following conditions and stipulations if Site N were authorized:

- The site is used at least once every five years for a major project.
- This use results in several hundred truck trips per day from the site during peak paving season.
- Peak paving season is assumed to be late spring and summer use.
- Truck traffic would be routed north on Barr Road, no truck traffic would be routed south towards the Tumalo Canal ACEC and Cline Falls Highway.
- ODOT would be required to make improvements to Barr Road, including relocation and grade improvements to the cattle guard at the BLM entry and widening of the improved surface of Barr Road to accommodate truck traffic and recreational traffic at the Barr North Trailhead. ODOT would conduct dust abatement on their material site and on Barr Road during all operations.
- Mineral extraction, processing, and equipment operation would be restricted to the hours of 7 am to 10 pm Monday through Friday.
- Operations at the mineral material would not be allowed on weekends (Saturdays and Sundays) or the following legal holidays: New Years Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, and Christmas Day.
- As a condition of approval, Barr Road would be fenced on both sides from the intersection of State Highway 126 south to the south boundary of Section 18
- Public motor vehicle access into the site from Barr Road would be closed with a gate as per BLM specifications, public access to Site N would occur from the Barr North Trailhead, not Barr Road.
- During periods of operation, information on Site N use would be posted at trailheads by ODOT.

The cumulative effect of the CBRA plan implementation and mineral material site operation would increase traffic on Barr Road periodically and at the Barr Road/State Highway 126 intersection. This may result in longer wait times for recreationists leaving the Barr North Trailhead when merging with truck traffic waiting to exit on the State Highway. Access to other trailheads is not expected to be impacted, as long as Site N traffic is not routed south on Barr Road. The effect on users of the Barr North trailhead would be minimized somewhat by the stated period of higher truck traffic, which is assumed to occur during seasons when paving is most easily done (i.e., not in the winter) and minimized by restricting mineral material site use on the weekends.

4.12 Range Management

Alternative 1 – No Action

Under the No Action alternative, no active vegetation management or development of new roads or trails would occur in the CBRA. Motorized use would be managed on the system identified in the UDRMP, with approximately 164 miles of route and 80 access points for motorized travel. No changes would be made to existing ROWs and use patterns would remain the same. The allotments within the planning area would continue to be grazed based on direction from the UDRMP. No fences would be moved, added, or removed; current use patterns related to recreation and travel would continue to affect allotments. No vegetation treatments would be conducted under the No Action Alternative and juniper encroachment would continue. Juniper encroachment, unmanaged access, and unmanaged non-motorized use would result in additional fragmentation and vegetation disturbance, resulting in compromised rangeland standards in some areas (see section 4.8, Shrub-Steppe Habitats).

Effects Common to Alternatives 2 – 4

Vegetation Management
Vegetation management proposed under alternatives 2-4 would reduce fuel loads and improve ecological condition in the planning area (see sections 4.4, Fire Management, and 4.8, Shrub-Steppe Habitats). Improved ecological condition results in greater site resiliency and higher annual production values. Healthy plant communities are less sensitive to livestock grazing and provide quality forage.

According to the UDRMP, "Prineville District BLM policy, based on the Emergency Fire Rehabilitation Handbook (BLM Manual Handbook H-1742-1), typically calls for exclusion of livestock grazing through the second full growing season after a fire" (p. 76). This would potentially effect grazing on a short-term basis in the planning area by limiting grazing for a season on a portion of an allotment or pasture. Project design features include a variety of tools for treatment area rest if prescribed broadcast burning is chosen as a management tool.

Transportation/Recreation and Rights of Way

All recreation/travel and right of way action alternatives would create a travel management system to manage recreation and travel use in the CBRA. As opposed to the no action alternative, all users except for pedestrians would be limited to designated roads and trails. Access to roads and trails would be limited to staging areas and trailheads. Reducing the number of access points and creating a designated trail system would help reduce the potential for gates to be left open during the grazing season and impacts from off-road vehicle use. Permittees were contacted to identify roads needed for administrative use to manage grazing on the allotments within the planning area. These roads were incorporated into the proposed travel management systems, thus eliminating effects to administrative use by grazing permittees. All action alternatives include road relocation to maintain permittee access into the Buckhorn Canyon allotment.

All action alternatives propose fence construction, removal, and relocation to reduce user conflicts, improve access management, and improve the cohesiveness of the allotments (see Maps 6 - 8). The action alternatives propose fencing both sides of Barr Road. The existing fence dividing the two pastures in the Cline Buttes Allotment would be removed. This would result in the west pasture

becoming larger and the east pasture becoming smaller. A small cross fence would go from the Barr Road fence to the existing fence on the northern boundary of the east pasture resulting in a small triangle of land at the north end of Barr Road being removed from grazing. The proposed fences along Barr Road would require far fewer access points to implement a travel management plan than would be required with the existing fence.

On the southern end of the eastern pasture in the Cline Buttes Allotment fencing of the Thornburgh Resort has created a small, narrow spot in the allotment. Under the action alternatives, the current allotment fence would be removed and the new southwest corner of the pasture would be where Barr Road crosses the fence along the private property border.

Under the action alternatives, the northwest portion of the Whiskey Still Allotment would be fenced and removed from grazing to decrease user conflicts in the interpretive trail portion of the Tumalo Canal ACEC. This is consistent with the direction outlined in the UDRMP (UDRMP, pg 67). This area is bordered on the north by the eastern pasture of the Cline Buttes Allotment, and on the west by Barr Road, and a new fence would be created along the southeast border of the core area adjacent to the relic canals. Appendix G of the UDRMP classifies the Whiskey Still Allotment to account for land taken out of active grazing for protection of the canal (see Table 53). This allotment is in the category where "Possible livestock grazing discontinued or RFA if the permit is voluntarily relinquished." The 31% represents an approximate percent of the allotment remaining open for grazing, based on potential placement of fencing around historic canal features associated with the Tumalo Canal. The proposed fencing in all action alternatives retains approximately 60 percent of the allotment for grazing.

The Maston Allotment is unfenced on portions of its boundary. Under all action alternatives a fence would be built along Newcomb Road on the southern end of the allotment. Two small pieces of the allotment south of Newcomb Road would be cut off from the main portion of the allotment as a result of the fence. Fence would also be built along the northern border of the allotment and in a few locations where control points are proposed to limit mechanized and equestrian trail access into the Deschutes River Canyon. As a result of these actions, much of the Maston Allotment boundary would be fenced. This new fencing would facilitate grazing within the allotment.

Cumulative Effects

Within the Cline Buttes Allotment, the proposed development of the Thornburgh Resort and fencing of the private land boundaries may isolate the eastern pasture into one section immediately south of Eagle Crest Phase 3, and a separate area east of Barr Road and west of the proposed Thornburgh Resort. The fragmentation of this eastern pasture by development and proposed fencing may increase the difficulty for managing livestock grazing on the buttes, although the reduction in motor vehicle access points and emphasis on designated, non-motorized use trails may help reduce the frequency of conflicts between public land users and grazing operations.

Chapter 5 - Consultation and Coordination

5.1 Public Involvement

Prior to the preparation of the EA, through direct mailing and follow-up presentations and workshops, the BLM solicited input from the public on the proposed project, and their views on impacts in connection with this project. The following methods were used to notify the public of the CBRA Plan and solicit input:

- Mailings to more than 1,500 individuals, agencies, and organizations
  - Regulatory and public agencies
  - Local landowners, including properties within 1/8 mile of the project boundary and all owners of private inholdings
  - UDRMP Mailing list
- On-site bulletin board and flyers
- Newspaper press releases (Bend, Redmond, and Prineville)
- Initial kick-off meeting, June 8, 2006
- Field Tours, July 30, August 1, 3, and 5th, 2006
- 2-day design workshop, September 16-17, 2006
- Roads and Trails Meeting, November 14, 2006
- Vegetation Management Meeting, November 16, 2006
- Planning information website and email comment inbox maintained throughout the planning effort.

The planning process has been characterized by a high degree of public interest, involvement and participation. Approximately 80 people attended the first public meeting, field trips were generally attended by about 20 people each, subsequent meetings generally attracted about 30 individuals, and the 2 day design workshop had approximately 70 participants.

BLM received comments from individuals regarding the draft concept plans, in addition to comments recorded at public meetings. A comment summary from the 2-day design workshop was posted on the BLM Prineville District Website throughout the planning process. Most of the comments fall into one of the following categories listed below:

1. Planning and Alternative Development
2. Off Highway Vehicles (in favor of)
3. Off Highway Vehicles (not in favor of)
4. Trail facilities (miles, types, locations)
5. Accessibility (river and buttes access, private land easements)
6. Staging areas/Trailheads (location, type, number of)
7. Separation of uses (separate different types of users, and separate use from private property)
8. Non-motorized trail needs
9. Need for Wildlife corridors, avoid seasonal closures through trail location
10. Need for enforcement
11. Issues regarding mining
12. Vegetation management

5.2 Agency Preparers

Name	**Contributions**	**Title**
Brooke Anderson	Range, Vegetation	Rangeland Management Specialist
Linda Christian	Writer/Editor	NEPA Coordinator
Jeff Goebel (USDA NRCS)	Facilitator	Watershed Planner
Keith Brown	Recreation	Recreation Planner
Steve Castillo	Forestry, Vegetation, Fuels	Forester
Steve Cohn	Coordination	Assistant Field Manager, Deschutes Resource Area
Greg Currie	Team Lead, VRM	Recreation Planner
Bill Dean	Wildlife, Vegetation	Wildlife Biologist
Kelly Esterbrook (USDA FS)	Fire/Fuels	Fuels Specialist
Dennis Fiore	Fire/Fuels	Fuels Specialist
Ron Halvorson	Botany, ACECs	Botanist
Ed Horn	Soils	Soil Scientist
Cassandra Hummel	Wildlife	Natural Resource Specialist
Michelle McSwain	Hydrology	Hydrologist
Jenni Moffitt	Vegetation, Range	Natural Resource Specialist
Teal Purrington	NEPA Coordinator, Writer/ Editor	Planning and Environmantal Coordinator
Dale Putman (USDA FS)	Transportation	Transportation Planner
Steve Storo	Minerals	Geologist
Suzanne Wiley	Rights of Way	Lands and Realty Specialist
Don Zettel (USDA FS)	Archeology, ACECs	Archeologist

5.3 Persons, Agencies, and Organizations Consulted

In addition to internal contributions, the Proposed Action was formulated in part based on past governmental and public comments, opinions, concerns, publications and observations concerning the current state of the CBRA and changes deemed desirable (or undesirable) in the area. Such input was received during meetings, design workshops, field tours, informal discussions, and written correspondence from 2006 to 2009. The following list is representative of those who contributed to the development of the plan:

Agencies
Glen Ardt, Oregon Department of Fish and Wildlife
Ted Weise, Oregon Department of Fish and Wildlife
Nancy Gilbert, U.S. Fish and Wildlife Service
Joe Stutler, Deschutes County
George Kolb, Deschutes County
Tom Blust, Deschutes County
Amy Pfieffer, Oregon Department of Transportation
Bill Hilton, Oregon Department of Transportation
Russ Frost, Oregon Department of Transportation
Ryan Franklin, Oregon Department of Transportation
Scott Edelman, City of Redmond
Jeff Powers, City of Redmond Public Works
Traci Cooper, Redmond Fire and Rescue
Nancy Pustis, Oregon Department of State Lands
Phil Chang, Central Oregon Intergovernmental Council
Christine Curran, State Historic Preservation Office
Bruce Ronning, Bend Metro Parks and Recreation District
Sisters City Council
Tumalo Irrigation District
Ian Caldwell, Oregon State Parks
Steve Filer, Federal Aviation Administration
Roger Riolo, Central Oregon Community College

Tribal Groups
Clay Penhollow, Confederated Tribes of Warm Springs

Organizations/Businesses
American Hiking Society
Central Electric Co-op, Inc.
Central Oregon Motorcycle and ATV Club
Central Oregon Runners Klub
John Wainwright, Backcountry Horsemen of Oregon
Cline Buttes Rock Pit
Cog-Wild Bicycle Tours
Bend Paddle Trail Alliance
Central Oregon Trails Alliance
Crooked River Ranch Riders Club
Deschutes County Bicycle/Pedestrian Advisory Committee

Deschutes County Four-Wheelers
Deschutes River Ranch
Eagle Crest
Oregon Equestrian Trails
Oregon Natural Desert Association
Oregon Recreation Coalition
Oregon Recreational Trails Advisory Council
Oregon State ATV Committee
Redmond Saddle Club
Sierra Club, Juniper Group
Silver Striders Guide Service
Sylvan Power
Thornburgh Resort

Others

Interested public not affiliated with an above mentioned group
Livestock grazing permittees
Miscellaneous additional businesses
Special Recreation Permittees

Glossary

A

Access - the ability of public land visitors to reach the areas they wish to visit.

Acre - a unit of area used in land measurement, equal to 43,560 square feet. There are 640 acres in one square mile.

Administrative Use – routes that are used by BLM and its permittees or assignees, for motor vehicle use in the management of public land resources.

All-motor – a portion of the motorized/shared use trail system on which Class I, II, and III OHVs are allowed.

Allotment - a specific portion of public land allocated for livestock grazing, typically with identifiable or fenced boundaries and permitted for a specified number of livestock.

All-Terrain Vehicle Safety Institute (ASI) - a nonprofit organization funded by a number of leading all-terrain vehicle manufacturers that provides safety training for Class I vehicles. These courses are provided/required by the State of Oregon. Under current Oregon law, safety education certificates are only required for youth (Class I up to age 15 and Class III ages 7-15) or for those 16 years and older who do not have a valid driver's license.

Animal Unit Month (AUM) - the amount of forage required to sustain one cow and calf for one month.

Archaeological Sites - geographic locations that contain the material remains of prehistoric and/or historic human activity.

Area of Critical Environmental Concern (ACEC) - a type of special land use designation specified within the Federal Land Policy and Management Act (FLPMA) used to protect areas with important resource values in need of special management.

Area of Traditional Cultural Significance - for the purposes of this plan, those locations used by Indian people to maintain their values, beliefs, and cultural identity, including, but not limited to, traditional plant collecting areas, fishing stations, or places for practicing traditional religious beliefs.

Assets – term used to describe roads, primitive roads, and trails that comprise the transportation system. Also, the general term used to describe all BLM constructed "Assets" contained within the Facility Asset Management System (FAMS).

At-risk archaeological resources - those archaeological sites and materials that are threatened by natural forces (e.g., flood, drought, erosion, fire), or by adverse impacts related to unauthorized human activities.

Average Daily Traffic (ADT) – the average number of vehicles two-way passing a specific point in a 24-hour period, normally measured throughout a year.

B

Basalt - a dark-colored volcanic rock with less than 52% silicon dioxide by weight. Its temperature when erupting ranges from 1100 to 1250°C. Basalt is less viscous (more fluid) than andesite and rhyolite and is capable of flowing several tens of kilometers.

Biodiversity (Biological Diversity) – the variety and variability among living organisms and the ecological complexes in which they occur.

Biomass - dry weight of organic matter in plants and animals in an ecosystem, both above and below ground.

Biotic - living.

Best Management Practices (BMPs) - a set of practices which, when applied during implementation of management actions, ensures that negative impacts to natural resources are minimized. BMPs are applied based on site-specific evaluations and represent the most effective and practical means to achieve management goals for a given site.

Broadcast Burning - burning natural fuels as they are, with no piling or windrowing.

Bureau of Land Management (BLM) - government agency with the mandate to manage Federal lands under its jurisdiction for multiple uses.

Bureau Tracking Species (TS) - species for which more information is needed to determine status within the state or which no longer need active management. Districts are encouraged to collect occurrence data to enable an early warning for species which may become threatened or endangered in the future. Until status of such species changes to federal or state listed, candidate or assessment species, "tracking species" will not be considered as special status species for management purposes.

C

Candidate Species - any species included in the Federal Register Notice of Review that are being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

Cinder - a frothy form of basalt formed by expanding gases during an eruption.

Class I Vehicle (e.g. Quad) – Class I all-terrain vehicles are a motorized off highway vehicle 50 inches or less in width with a dry weight of 800 pounds of less that travels on three or more low pressure tires, has a saddle or seat for the operator and is designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland or other natural terrain (Title 59, Oregon Vehicle Code, 801.190). See also Off Highway Vehicle (OHV).

Class II Vehicle (e.g. full size 4wd vehicle or jeep) – Class II all-terrain vehicle means any motor vehicle that: (1) weighs more than a Class I vehicle; (2) is designed for, or is capable of travel on or immediately over land, water, sand, snow, ice, marsh, swampland or other natural terrain; and (3) is actually being operated off

a highway or is being operated on a highway for agricultural purposes under ORS 821.191 (Title 59, Oregon Vehicle Code, 801.193). See also Off Highway Vehicle (OHV).

Class III Vehicle (e.g., motorcycle) – Class III all-terrain means an off-highway motorcycle with a dry weight of 600 pounds or less that travels on two tires (Title 59, Oregon Vehicle Code, 801.194). See also Off Highway Vehicle (OHV).

Closed Area – an area where off-highway vehicle use is prohibited. Use of off-highway vehicles in closed areas may be allowed for certain reasons; however such use shall be made only with the approval of the authorized officer.

Communication Site - (1) a hilltop or favorable signal receiving and transmitting location where a collection of facilities are sited; (2) a facility consisting of a small building and tower, used for transmission or reception of radio, television, telephone or other electronic signals.

Communities at Risk – areas where homes and wildlands intermix, identified by the National Fire Plan to receive funding for projects designed to reduce potential for catastrophic fire.

Community Wildfire Protection Plan (CWPP) – a CWPP is a plan developed by a community in an area at-risk from wildland fire. The CWPP is a collaborative product involving interested parties, local government, local fire fighting agencies, the state agency which oversees forest management and, if present in the vicinity, federal land management agencies. A CWPP identifies and prioritizes the area (both federal and nonfederal lands) for hazardous fuels reduction treatments; and recommends methods for achieving hazardous fuels reductions. Second, the plan recommends measures for reducing structural ignitability throughout the at-risk community.

Connectivity (of habitats) - the linkage of similar but spatially separated vegetative stands (such as mature forests) by patches, corridors, or "stepping stones" of like vegetation across the landscape; also, the degree to which similar landscapes are so linked (PNW GTR-328, 1994).

Consultation - formal and informal consultation as defined by laws such as the National Historic Preservation and Endangered Species Acts. Also, any input formally requested for analysis purposes from any internal or external source.

Control Point - geographic features that either discourage citing a trail nearby (e.g. a cliff, area of deep sand), or encourage citing a trail nearby (scenic viewpoint). In the CBRA, control points are used primarily to establish minimal trail difficulty at the start/end of a trail segment.

County Road - "county road" means a public road designated by the County as part of the County road maintenance system.

Cultural Resource - material or non-material aspects of human culture which are significant to living cultures, including groups maintaining and preserving their traditions, and academic researchers such as anthropologists and historians.

D

Decibel - a logarithmic unit for measuring the relative strength of a signal (i.e., Sound). On the **decibel scale**, the smallest audible sound (near total silence) is 0 dB. A sound 10 times more powerful is 10 dB. A sound 100 times more powerful than near total silence is 20 dB. A sound 1,000 times more powerful than near total silence is 30 dB. Here are some common sounds and their decibel ratings:

- Near total silence - 0 dB
- A whisper - 15 dB
- Normal conversation - 60 dB
- A lawnmower - 90 dB
- A car horn - 110 dB
- A rock concert or a jet engine - 120 dB
- A gunshot or firecracker - 140 dB

Disturbance - any event which alters the structure, composition, or function of terrestrial or aquatic habitats (PNW GTR-328, 1994).

E

Ecological Site Inventory (ESI) - the basic inventory of present and potential vegetation of BLM rangelands. Ecological sites are differentiated on the basis of soil type and kind, proportion, or amount of plant species.

Ecological Site – an area with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in their ability to produce distinctive kind and amounts of vegetation and to respond to management. Ecological sites are defined and described with information about soils, species composition, and annual production.

Ecosystem - a spatially explicit, relatively homogeneous unit of the earth that includes all interacting organisms and components of the abiotic environment within its boundaries. An ecosystem can be of any size; e.g., a log, pond, field, forest, or the earth's biosphere.

Ecosystem Health - a condition where the parts and functions of an ecosystem are sustained over time. The system's capacity for self-repair is maintained such that goals for uses, values, and services of the ecosystem are met. Also includes forest health, rangeland health, and aquatic system health.

Ecosystem Management - the use of a "whole-landscape" approach to achieve multiple-use management of public lands by blending the needs of people and environmental values in such a way that these lands represent diverse, healthy, productive, and sustainable ecosystems.

Endangered Species - any species defined under the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range. Listings are published in the Federal Register.

Environmental Assessment (EA) - one type of document prepared by Federal agencies in compliance with the

National Environmental Policy Act (NEPA) that portrays the environmental consequences of proposed Federal actions that are not expected to have significant impacts on the human environment.

Environmental Impact Statement (EIS) - one type of document prepared by Federal agencies in compliance with the National Environmental Policy Act (NEPA) that portrays the environmental consequences of proposed major Federal actions that are expected to have significant impacts on the human environment (see EA, above).

Ephemeral Stream - a stream, or reach of a stream, that flows only in direct response to precipitation. It receives no continuous supply from melting snow or other source, and its channel is above the water table at all times.

Erosion (accelerated) - erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, e.g., fire that exposes the surface.

F

Fire Regime - the frequency, predictability, intensity, seasonality, and extent characteristics of fires in an ecosystem.

Federal Land Policy and Management Act of 1976 (FLPMA) - a law mandating that the Bureau of Land Management manage lands under its jurisdiction for multiple uses.

Fire Management Plan (FMP) - a strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Foliar Cover – The percentage of ground covered by a vertical projection of exposed leaf area. Small openings within the canopy are excluded.

Forestland - land stocked with at least 10 percent live trees or land formerly having such tree cover and not currently developed for non-forest use.

G

Ghost Fence – a short, discontinuous section of fence constructed to manage access without completely surrounding an area.

Ground Water - water filling all the unblocked pores of the material below the water table.

H

Habitat Fragmentation - the splitting or isolating of patches of similar habitat, typically forest cover (but could also apply to grass fields, shrub patches, and other habitats). Habitat can be fragmented from natural

conditions, such as thin or variable soils, or from management activities or development such as clear-cut logging, agriculture, or residential development.

Heterogeneity – cultural, social, biological or other differences within a group.

Historic Condition - as used in this text, the condition of lands and ecosystems prior to European settlement. In central Oregon, European settlement occurred during the period from approximately 1850s to 1900. An approximation of these conditions is drawn from written and photographic accounts from the period and is used to determine the range of variability for plant and animal species across a landscape (Ochoco NF Viable Ecosystems Management Guide, 1994).

Historic Range of Variability (HRV) - the typical fluctuations of processes or functions, and the typical proportions of ecosystem elements in an area over a period of time when the ecosystem was not significantly affected by European settlement and management. HRV is the amplitude or minimum-maximum ranges of "natural" conditions.

Hunting – for the purposes of this plan, to take or attempt to take any wildlife by means involving the use of a weapon or with the assistance of any mammal or bird (ORS 496.004 (10)).

I

Inholding – for the purposes of this plan, and inholding refers to private land which is surrounded wholly by BLM administered lands or surrounded by a combination of BLM administered lands and the Deschutes River Canyon.

Interdisciplinary - involving more than one discipline or resource management program.

Interim System – the interim system refers to the mapped and designated system for motorized vehicle use contained in the UDRMP (RMP/ROD Map 13).

Intermittent Stream - a stream, or reach of a stream, that flows for prolonged periods only when it receives groundwater discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Interior Columbia Basin Ecosystem Management Project (ICBEMP) - a project conducted during the 1990s and early 2000s examining the effects (on a large, regional scale) of past and present land use activities on the Interior Columbia River Basin ecosystem and a small part of the Great Basin ecosystem.

L

Landscape - all the natural features which distinguish one part of the land from another. A spatially heterogeneous area with repeating patterns, similar climate, and landform, and the associated disturbance regimes.

Leasable Minerals – minerals that may be leased to private interests by the Federal government and includes oil, gas, geothermal, coal, and sodium compounds.

Limited Area – An area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type but can generally be accommodated within the following categories: Numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions.

Litter - the dead remains of plants, usually lying on the soil surface.

Locatable Minerals - minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

M

Maintenance Intensities –

Level 0 (No maintenance): Undesignated routes that are not part of the BLM transportation system and receive no maintenance.

Level 1 (Low Maintenance): Designated routes where minimum (low intensity) maintenance is required to protect adjacent lands and resource values.

Level 3 (Moderate Maintenance): Designated routes requiring moderate maintenance due to low volume (e.g. seasonally or year-round for commercial, recreation, or administrative access).

Level 5 (High Maintenance): Designated routes requiring high maintenance due to year-round needs, high volume traffic (including passenger vehicles), or significant use.

Microbiotic Crusts - lichens, mosses, green algae, fungi, cyanobacteria, and bacteria growing on or just below the surface of soils.

Mineral Estate - refers to the ownership of minerals at or beneath the surface of the land.

Mitigating Measures - modifications of actions that (a) avoid impacts by not taking a certain action or parts of an action, (b) minimize impacts by limiting the degree or magnitude of the action and its implementation, (c) rectify impacts by repairing, rehabilitating, or restoring the affected environment, (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action, or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring and Evaluation - the collection and analysis of data to evaluate the progress and effectiveness of on-the-ground actions in meeting resource management goals and objectives.

Motorcycle Safety Foundation (MSF) – a nonprofit organization funded by a number of U.S. motorcycle manufacturers and distributors that provides safety courses for off-highway motorcycles. These courses are provided/required by the State of Oregon. Under current Oregon law, safety education certificates are only required for youth (Class I up to age 15 and Class III ages 7-15) or for those 16 years and older who do not have a valid driver's license.

Multiple Use – the management of public land and its resources to best meet various present and future needs of the American people. This means coordinated management of resources and uses.

N

National Environmental Policy Act of 1969 (NEPA) - a law requiring all Federal agencies to evaluate the impacts of proposed major Federal actions with respect to their significance on the human environment.

Noxious Weed - a plant specified by law as being especially undesirable, troublesome, and difficult to control.

National Register of Historic Places (NRHP) - established by Congress with the passage of the National Historic Preservation Act of 1966, an ever increasing, formal list of sites that are culturally significant according to specific criteria.

O

Off Highway Vehicle (OHV) - unless otherwise stated, this generally refers to Class I all-terrain vehicles, Class II full width four-wheel drive vehicles, and Class III motorcycles.

Off-Highway Vehicle Designations -

- Open – The BLM designates areas as "open" where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.
- Limited – The BLM designates areas as "limited" where it must restrict OHV use in order to meet specific resource management objectives. These limitations may include restricting the number or types of vehicles; limiting the time or season of use; permitted or licensed use only; or limiting use to designated roads and/or trails.
- Closed – The BLM designates areas as "closed" if closure to all vehicle use is necessary to protect resources, ensure visitor safety, or reduce use conflicts.

Old-growth - old forest often containing several canopy layers, variety in tree sizes and species, decadent old trees, standing and down dead woody material (PNW GTR-328, 1994).

Overstory - the upper canopy layer; the plants below comprise the understory.

P

Patch - an area of vegetation with homogeneous composition and structure.

Perennial Stream - a stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

pH – a measure of the acidity or basicity of a solution. It is defined as the cologarithm of the activity of dissolved hydrogen ions.

Planning Area – the area containing all BLM-administered lands that would be managed under the CBRA Plan.

Prescribed Fire - the introduction of fire to an area under regulated conditions for specific management purposes (usually vegetation manipulation).

Prescribed Natural Fire – a fire caused by lightning for which minimal to no suppression action is taken if it is under pre-determined conditions and within acceptable parameters. Prescribed natural fire is used to accomplish certain resource objectives.

Pressure Ridge - a ridge formed during inflation of a basalt flow, often having one or more prominent tension cracks along the ridge axis.

Primary Wildlife Emphasis - designates that wildlife is one of the most important management considerations for an area. Areas allocated to primary emphasis are intended to benefit wildlife and retain high wildlife use by applying specific guidelines (see Chapter 2).

Proper Functioning Condition (PFC) - adequate vegetation, land form, or large woody debris present to dissipate stream or wave energy, filter sediment and capture bedload, improve flood water retention, develop root masses that stabilize stream banks, islands and shorelines, develop channel characteristics to provide habitat for aquatic species, support greater biodiversity, reduce erosion, and improve water quality (USDI, 1998).

Public Access Point – for the purposes of this plan, a public access point is defined as a road or trail location entering BLM administered lands from any public road or road open to unrestricted public use. Public access points may include locations where the public currently accesses public lands through undeveloped private parcels. Public access points also includes roads and trails that enter BLM administered lands from Destination resorts, since these often allow public access or larger numbers of users than typical private property gates.

Public Land - any land or interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management.

Public Road (Deschutes County) – "public road" means a road over which the public has a right to use that is a matter of public record (Chapter 16.08) note: and not designated as a "County Road".

R

Recreation Emphasis – management classification in the UDRMP that establish trail management goals for an area. The CBRA includes:

Non-motorized recreation exclusive. Areas managed to promote non-motorized recreation uses. Trails and facilities in these areas will be designed and managed for non-motorized trail use. These areas are designated closed to motorized use except for use of public roads and rights-of-way, or roads that access recreation facilities, trailheads, etc.

Non-motorized Recreation Emphasis. Areas managed to provide for motorized use on roads only, with road systems that provide for general access into an area or loop roads to tour an area. Trails and related facilities in these areas will be designed and managed for non-motorized trail use.

Multiple Use, Separated Facilities. Areas managed with all or a portion of the road or trail use with separate routes and related facilities for motorized and non-motorized uses. The separation of uses may be seasonal, by area, or by specific routes or facilities.

Resilience – 1) the ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages; 2) in human communities, refers to the ability of a community to respond to externally induced changes such as larger economic forces.

Resource Area - the "on-the-ground" management unit of the Bureau of Land Management comprised of BLM-administered land within a specific geographic area.

Resource Management Plan (RMP) - current generation of land use plans developed by the BLM under the Federal Land Policy and Management Act. The Upper Deschutes RMP provides the management framework for the CBRA Plan.

Restoration - as used in this text, vegetative treatments used to modify an ecosystem and designed to return plant and animal communities toward a condition and level of functioning that existed prior to human disturbance or influence.

Right of Way - a grant that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, and reservoirs.

Riparian - a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil."

S

Salable Minerals - high volume, low value mineral resources including common varieties of rock, clay, decorative stone, sand, gravel, and cinder.

Savanna - In this FEIS/RMP, non-forest (usually shrub-steppe) land where juniper occurs as widely scattered trees at less than 10% crown cover.

Scenic River - a river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

Secondary Wildlife Emphasis – a designation where wildlife is one of several resource management programs that are of focus in an area, and typically receive a slightly lower, but still significant, level of management consideration. Areas allocated to a secondary emphasis are intended to support wildlife and maintain a moderate amount of use.

Seral Stage - the rated departure of a plant community from a described potential natural community (PNC) for a specific ecological site. Low-seral stage is an existing plant community which is defined as 0-25% comparability

to the defined PNC; Mid-seral stage is an existing plant community which has 26-50% comparability to the PNC; Late seral stage is 51-75% comparable to the PNC; PNC is an existing plant community with 76-100% comparability to the defined PNC.

Site Condition - the level of condition, or degree of function, used to express the current condition of a site in contrast to site potential.

Site Potential - a measure of resource availability based on interactions among soils, climate, hydrology, and vegetation. Site potential represents the highest ecological status an area can attain given no political, social, or economic constraints. It defines the capability of an area, its potential, and how it functions (ICBEMP, 2000).

Snag - a standing dead tree, usually larger than five feet tall and six inches in diameter at breast height. Snags are important as habitat for a variety of wildlife species and their prey.

Special Habitat Features – non-vegetative factors or finer-scale characteristics of vegetation, including caves, cliffs, playas, riparian areas, wetlands, foraging areas, snags, and down wood.

Special Recreation Management Area (SRMA) - recreation management areas where recognized recreation values exist or where significant public recreation issues or management concerns occur. Special or more intensive types of management are typically needed. Detailed recreation planning is required for these areas, as well as greater managerial investment.

Special Status Species – a plant or animal species falling into any one of the following categories: Federally listed threatened or endangered species, species proposed for Federal listing as threatened or endangered, candidate species for Federal listing, State listed species, Bureau sensitive species, Bureau assessment species (see separate definition for each).

Species Diversity - the number, different kinds of, and relative abundances of species present in a given area.

Stand - a contiguous group of similar plants. For forest use, a contiguous group of trees sufficiently uniform in age-class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit.

Stateside Comprehensive Outdoor Recreation Plan (SCORP) – a plan prepared by the State of Oregon that describes and analyzes the organization and function of the outdoor recreation system of the state. The plan provides an analysis of the roles and responsibilities of major outdoor recreation suppliers; an analysis of demand, supply and needs; and issue discussions.

Steppe – in physical geography, a steppe is a grassland plain without trees.

Structure - the physical organization and arrangement of vegetation; the size and arrangement (both vertical and horizontal) of vegetation.

Subsoiling - a restoration method used to loosen compacted soils in order to prepare the site for seeding and plant growth. This is generally done on compacted soils, such as unwanted roads, trails and logging landings. A winged subsoiler is attached to the back of a machine and pulled through the ground to roll or lift the surface soil, fracturing the compacted layer so that it will grow vegetation.

Succession - the gradual supplanting of one community of plants by another. The sequence of communities is called a sere, or seral stage. A process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for establishment of the next stage. The different stages in succession are often referred to as seral stages.

Sustainability – 1) meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land; 2) in commodity production, refers to the yield of a natural resource that can be produced continually at a given intensity of management (ICBEMP, 2000).

Sustained Yield - maintenance of an annual or regular periodic output of a renewable resource from public land consistent with the principles of multiple use. Also: The yield that a forest can produce continuously at a given intensity of management. Sustained yield management implies continuous production, so planned as to achieve, at the earliest practical time, a balance between increment and cutting.

T

Technical Trail Feature (TTF) - an obstacle on the trail requiring negotiation, the feature can either be man-made or natural, such as an elevated bridge or rock face, respectively.

Terrestrial - pertaining to the land.

Threatened Species - any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Listings are published in the Federal Register.

Transportation System – the sum of BLM's recognized inventory of linear features (roads, primitive roads, and trails) formally recognized and approved as part of the BLM's transportation system.

Transportation Linear Disturbance

Transportation System Linear Features (Assets)

- **Road** – A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.
- **Primitive Road** – A linear route managed for use by four-wheel drive or high clearance vehicles. These routes do not normally meet any BLM road design standards.
- **Trail** – A linear route managed for human powered, stock, or off-highway vehicle forms of travel or for historical or heritage values. Trail are not generally managed for use b y four-wheel drive or high clearance vehicles.

U

Understory - collectively, those plants that are beneath the overstory. See overstory.

Upland - the portion of the landscape above the valley floor or stream.

U.S. Department of Interior (USDI) - government department which oversees the Bureau of Land Management and many other agencies.

U.S. Fish and Wildlife Service (USFWS) - government agency responsible for managing fish and wildlife and their habitats.

V

Vehicle –

- **Low Clearance Two-Wheel-Drive (2WD) Vehicles**
  A low clearance 2WD vehicle is defined as a standard passenger vehicle with less than 8 inches of clearance from the lowest point of the frame, body, suspension, or differential, to the ground.
- **High Clearance Two-Wheel-Drive (2WD)Vehicles**
  A high clearance 2WD vehicle is defined as a SUV or truck type vehicle, with at least 15 inch tire rims or more, designed for heavier type use than a standard passenger vehicle, with at least 8 inches of clearance or more, from the lowest point of the frame, body, suspension, or differential, to the ground.
- **High Clearance Four-Wheel-Drive (4WD) Vehicles**
  A high clearance 4WD vehicle is defined as a SUV or truck type vehicle, with at least 15 inch tire rims or more, with a low gear transfer case, designed for heavier type use than a standard passenger vehicle, with at least 8 inches of clearance or more from the lowest point of the frame, body, suspension, or differential, to the ground, also including a means to mechanically power both, front and rear wheels at the same time.

Visual Resources - the aesthetic qualities of the landscape. This is determined by assessing the scenic quality of a site, the sensitivity of people to changes in the landscape, and the visibility of the landscape from major viewing routes and key observation points.

Visual Resource Management Class – management goals assigned to public lands based on scenic quality, sensitivity levels, and distance zones. There are four classes. Each class has an objective that prescribes the amount of modification allowed within the landscape.

W

Watershed - the region draining into a river, river system, or body of water. A fifth-field hydrologic unit code of the U.S. Geologic Survey (USGS) comprising 50,000 to 100,000 acres.

Weed - a plant considered undesirable, unattractive, or troublesome, usually introduced and growing without intentional cultivation. See also Noxious Weed.

Wildfire - any unwanted wildland fire.

Wildland Fire - any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA) - a decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Wildland Urban Interface – An area within or adjacent to an at-risk community that is identified in a community wildfire protection plan.

Wildlife Management Unit (WMU) – for the purposes of managing Oregon's wildlife, the state has been divided into separate wildlife management units by the Oregon Department of Fish and Wildlife.

Withdrawal – a total or partial transfer of jurisdiction and administration of Federal lands between Federal agencies for a specific public purpose. Note – this doesn't refer to withdrawal from mining

Woodland - a plant community in which, in contrast to a typical forest, the trees are often small or short-boled relative to their crown width or height. Collectively, the trees form an open canopy with the intervening area occupied by lower vegetation, commonly grass or shrub.

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Appendix 1 – Trail Objectives and Standards

Trails shown on Maps 6 - 8 in the CBRA Plan EA show general trail corridors, 200 feet wide, within which specific trails would be located. The following information provides details on trail standards proposed for different trail types, methods used for trail construction and obliteration, and criteria used to determine specific placement or relocation of trails. Trail design standards would be applied to both existing and proposed routes – for example, existing routes may be realigned to provide more durable, less erosion prone trail treads. Within the proposed trail corridors shown in this EA, specific routes would be flagged on the ground, and site specific survey work/clearances would be conducted prior to route construction.

Trail design and maintenance standards are shown in Table 8, CBRA Proposed Trail Standards.

Trail design criteria are to be followed as guidelines. Not all of the criteria can be met on every segment of every trail. Their purpose is to help create sustainable, low maintenance trails that provide quality recreation experiences and to document trail design intent to agency staff and partners who are helping to create and maintain trails in the CBRA.

Trail Design Criteria

1. **Know and understand trail management standards/objectives**. Trail standards provide the framework for what a trail will look like, who will be using the trail, and how the trail will be managed.

2. **Create loops and avoid dead end trails.** With the exception of routes that provide planned access from private property, all trails should begin and end at a trailhead or another trail. A well-planned, stacked loop trail system offers recreationists a variety of options. Easier, shorter loops are arranged close to trailheads, with longer, more challenging loops extending further beyond the trailhead. Occasionally, destination trails to a point of interest will require an out and back trail.

3. **Identify control points and use them to guide trail design and layout.** Control points are specific places or features that influence where the trail goes. Basic control points include the beginning and end of the trail, property boundaries, intersections, drainage crossings, existing or planned fences, and locations for turns.

Positive control points are places where visitors are drawn to, including scenic overlooks, historic sites, rock outcroppings, rivers or other natural features or points of interest. In many cases, if the trail does not incorporate these features, visitors will likely create unsustainable social trails to get to them.

Negative control points are places where visitation is not desired, such as low-lying wet areas, flat ground, extremely steep cross slopes or cliffs, environmentally sensitive areas, safety hazards, and private property.

Control points will be used at locations where trail user types change, for example:

- When a non-motorized trail connects to a motorized trail.
- When a motorized trail changes from an all-motor to a motorcycle trail

In other cases, control points will be used when trail difficulty levels change significantly, for example, from an easy or moderate mountain bike trail to a downhill or difficult trail. In these cases, a gateway or trail filter may be used. These features consist of gates or narrow passageways that force a trail user to stop, read information signs, and/or navigate a high-skill-level, low-consequence obstacle. Trail filters will be considered at trail intersections where major changes in difficulty levels occur or just prior to technical features. Placement of trail filters will be done in consultation with trail user groups.

4. **Use a limited number of designated trailheads. Manage the motorized use trail system as a "closed system".** Trail use with horses, mountain bikes and motor vehicles are limited to designated routes only. Access to these trails is provided by a limited number of trailheads in order to reduce conflicts, and discourage the spread of user created parking areas. For the motorized use trail system, riders/drivers will only be able to legally enter/exit the trail system at a limited number of trailheads/ staging areas. With an access controlled trail system, riders/drivers can be directed to information (maps, signboards, agency staff or volunteers, etc.) that provide crucial information to visitors.

5. **Limit all-motor trails to 102 inches in width, Class I and III trails to 50 inches, and Class III trails to 36 inches.** The width of 102 inches (8' 6") or narrower is based on Oregon State law (ORS 818.090) limiting the maximum allowable width of any vehicle operated on an Oregon road (unless a Wide Load Permit is obtained). The 50 inch limit for Class I and III trails is a Oregon statewide standard, and is the identical width as used in Central Oregon OHV areas, including Millican Valley, East Fort Rock, and Henderson Flats. The 36" limit for Class III trails is designed to restrict most quads, while allowing most motorcycle riders to pass without delay. All-motor trails used for administrative access or road ROWs may be wider than 102 inches, but this will be the exception, rather than a standard.

6. **Maintain desired trail width by restricting the type of vehicle on particular trails.** Restricting vehicle width on particular trails is important to maintain and protecting the narrow nature of specific CBRA trails. Narrow trails provide desired trail experiences and are better for resource protection. Trail users often prefer a narrower, winding trail to increase difficulty, increase the amount of saddle time per mile of trail system, and add variety to their visit. For those trails identified as narrow and more difficult, the following techniques will be used:

- keep the radius on turns tight
- reduce straightening of trails into and out of turns
- use natural features to reinforce trail difficulty and winding nature

7. **Design trails to increase saddle/seat time and reduce speeds.** The preferred measure of many types of trail systems is not the miles of trail, but the hours it takes to ride the system (i.e., seat time). Seat time is a product of the number of miles, times the speed of the rider/driver. If average speeds can be reduced, the result is more seat time with the same number of miles of trail. Reducing vehicle speeds also has other positive effects. If speeds are reduced, so too will dust and sound. The most effective, cost efficient way to reduce speeds is by design, by integrating turns, obstacles, sideslopes and exposure to make the trail system more difficult, interesting and slow users down naturally.

8. **Use cross slope and avoid flat ground whenever possible.** The trail tread should generally run perpendicular to the cross slope and should utilize frequent grade reversals. This is the best way to keep water off the trail. Use curvilinear design principles to create a trail that follows the natural contours of the topography, sheds water, blends with the surrounding terrain, and provides fun recreation opportunities.

The following grade guidelines will help determine appropriate tread locations.

- The Half Rule: "A trail's grade shouldn't exceed half the grade of the hillside or sideslope (cross slope) that the trail traverses. If the grade does exceed half the sideslope, it's considered a fall-line trail. Water will flow down a fall-line trail rather than run across it. For example, if you're building across a hillside with a (cross slope) or 20 percent, the trail-tread should not exceed 10 percent." (IMBA 2004). Steeper cross slopes allow more flexibility for sustainable tread grades while flat of low angle cross slopes can be problematic. There is an upper limit to this rule. Sustaining a 24 percent tread grade, even on a 50 percent cross slope, is unlikely. Trail segments may break this rule on durable tread surfaces such as solid rock.

- The Ten Percent Average Guideline: the average trail grade over the length of the trail should be 10 percent or less for greatest sustainability. Short section of the trail may exceed this, but the overall grade should remain at 10 percent or less.
- Maximum Sustainable Grade: This is the upper grade limit for those short trail segments that push the limits of the previous two guidelines. It is determined by a site-specific analysis based on environmental conditions, trail objectives and observations of existing trails (i.e., what's working, and what's not?).
- Grade reversals: Frequent changes in the direction of tread grade (gentle up and down undulations) will ensure that water is forced off the trail at frequent intervals.

9. **Locate trails in stable soils**. Avoid clays, deep and loose soils, and soils that do not drain rapidly. Consider season of use and type of use. A trail on a south aspect will have greater usability and sustainability for winter use. The capabilities of motorized vehicles to function in wet and muddy conditions make it critical to avoid unstable or poorly drained soils. For most users (not including equestrians) the best soil conditions in the CBRA are those with relatively high rock content.

10. **Avoid Switchbacks When Possible**. Switchbacks are difficult, time-consuming, and expensive to construct and maintain. Users often cut them, causing avoidable impacts. Utilizing curvilinear design eliminates the need for many switchbacks. Climbing turns are easier to construct and maintain and utilize natural terrain features (benches, knolls, rocky outcrops) to change the direction of the trail.

11. **Avoid Ridge Tops or Edges of Plateaus**. Ridge tops or edges of Plateaus are often primary corridors for wildlife or key habitat for raptors. Noise from ridge top trails is broadcast over a wide area. Trails should be located on the side of ridges, or set back from canyon edges. Ridges should used whenever possible to create natural sound barriers to isolate noise.

12. **Use Vegetation and other Natural Features to conceal the Trail, Absorb Noise and retain trail difficulty levels**. This can be difficult in a dry environment such as CBRA. Trails can be routed to follow transitions in vegetation. For motorized use trails, retention of greater numbers of juniper and shrub cover will help create an undulating trail that slows riders and keeps them from cutting corners and straightening the route, thus increasing speeds.

13. **Carefully design intersections to avoid safety problems**. When locating trail crossings (particularly motorized use or mountain bike trails) be aware of sight distance and sight lines. Collisions can be avoided if trail users can see each other. Avoid four way intersections. Offsetting the cross traffic helps reduce speeds and reduces the risk of collisions. For trail crossings of paved roads,

signs warning trail users of upcoming crossings should be used. Trail crossings of paved roads will require signs warning motorists of crossing, based on MUTCD or approved State/County standards.

Trail Types

Motorized/Shared Use Trails

All-motor Trails (Class I, II, and III)

Easy All-motor Trails - The Easy All-motor trails will be cleared of obstructions to about 102 inches (8.5 feet), with an 8 foot clearing height. Compared to the rest of the OHV trails, the Easy All-motor trails will be the widest and will not traverse slideslopes greater than 25%. The tread will primarily consist of a natural surface with few obstacles exceeding 6-8" in height. These are the flattest trails in Cline Buttes, with a maximum grade of 15% or less for 200 feet or less.

The Easy All-motor trails will require periodic maintenance, and be designated as Level 3 maintenance intensity (See Appendix 1, Trail Design and Maintenance Standards).

Intermediate All-motor Trails - Compared to the Easy trails, the Intermediate All-motor trails include more twists and corners, especially in the newly constructed sections, but the grade of the tread remains moderate, 20% or less, for 300 feet or less. These All-motor trails will be cleared identically to the Easy trails. Intermediate All-motor trail treads will be moderate in their width, with the ideal maximum of 102 inches or narrower, with no sideslopes greater than 25%. The tread will primarily consist of a natural surface with few obstacles exceeding 8-10" in height. The tread will include more rock than the Easy trails, which should help control vehicle speeds. The Intermediate All-motor trails will require periodic maintenance, and be designated as Level 3 maintenance intensity.

Difficult All-motor Trails - Most of the Difficult All-motor trails will require new construction, emphasizing numerous horizontal and vertical alignment changes. The Difficult All-motor trails will provide the narrowest Class II trails in the CBRA. These trails will cleared of obstructions at a width of 80-126 inches (6.5 to 10.5 feet), depending upon prescribed vehicle width and sideslope. Tread width for trails on sideslopes less than 25% will vary from 80-102 inches (6.5 to 8.5 feet) in width, while tread width on sideslopes greater than 25% will vary from 80-126 inches in width. The 80-102 range is for the technical bypasses, where the terrain may limit vehicle size. The 102 to 126 range is for a slightly wider trail on steep sideslopes, where the sidehill demands additional width. The clearing height will be about 8 feet, with vehicle/helmet/leg slaps common. The tread will almost entirely consist of a natural surface, with a high percentage of rock or broken rock, where obstacles greater than 10 inches will be commonly encountered. Except for the Technical All-motor routes, these Class II trails will be the steepest in the CBRA, with a maximum grade of 50% or less for 300 feet or less. The Difficult All-motor trails will require limited maintenance, and be designated as Level 1 maintenance intensity.

Technical All-motor Trails - All-motor trails with a Technical rating are short sections of trail primarily designed for rockcrawling and motorcycle trials opportunities (although all classes of OHV's will be allowed). These trails will not be limited by tread steepness, and are explicitly meant to provide the steepest tread grades of any trails in the CBRA. These trails are few in number and mileage, and are only located in defined areas, on steep slopes comprised of solid or broken rock. These trails are limited to 300 feet in length, but most will be considerably shorter. These trails are designed for a tread width of 80 to 240 inches, providing the flexibility to develop multiple "lines" within a single

trail tread. Minimal clearing will be completed on these Technical All-motor routes, leaving as many trees as possible to increase challenge and difficulty. Vehicle/helmet/leg slaps will occur frequently. Turnouts may be provided at the base of each Technical All-motor route, or at the base of a set of such routes. These turnouts are meant to allow Class II groups to pull off the trail, allowing other users to pass without incident. The Technical All-motor trails will require limited maintenance, and be designated as Level 1 maintenance intensity.

Class I and III Trails (motorcycle and quad)

Easy Class I and III Trails - These trails will be cleared of obstructions 60-72 inches (5 to 6 feet) wide, 7 feet high, with few helmet/leg slaps. Like all Class I and III trails, the preferred tread width for Easy Class I and III trails is 50", but may initially be wider until the existing routes can be narrowed over time. Only a limited number of obstacles will be found in the tread, with few of them exceeding 6-8" in height. The tread will be primarily natural surface, with a maximum grade of 15% for 200 feet or less. Easy Class I and III trails will require periodic maintenance, and be designated as Level 3 maintenance intensity.

Intermediate Class I and III Trails – The Intermediate Class I and III trails will include numerous alignment changes, especially on newly constructed sections. Up to 3 Turnouts per mile will be provided, especially on sidehills and in technical sections. These trails will be cleared of obstructions 50-60 inches wide, six feet high, with many helmet/leg slaps. The ideal tread width with sideslopes less than 25% is 50", while that width is increased to 60" on sideslopes greater than 25%. The tread will normally be constructed of a natural surface, with many obstacles, although few of them will exceed 8-10" in height. The maximum grade for Intermediate Class I and III trails is 25% for a distance of 300 feet or less. These trails will require periodic maintenance, and be designated a Level 3 maintenance intensity.

Difficult Class I and III Trails – The Difficult Class I and III trails will be cleared of obstructions to 50 inches, with a six foot clearing height; helmet/leg slaps are common. Compared to other Class I and III trails, these will be the narrowest, with a tread with of 50" on sideslopes less than 25%, while that width is increased to 60" on sideslopes greater than 25%. The tread will usually be constructed of a natural surface. Obstacles exceeding 10" in height will be common on these trails. The maximum grade for Difficult Class I and III trails is 40% for a distance of 300 feet or less. These trails will require limited maintenance, and be designated a Level 3 maintenance intensity.

Class I Trails (motorcycle)

Intermediate Class I Trails - The Intermediate Class III trails may provide up to 3 turnouts per mile, especially in technical terrain, or on sidehills. The clearing width will range from 18 to 36 inches, with a 6-foot clearing height; helmet/leg slaps will be numerous. These trails will have a tread 18-24" wide on sideslopes less than 25%, and an 18-36" wide tread on sideslopes greater than 25%. Obstacles in the tread will be common, typically ranging from 8-10" in height maximum. The maximum grade for Intermediate Class III trails is 30%, for 300 feet or less. These trails will require limited maintenance, and be designated a Level 1 maintenance intensity.

Advanced Class I Trails –

Because of the technical, sidehill nature of these trails, up to 6 turnouts per mile may be provided. The clearing width will range from 18 to 36 inches, with a 6-foot clearing height; helmet/leg slaps will be

common. These trails will have a tread 12-24" wide on sideslopes less than 25%, and an 18-48" wide tread on sideslopes greater than 25%. Obstacles in the tread will be common, many over 10" in height. The maximum grade for Advanced Class III trails is 50%, for 300 feet or less. These trails will require limited maintenance, and be designated a Level 1 maintenance intensity.

Non-motorized Use Trails

CBRA Alternative maps show the following types of non-motorized use trails, with the following general characteristics:

Pedestrian Trails – Pedestrian trails are proposed in a variety of settings, these include primitive and difficult, single track hiking trails into the Deschutes River Canyon, more moderate hiking trails on the buttes, and easy interpretive trails at the Tumalo Canal ACEC and adjacent to the Tumalo Canal trailhead.

Pedestrian trails with a moderate or difficult rating may have steps, switchbacks, and waterbars or tread armor if slopes are over 20 percent depending on soil conditions and trail maintenance needs.

Pedestrian trails within or adjacent to trailheads (e.g., from parking areas to picnic areas) may have hardened surfaces and be designed to meet ADA standards. High standard trails may include short, interpretive trails from the Tumalo Canal Trailhead.

Non-motorized – These shared use trails are used to accommodate all non-motorized users in areas where use levels are expected to be relatively low and the majority of routes use existing roads. These trails are typically used in flatter portions of the CBRA, where safety concerns for trail users are lower. The 96 inch trail width is widest of the non-motorized trails in the CBRA (See Table 8, CBRA Proposed Trail Standards), but may be slightly less in low-use areas or areas where terrain does not permit trails of this width. A separate trail located adjacent to one side of the road may be provided in certain situations, such as if ROW road traffic is high and creates a conflict with trail users or if specific features to provide trail difficulty or interest are available. In certain specific cases, these trails may be have a crushed rock surface in order to minimize erosion, typically at road crossings or entry to trailheads. Surface drainage across these trails should be designed to minimize erosion of the trail surface and edges.

Non-motorized trails are also used to access facilities, such as trailheads. In these cases, different user groups may share a short stretch of collector trail that leads to the trailhead. These shared use routes are also located where non-motorized trails cross paved roads.

Horse – Equestrian trails in the CBRA include a variety of route types, from old roadways closed to motor vehicles to narrower trails on steep terrain. Horse trails are generally the widest non-motorized use trails and will have a trail ceiling, or clearing height of 10 feet, greater than all other non-motorized trail types.

Bike – Like the equestrian trails in the CBRA, mountain bike trails include a variety of trail types. Mountain bike trails include old roads closed to motor vehicles, relic canal berms, single track trails and technical downhill trails. Trail ceiling or clearing height is similar to the equestrian trails, typically 8 feet or higher. Newly constructed mountain bike trails will utilize rocky ground where possible, both to add technical trail features and provide the most stable, longest season trail surface. Technical trail features with bypasses will be considered during trail design, with an emphasis on using naturally occurring features.

Parallel – In some areas, trail uses are separated on two distinct trails that parallel each other in order to provide large trail loops while in turn minimizing the complexity of the trail system (e.g., the number of trail crossings) and the fragmentation of public land. Trails would be located within the 200 foot wide corridor shown on Alternative maps, however the exact distance between the trails will be determined through field work, and may vary depending on vegetation, topography and soil conditions. When sections of the relic canal system are used for non-motorized trails, parallel trails are often used to separate horse use from hiking and mountain bike use on the narrow canal berm and avoid routing equestrian use directly adjacent and below pedestrian and mountain bike traffic on the canal berm. Parallel trails will be dependent on good maps and trail signs and will also require decommissioning of trail links between the parallel routes, both existing and new, user created routes.

Trail Access Structures

Different types of structures will be used at the access points to trail systems and at select intersections where the allowable use of the trail changes. The simplest and most common tool will be signs or trail markers. Natural obstacles will be used wherever possible. Other access controls include boulder placement, bollards, and gates of differing widths, timber barriers, and minor structures such as fence walkovers. Trail user groups were consulted during the CBRA planning process, to help come up with designs for gates, particularly structures that allow equestrian access while limiting motor vehicle access on non-motorized trails. While gate designs have been made for the CBRA area, implementation of these access controls will have to take an adaptive approach and user groups will be consulted and designs modified based on lessons learned as the trail system is implemented. Some of these draft designs are shown in Figure 32 – Gate and Sign Details.

Trail Construction, Rehabilitation and Maintenance

The following steps will be taken when constructing, decommissioning and maintaining trails in the CBRA.

1. Close trail and convert to natural habitat
Non-designated trails would be closed by using signs, fencing, low barriers constructed of unfinished poles or split rail juniper, and/or, where necessary, placement of slash, boulders, or berms. Scarification may occur in locations where revegetation through seeding would occur, and would occur only to the depth necessary to restore soil conditions consistent with adjacent uncompacted sites. More intensive work would occur where closed routes connect to, or cross designated routes or public roads.

2. Close road and convert to natural habitat
Non-designated roads would be closed by using signs, fencing, low barriers constructed of unfinished poles or split rail juniper, and/or, where necessary, placement of slash, boulders or berms. Scarification may occur in locations where revegetation through seeding would occur. Roads would be converted to habitat primarily by reestablishing the natural drainage pattern of the landscape, and by scattering slash and revegetating with native seed as needed. More intensive work would occur where closed roads connect to, or cross designated routes or public roads.

3. Down-grade and/or convert road to trail
Some roads in the planning area have become wider than necessary through high use levels and lack of maintenance. In some cases, road widths will be reduced while maintaining the route for full-size vehicle access. In most cases existing road widths may be made narrower, if the route is not designated for administrative use, and falls within the following user types and difficulty levels:

- Class I and III OHV trails with a moderate or difficult level of use objective.

- Equestrian trails with a moderate or difficult level of use objective.
- Mountain bike trails with a moderate or difficult level of use objective
- Pedestrian trails

In other cases, existing roads may be converted to narrower trails. Any road edge drainage or ditches will be removed to reestablish the natural drainage pattern of the landscape. Fill or sloughed material on the road edge will be used to narrow and recontour the area. The portion of the roadbed to be removed would be decompacted. An appropriate width trail tread on a preferred alignment would be constructed with and outslope of 2% to 5% to maintain natural drainage patterns. Revegetation would occur as needed to rehabilitate the area. Signs, placement of slash, or low barrier fencing made of natural materials (e.g., juniper rails or rocks) may be used to clearly define trail boundaries.

For trails routes using existing roads that are shared between equestrians, mountain bicyclists and pedestrians, the existing roadbed will not be narrowed and in some cases, trail users will be directed to use one side of the road regularly to reduce conflicts and maintain suitable trail tread for different uses.

4. Improve trails

Existing routes would be narrowed using the appropriate trail removal and conversion methods described above. On steeply graded segments (exceeding a grade of 8 – 12%), such as pedestrian trails to the Deschutes River, trails will be rerouted to provide safe and reasonable grades and incorporate natural features or constructed steps using native materials.

In most cases, existing routes that are located at the bottom of drainages and dry canyons will be relocated to either side of drainage, slightly upslope, to reduce the concentration of water and provide a more interesting trail route. Priority will be given to areas where this type of improvement will have the most benefit in terms of reducing trail use in muddy or wet areas.

5. Establish new trails/Trail Maintenance

New trails would be constructed so that they are outsloped from 2% to 5% to allow water to drain from the surface naturally. Trail standards would generally fall into the parameters shown in Table 8, CBRA Proposed Trail Standards Common to All Action Alternatives. Construction and maintenance of OHV trails would be done using BLM and USFS equipment and staff from the combined Off-Highway Vehicle Operations (USFS and BLM staff/equipment) and/or contractors. Construction of single track Class I (motorcycle) trails will most likely be done using COHVOPs staff and volunteers with hand tools and portable power tools, in order to maintain a narrow and difficult trail rating.

Construction and maintenance of the non-motorized trail system will rely heavily on user groups and volunteers. Numerous organizations have expressed an interest in helping to build and maintain trails, including Central Oregon Trails Alliance (COTA), the City of Redmond, Thornburgh Resort, and Oregon Equestrian Trails (OET). All trail projects will likely use a combination of contracted services, volunteers, service organizations, and agency staff for construction and maintenance.

As part of an overall trail maintenance process, trails will be reviewed at least annually, preferably in late summer early fall prior to the start of the heaviest use season. Trails will be reviewed for safety, to verify trail difficulty ratings, ensure needed trails signs are in place, and review any constructed features.

6. Trail Maintenance Triggers

Triggers for additional maintenance of trails may include the following:

- Downgrade of trail difficulty

- Presence of short-cutting of turns and switchbacks
- Vegetation cover loss
- Widening or braiding
- Trail incision and soil loss

Maps, Signs and Public Information

For the CBRA trail system to be successful, trail maps will need to be produced and widely available, both onsite, online and from various community providers. Trail maps will indicate trail routes, allowed trail users, designated access points (and whether these are public or private), trail difficulty levels, trail names or numbers, land jurisdiction boundaries and other pertinent information on regulations, use, and resource protection.

Appropriate signage at access points throughout the CBRA will provide information on sharing the trails and reducing user conflicts, particularly on shared use trails. Information will be provided to all users regarding the allowed uses on particular trails, the difficulty level and intent of each trail, specific rules or regulations and the reasons for these rules.

For the purposes of distinguishing trails, motorized use routes will be identified by number, while non-motorized trail routes will be identified by name. Signs will be provided in the following categories:

- Trailhead Kiosks

  Trailhead kiosks are large signs (see Figure 33, 34) positioned at the beginning of a trail or trail system. Kiosk design is proposed to use juniper poles/limbs and dimensional wood. At major trailheads, several kiosks are proposed, with one kiosk providing trail information and regulatory/ safety information, while a second kiosk would contain interpretive and educational information. The types of trails, lengths of trail loops and difficulty levels will be provided at trailhead kiosks. Information on trail user etiquette, land jurisdiction boundaries and partnerships would typically be provided.

- Directional Signs

  Directional signs provide navigational information – typically including the route name or number and distance to major intersections, key destinations or trailheads.

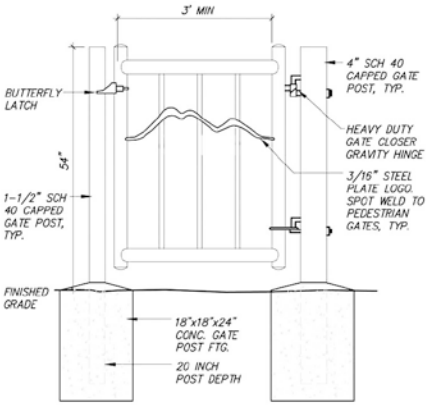
- Warning Signs

  Warning signs are used to caution trail users of upcoming hazards and would be placed close to the trail so they are easy to see. Warning signs may include locations where trails cross ROW or public roads, challenging/technical trail features, or alert trail users of upcoming gates or nearby private property.

- Difficulty-Level Signs

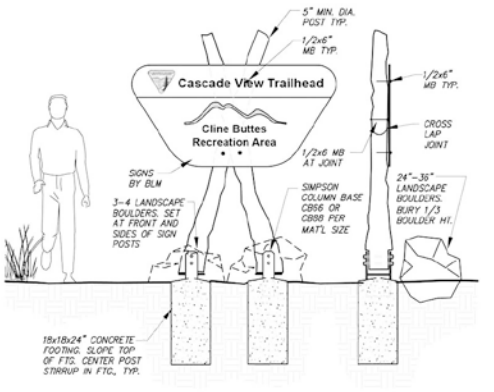
  Difficulty level signs will typically be placed at each trailhead and both at and just after each trail segment entry point. While these signs are expected to be small, they should clearly display the difficulty level and route length. These signs will be based on standard difficulty level signs used for ski and mountain bike trail systems and will be selected for consistency with other local trail

Figure 32: Gate Details



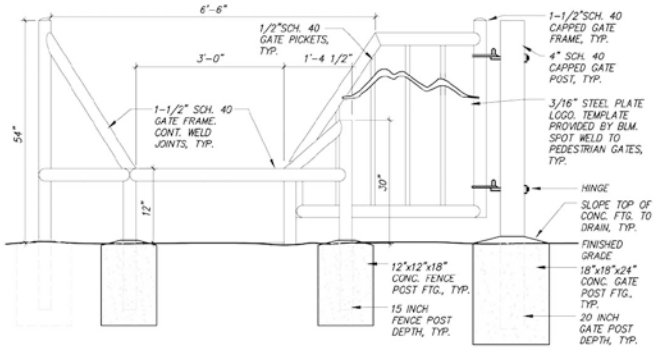
PEDESTRIAN GATE

SCALE: N.T.S.



SMALL ENTRY SIGN

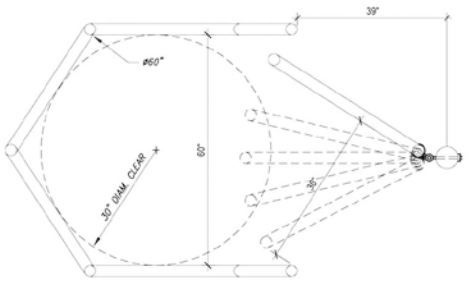
SCALE: N.T.S.



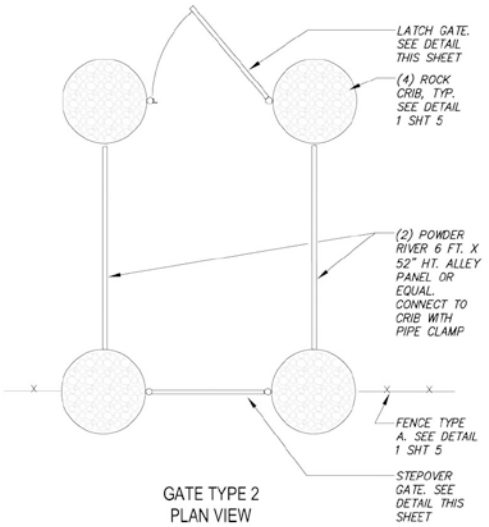
EQUESTRIAN GATE TYPE 1

GATE TYPE 1
ELEVATION VIEW

SCALE: N.T.S.



GATE TYPE 1
PLAN VIEW

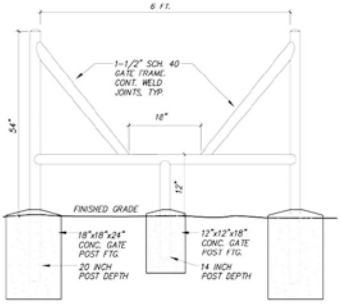


GATE TYPE 2
PLAN VIEW

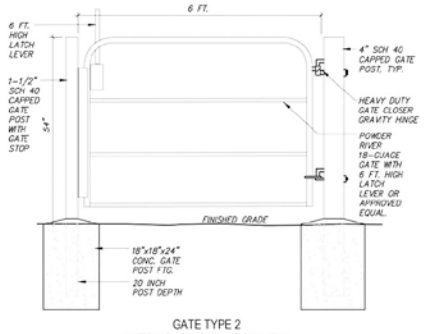
EQUESTRIAN GATE TYPE 2

GATE TYPE 1
ELEVATION VIEW

SCALE: N.T.S.

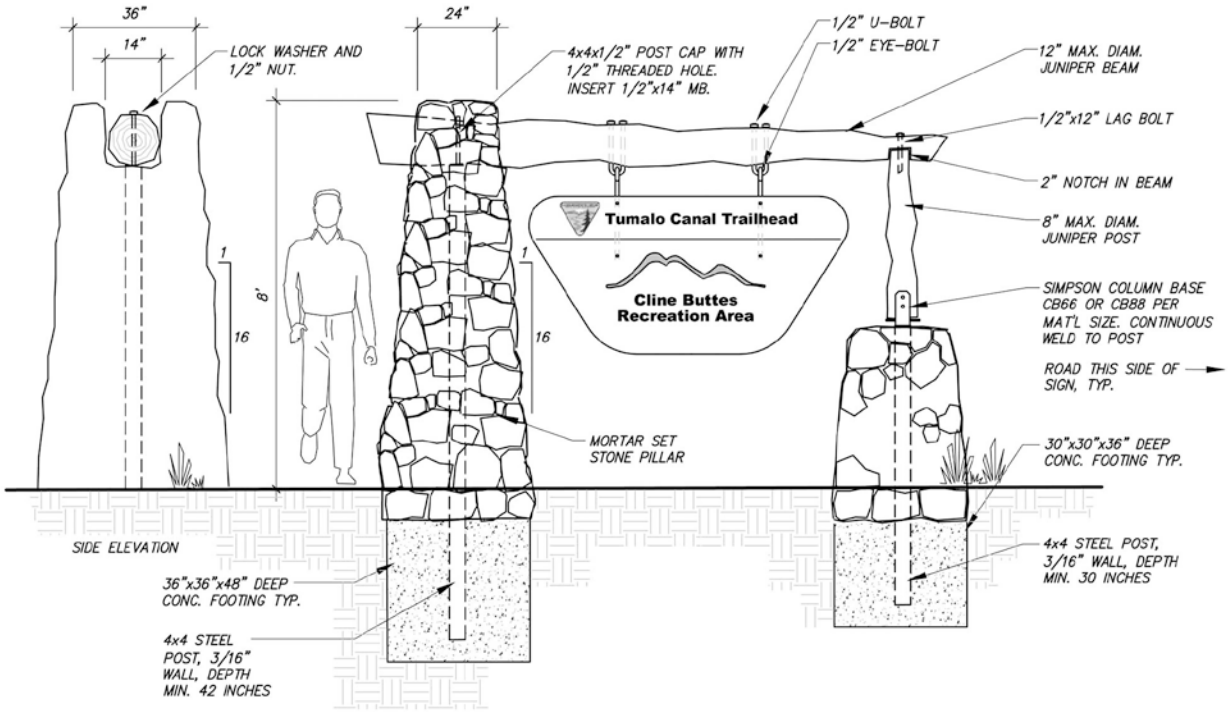


GATE TYPE 2
STEPOVER ELEVATION VIEW



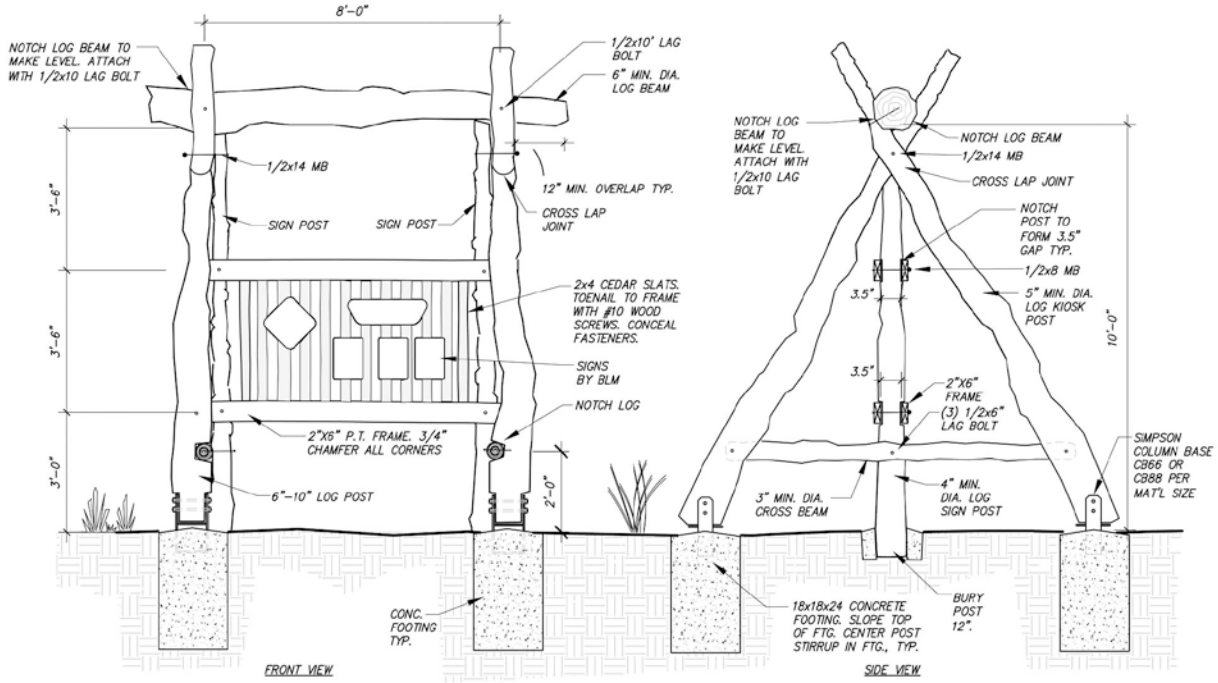
GATE TYPE 2
LATCH GATE ELEVATION VIEW

FIGURE 33: SIGN DETAILS



ENTRY SIGN

SCALE: N.T.S.



KIOSK TYPE A (INFORMATION)

SCALE: N.T.S.

Figure 34: Wood Fence Details

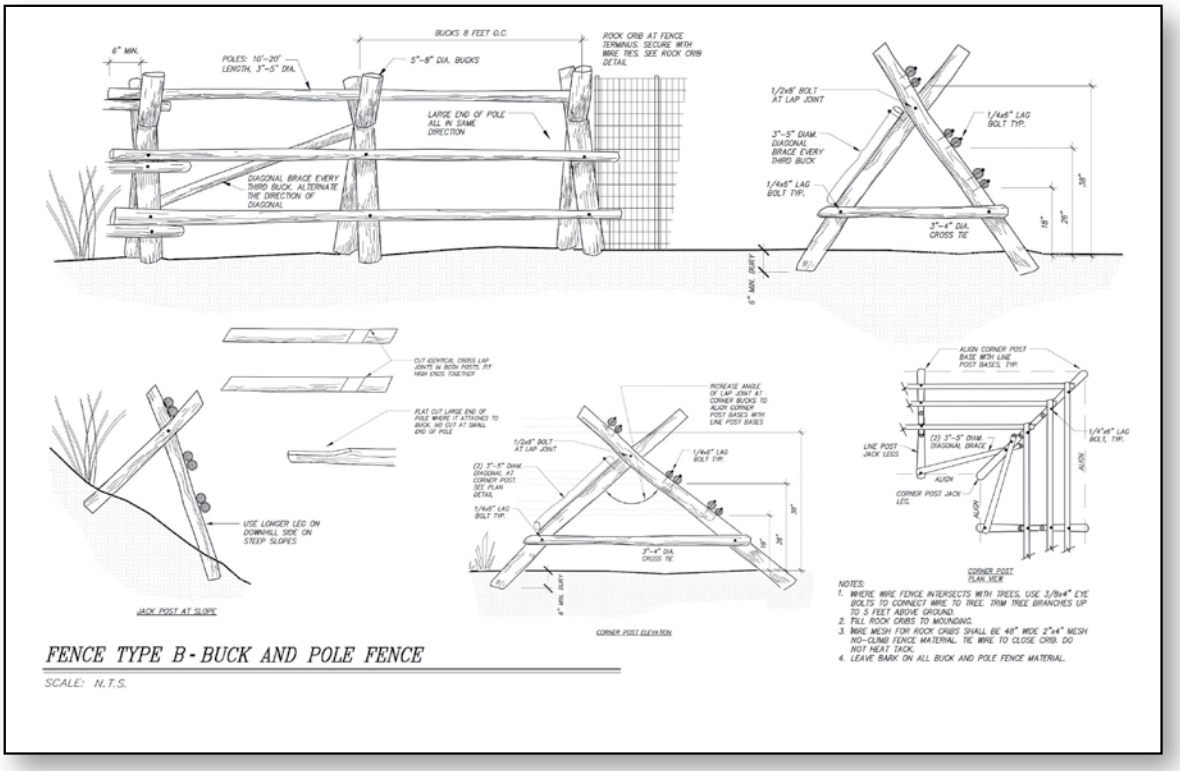
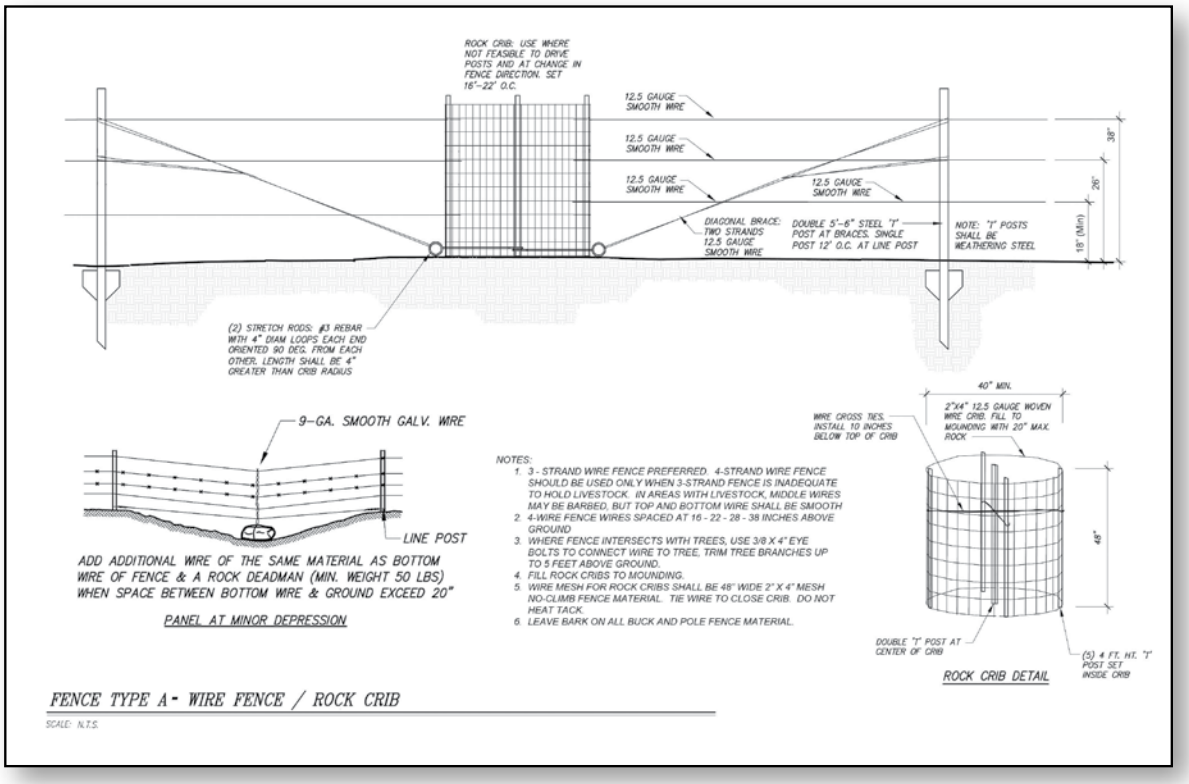


Figure 35: Wire Fence Details



systems on USFS managed lands. These signs are particularly critical at the intersections of trails of varying difficulty levels.

- Regulatory Signs

  Regulatory signs delineate rules, such as allowable users of a trail, seasonal or temporary closures, or allowable direction of travel.

- Interpretive/Educational Signs

  These signs will interpret natural or cultural points of interest along the trail and should be placed farther from the trail tread than other signs (roughly 4 feet away). Key areas for educational signs include trails rated as easy or beginner trails within the Tumalo Canal ACEC or Peck's Milkvetch ACEC, or at scenic viewpoints.

  Other key educational signs needed in the area include trail sharing signs, based on the IMBA trail yield sign standard. Signs indicating allowable uses of the trail should be posted at trail intersections and occasionally along trail segments. Allowable use signs will be more prevalent on the buttes and for parallel sections of trail in the Maston area, due to narrower trail width and potential hazards, and due to proximity of trails with different use types.

Trail Difficulty Rating

Trails proposed for the CBRA are rated according to a categorized system in order to ensure a safe and enjoyable experience for the users of the trail. A trail difficulty rating system can ensure that users are informed and allow them to use trails that match their skill level. In addition, risks of conflicts or injuries can be reduced by preventing inexperienced users from using trails that exceed their skill level. A rating system also allows the BLM to assess whether or not they have provided a variety of difficulty levels for the wide range of potential users. Trail difficulty levels rate the technical difficulty and challenge of the trail only, not the physical exertion created by use of the trail. Trail standards for each of the difficulty levels are shown in Table 8: CBRA Trail Standards, and generally use these criteria:

Tread width: Generally, the wider the tread, the easier the trail is due to increased space for maneuvering and increased line of sight.

Tread Surface: Generally, the more stable and smooth the surface, the easier the trail is rated. Hardened trails that are paved or surfaced require less skill than trails that have loose and unpredictable surfaces.

Trail Grade (Maximum and Average): Maximum grade is defined as the steepest section of trail that is more than approximately 10 feet in length. Average grade is the total elevation gain divided by the total distance of the trail and multiplied by 100. Generally, the greater the grade, the more difficult the trail is rated.

Trail Obstacles: Trail obstacles may be natural or man-made and include objects that impede regular travel along the trail. Single track mountain bike trails and OHV trails often have technical trail features (TTF) that add challenge. The larger an object is, or the more difficult it is to clear, navigate or go over an object, the more difficult the trail is rated.

For a specific trail segment, features that create an advance difficulty level will typically have bypasses to allow trail users to avoid the difficult feature and travel through at the average difficulty level for that stretch of trail.

As a section of trail or a trail system is developed in the CBRA, BLM will review the trails to see if they meet the desired difficulty levels. User groups will be consulted to review the proposed difficulty ratings prior to any final decisions or posting of difficulty ratings. Trails will be rated with difficulty symbols consistent with other trail use areas in Central Oregon. Typically, these signs/symbols include:

- Easiest - White Circle
- Easy – Green Circle
- More Difficult/Moderate – Blue Square
- Very Difficult – Black Diamond
- Extremely Difficult – Double Black Diamond

Trail System Implementation

Implementation of trail systems in the CBRA is partially dependent on external funding sources, partnerships, and volunteers. These factors make it difficult to define specific implementation steps or phases for the CBRA. However, given the extremely high existing route density and number of access points to the CBRA, the steps taken to implement the trail system become important factors in the long term success and sustainability of the area. Implementation of the trail system will include the following goals:

Access controls are a critical priority

BLM will seek to provide designated trailheads and reduce the number of unmanaged access points prior to, or concurrently with, trail construction or improvements. Lack of access controls and managed trailheads may result in user conflicts, degradation of newly constructed/maintained trail systems, or unauthorized use of decommissioned routes. If funding is not available to construct trailheads to final design standards, a short term trailhead facility will be created in the same location, with adequate cleared area for parking and boundary fencing, but without final grading, lot surfacing or restrooms. Priority will be given to implementation of trail systems in areas that have had access controls and trailheads constructed.

UDRMP Travel Management Closures

Priority will be given to implementing the UDRMP travel management designation (Close to motor vehicles) in the Maston area, before implementing trail systems in this, or other areas.

New Trail Construction and Route Decommissioning

Trail construction/designations will occur in balance with route decommissioning. All CBRA trail alternatives call for route decommissioning and new trail development. Given the existing high level of route density in the CBRA, steps will be taken to manage the route density throughout the CBRA implementation. These include:

In areas designated as Primary or Secondary Wildlife Emphasis, construction or improvement of trails will be done concurrently with route decommissioning to ensure there is no net increase in route

density during trail system implementation. Priority will be given to decommissioning routes that are located near raptor nest sites, or provide the greatest benefit in terms of creating unfragmented patches of public land.

Management of existing trail use during trail system construction

In areas designated as General Wildlife Emphasis, the following approach will be taken:

For areas that contained motorized/shared use trails in each alternative, BLM will identify an initial route system composed of

- Existing routes that are included in the final proposed trail system
- Existing routes that are not part of the final proposed trail system, but most closely match the final trail system configuration (loops and trail system connectivity)

The intent will be to provide immediate management direction for motorized trail use and provide maps and signs to keep visitors on a designated system that can remain relatively stable while new trails are constructed and unneeded routes are decommissioned. As new trails are constructed, priority will be given to decommissioning unneeded routes in the same area (conflicting routes or parallel/ redundant routes). The short-term, initial route system for Alternative 2 is shown on Map 17 – Alternative 2 Initial Motorized/Shared Use Routes.

For new trail construction in these areas, priority will be given to completing trails that form the larger, all-motor vehicle loop system and move routes away from adjacent private parcels. The priority for decommissioning routes will be on routes that link to non-motorized trails, are located near raptor nest sites, or provide the greatest benefit in terms of creating unfragmented patches of public land.

In areas where the majority the trail system is based on new construction and a high percentage of the existing routes will be decommissioned, short term area closures may occur while the trail system is being implemented. Areas that lack extensive ROW roads, have existing fences and topographic features that help manage access, and have identifiable boundaries, such as State Highways or County Roads, will be most likely to successfully use this approach (e.g., the area north of State Highway 126)

For areas that contain non-motorized trails, the following approach will be taken:

- Prior to route development or signing in the Maston Area, existing routes located near raptor nesting areas that are not part of the final trail system will be decommissioned and closed to use.
- Priority for route decommissioning in all areas of non-motorized trail use will include routes that provide unmanaged access and/or motor vehicle access into non-motorized trail use areas.
- Priority will be given to constructing routes that provide for trail connectivity and provide workable loop systems (for example, in Alternative 2, creating a horse trail parallel to Newcomb road will create a loop trail for horses using the existing powerline roads, so this trail development would likely occur before additional trails are constructed to form the parallel trail loop).

Table 8: CBRA Trail Standards

Trail Type	Gate Width (in)	Exposure Potential	Alignment	Turnouts/ mile (#)	Clearing width (in)	Clearing height (ft)	Helmet/leg/ vehicle slap (#)	Sideslope≤25% Tread Width (in)	Sideslope>25% Tread width (in)	Obstacles (#)	Obstacle Height (in)	Max Grade (%)	Max grade length (ft)	Maint Intensity
All motor easy	102	Minimal	Moderate	wide spot	102	8	Few	102	n/a	Few	6-8	15	200	3
All motor moderate	102	Minimal	Numerous	wide spot	102	8	Few	102	n/a	Many	8-10	20	300	3
All motor difficult	102, or less	High	Numerous	6	80-126	8	Common	80-102	80-126	Common	10+	50	300	1
Technical All motor	102, or less	High	Moderate	wide spot	Variable	8	Few	n/a	240	All	10+	n/a	300	1
Class I+III easy	50	Minimal	Moderate	wide spot	60-72	7	Few	50	n/a	Few	6-8	15	200	3
Class I+III moderate	50	Moderate	Numerous	3	50-60	6	Many	50	60	Many	8-10	25	300	3
Class I+III difficult	50	High	Continuous	6	50	6	Common	50	60	Common	10+	40	300	3
Moto only moderate	36	Moderate	Numerous	3	18-36	6	Common	18-24	18-36	Common	8-10	30	300	1
Moto only difficult	36	High	Continuous	6	18-36	6	Common	12-24	18-48	Common	10+	50	300	1
Horse easy	Horse gate	Minimal	Moderate	wide spot	96	10	Few	24-72	n/a	Few	n/a	15	200	1[1]
Horse moderate	Horse gate	Minimal	Moderate	3	72	10	Few	18-24	24-36	Many	n/a	25	300	3
Horse difficult	Horse gate	Moderate	Moderate	6	60	10	Many	18-24	24-36	Many	n/a	40	300	3
Mtn bike easy	30	Minimal	Moderate	wide spot	48	8	Few	24-72	n/a	Few	0-6	8 sustained (15)	200	1[1]
Mtn bike moderate	30	Minimal	Moderate	3	36	8	Few	24-48	24-48	Many	8-12	10 sustained (25)	300	3
Mtn bike difficult	30	Moderate	Numerous	6	36	8	Many	18-24	18-36	Common	36+[2]	15 sustained (25)	300	3
Mtn bike downhill	30	High	Continuous	wide spot	36	8	Many	12-24	12-24	Common	n/a	50	500	3
Ped only easy	S-gate	Minimal	Moderate	wide spot	48	8	Few	18-72	n/a	Few	n/a	10	200	1
Ped only moderate	S-gate	Minimal	Moderate	wide spot	36-48	8	Few	12-18	12-24	Few	n/a	25	300	1
Ped only difficult	S-gate	Moderate	Numerous	wide spot	36	8	Common	12-18	12-24	Common	n/a	40	200	3
Parallel – horse	Horse gate	Minimal	Moderate	wide spot	96	8	Few	24-72	n/a	Few	n/a	15	200	3
Parallel – bike	30	Minimal	Moderate	wide spot	96	8	Few	24-72	n/a	Few	6-12	15	200	3
Shared (non-motorized)	Horse gate	Minimal	Moderate	wide spot	96	8	Few	24-72	n/a	Few	0-6	15	200	1[1]

1. Maintenance intensity, clearing width, and clearing height may be increased if these routes are also used for administrative purposes
2. Technical mountain bike routes may have significant drops and obstacles. These features will always have a bypass route at or below the average difficulty level for the particular trail segment
3. Alignment: degree of twists, corners, and turning (including horizontal and vertical curves)
4. Clearing: Trees, boulders and constructed gateways ma be utilized to limit the width of a vehicle that can access the entire trail system, or a particular trail segment.
5. Obstacle: rocks, ledges, narrow passages, downed trees, ridges
6. Exposure: What is the probable consequence (severity) should a rider/trail user fall or lose control?
7. Turnouts will be located at intervisible points where extra width or a short passing lane is likely to be required, such as where users are likely to meet and where sidehill slopes are too steep for safe passing.

Appendix 2 - Existing CBRA Access Points and ROWs

Field surveys and data collection occurred throughout the CBRA during the initial stages of planning for the area. Photographs and data were collected using resource grade GPS equipment to verify all access points, types of access (width, use types, route condition, signs, etc.). Field surveys were also conducted to document the condition and type of access to private property. The following is a summary of the existing access for the CBRA.

Public Access Points

Maston Area

The Maston area is bordered by county roads to the west and south. Cline Falls Highway forms the western edge of the area, while Newcomb Road extends about one mile along the south boundary of the area, before turning south and connecting to Harper Road. A non-County, BLM granted ROW road (ROW 24/38, Map 5) extends along the rest of the southern boundary of the area, and provides access to parcels 15 and 16 located on the western canyon rim of the Deschutes River. The Deschutes River forms the eastern boundary of the area, while a residential subdivision is directly to the north, with Eagle Crest Resort slightly further north. Rural residential development occurs to the south of the Maston area, including homes in the White Rock Loop area and the Deschutes River Ranch development.

At a minimum, there are about 25 public access points into the Maston Area and Harper Road parcel. The most heavily used access points into the area occur at nine locations on the north side of Newcomb Road, which is not fenced. Visitors often park along these roads before starting their trail use in the area. Local residents in the White Rock Loop/Harper Road areas access the Maston area via these roads also, by riding or walking directly from their property. Many people drive to the east end of the Newcomb ROW road, and continue north into the Maston Area along the western rim of the Deschutes River Canyon. This use has created many road spurs along the canyon rim. There is one frequently used river access trail in this area.

There are several 4-foot gates or openings in the fence surrounding the Harper Road parcel. One vehicle access gate is located on an approved ROW road into the Harper Road parcel. An unauthorized vehicle access gate is located on BLM administered land at the northeast corner of this parcel.

There are only about five access points into the Maston area from Cline Falls Highway, due to the grazing fence that runs along the length of the parcel. OHV users and equestrians have entered the Maston area by crossing Cline Falls Highway in several places north of Newcomb Road, including a wire gate at the south end of the Maston area and at a location near the red cinder road to the north. This red cinder ROW road located 1/8 mile north of the Cline Buttes Rock Pit Road is used by the public to access a well used river trail and for occasional horse trailer parking. On the north boundary of the Maston area, several wire gates provide access to the area from private parcels located along Wickiup Avenue.

About a dozen river access routes have been mapped by BLM within the Maston area. On the west side of the canyon (from north to south), these include:

- A heavily used river trail occurs on the west side of the Deschutes River, which begins at several developed trailheads within Eagle Crest Resort. This river trail route passes through a dozen individual private parcels (parcels 4, 5, 7, 8, 9, and 12), in addition to BLM and County managed parcels along the river canyon (see Map 5).
- Several routes descend a draw located between the red cinder road and the northern boundary of the Maston area.
- Heavily used routes descending from a user-created parking spot near the east end of the red cinder road, just south of a private residence (Parcel 7, Map 5).
- A steep, primitive route descends into the canyon at the power line that crosses the river canyon north of Newcomb Road. This power line crosses the canyon and runs a short distance through BLM administered land on the east side of the canyon at Quarry/McVey Roads (see below).

On the east side of the canyon, access points include:

- A route descending an old road grade in the vicinity of 63rd Street. This access was principally used by local residents. The County has now vacated 63rd Street as a public road (Kolb, 2007).
- A trail route descending into the canyon at the end of Jaguar Road.
- Several steep and rugged routes at the Quarry/McVey Road area.

Of these numerous river access points, the trail from Eagle Crest offers the easiest and most highly developed access route. Access from Eagle Crest is provided for resort residents and guests only. The user-created trail at the end of the red cinder road located at the north end of the Maston area offers the second easiest access to the river, followed by the access route at Jaguar Road. All of the public (BLM) access routes to the river are very steep, primitive user-created trails. Some private properties on the river canyon also have river access trails. Few visitors access the river directly from BLM administered land at Harper Road due to the steep terrain, although this location has been used by the public to trespass on Deschutes River Ranch property to access Awbry Falls. Most of these access points were identified and reviewed by the Bend Paddle Trail Alliance (BPTA) during the CBRA planning process. These routes were not deemed suitable for put in/take out locations for kayaks or other river craft (Day, 2006).

Buttes Area

Eastern Access to Buttes Area

The west side of Cline Falls Highway is fenced north of Newcomb Road for approximately 2 miles. Access points in this area from Cline Falls Highway include McConnell Road, several user-created trail routes, and the FAA Road and "Bennett Road" which merge to form one intersection with Cline Falls Highway. The Bennett Road serves as a secondary access ROW road into the proposed Thornburgh Resort.

The west side of Cline Falls Highway north of the Thornburgh Property is not fenced. Within this stretch of road, there is one major developed road access point (the Cline Buttes Rock Pit Road) and several minor routes. These other routes from Cline Falls Highway are user-created trail routes in several draws or swales. One fairly heavily used road access point occurs at the north end of Cline Falls Highway, opposite Salmon Avenue. Although this access point starts on private property, it is used to access BLM lands via several power line access roads.

The Cline Buttes Rock Pit Road is a maintained ROW road that provides public access to the Cline Buttes Rock Pit, a commercial operation on private property. This gravel road is in good condition, and does receive regular use as a public land access point. There are over 25 routes leading into the CBRA from the Cline Buttes Rock Pit Road. Some of these are access roads underneath power lines; many others are user-created trail routes. A steep and rough ROW road (ROW 13, Map 5) provides access from the Cline Buttes Rock Pit Road to the communication site on the middle butte.

There are about six access points from Eagle Crest Phase 2 into the CBRA. Most of these are gates at existing power line ROWs. There are also a few walkovers that allow pedestrian access from portions of the resort. User-created hiking trails lead from neighborhoods to these access points. In addition, the approximately 15 miles of developed trails on the resort have several connections to the CBRA. The main access point seems to occur at Merlin Drive, which has a full size vehicle gate (for power line and water tank access) and a walkover and small parking area. Resort residents and guests often park at this location and hike into the CBRA. The other major access point from Eagle Crest occurs at Eagle Crest Boulevard, which is a paved right-of-way road connecting Eagle Crest Phases 2 and 3. There is a paved bicycle path along the north side of this road through BLM administered lands. Resort residents and guests use this trail system, although general public access to Eagle Crest trails occurs at several locations, including from the residential subdivisions to the north of the resort.

Northern Access to Buttes Area
The eastern edge of BLM lands north of Eagle Crest resort is not fenced. A well-used road access is located in this area, at the end of Antler Avenue. This access is occurring through an undeveloped private parcel. Along the north edge of the Buttes area, there are several access points from private parcels, including several well-used vehicle routes. In general, this north boundary is not fenced, except for the occasional private property fence. There are several access points off the south end of 95th Street, although most of these appear to be blocked by adjacent private property owners and/or signed as private land. The end of 103rd Street appears to be a lightly used access point, once blocked with rocks, but now reopened.

Eagle Crest Boulevard is the only road access into the buttes area of the CBRA from State Highway 126. This paved ROW road provides access to Eagle Crest Resort (Phase 3), and a portion of Eagle Boulevard has also been granted as the northern ROW road (ROW Road 11/33, Map 5) to the proposed Thornburgh Resort.

Western Access to Buttes Area
Barr Road extends for 5.5 miles along the west edge of the Buttes area. At least 15 access routes start at Barr Road and enter into the Buttes area. The southern 2 ½ miles of Barr Road is fenced along the eastern edge (adjacent to the Tumalo Canal ACEC). There are about three access routes along this portion of road. These include a road along the southern edge of the Tumalo Canal ACEC (located south of Gerking Market Road) that is regularly used by equestrians, and several routes at the north end of the Tumalo Canal ACEC.

The remaining 4-mile northern portion of Barr Road is unfenced. Over this stretch of road, there are about 12 routes leading east toward the buttes. Many of the routes are used to access the tops of the buttes by traveling through the Thornburgh Resort property. Both Eagle Crest and Thornburgh property managers have reported trespass and cut fences from public land visitors seeking access to the buttes.

Southern Access to Buttes Area
There are few, if any, public access points from the south boundary of the buttes area. Access from this area occurs from private parcels along Barr Road, Black Horse Lane, and McConnell Drive. Access

from these areas appears to be primarily hiking and equestrian use. A faint, two-track route leads from the north edge of McConnell Drive into the CBRA, but does not appear to be heavily used.

Eagle Crest Phase 3
Eagle Crest Phase 3 occupies the majority of private land on the northern butte. Most of the public land access from Eagle Crest Phase 3 occurs on the west and south sides of the development. Nearly all of these access points occur at existing gates on ROW roads or power lines. Eagle Crest has developed a community use area adjacent to BLM at the western edge of the resort. This area was developed as a potential equestrian facility; however, the planned use of this area is uncertain at this time (Samples, July 2007). It remains a location of interest for future trail connections from the resort to trails on the surrounding public lands (Samples, July 17, 2007). This area is located to the north of the large CEC power line (ROW OR 012676, Map 5) that runs east-west through the resort.

Central Area (area between Barr Road and Fryrear Road)

Eastern Access to the area
The majority of these access points occur from the west edge of Barr Road. The 5.5 mile west edge of Barr Road is unfenced, which has led to the development and use of about 34 routes. Most of these routes are currently open to motor vehicles. Visitor use over the past several decades has resulted in the creation of large, bare dirt parking and vehicle use areas on BLM administered lands at the north and south ends of Barr Road.

Northern Access to the area
There are about six access routes leading from State Highway 126 south into the CBRA. The majority of these are roads, and several of these currently provide the primary access to private parcels, although no formal ROWs have been granted by the BLM. Several of these access points occur at abandoned relic portions of State Highway 126. The westernmost of these (at T 14 S, R 11 E, SW ¼ Sec. 2) is a wire gate and serves as an occasional parking area/trailhead for equestrians and OHV users. An access road and metal gate are located on BLM administered lands approximately ½-mile further west, at the bottom of Deep Canyon. This location is a highly popular access point for equestrians, OHV users and other visitors who travel south in Deep Canyon and the other smaller canyons (Dry Canyon and Fryrear Canyon) that extend southwest towards Sage Ranch Road and Fryrear Road.

This user-created parking area often receives high levels of use, with parking and trail use occurring both on private property and adjacent BLM administered lands. While the canyons to the south are the major interest of those entering the CBRA at this point, travel south from this gate requires trespass on private property, through which neither the BLM nor the public have an easement. This access point is sometimes used for group or event use.

Western Access to the area
Access from Fryrear Road is limited to only a few locations, due to a fence construction project that occurred in the late 1990s. None of the existing access points is currently open to public motor vehicle use. There are several locked gates for administrative access, and one small trailhead built in the late 1990s by the BLM on lands owned by the State of Oregon. A timber framed box was built at this access point to allow horse access, while blocking motor vehicle use. This access point was vandalized to open it to unrestricted use. Access at this trailhead is closed to motor vehicles, and equestrians have been notified by signs at the trailhead since the late 1990s to avoid use of this access trail seasonally, due to nesting raptors. Further south on Fryrear Road, Sage Ranch Road provides access to the top of Dry Canyon. Sage Ranch Road is a ROW road across BLM administered lands that provides access to a 320 acre parcel (parcel 33, Map 5) located approximately 1 ½ miles east of Fryrear Road. However, this road

is not a public road, and due to an intervening private parcel (parcel 35) adjacent to Fryrear Road, neither the public or BLM has an easement to enter at this location. Based on conversations with the affected landowners, this road is used by local residents to access the canyon. Further south, an easement exists within the Fryrear Ranch Road subdivision for community access to BLM, and other access points from private parcels are used in the area between Fryrear Ranch Road and Plainview Road.

Southern Access to the area
One access point into BLM occurs from State Highway 20 at the Innes Market Road intersection. This access point provides legal access for properties located adjacent to, and west of the CBRA, as well as informal (non-ROW) access to a 240 acre inholding located approximately 2 miles north of this intersection.

There are no public access points into the CBRA from Innes Market Road, in part due to fence construction in the last five years. There are numerous driveways that lead from Innes Market Road or Dusty Loop Road through BLM administered lands and into private property. One of these access points provides access to several 10-acre parcels and 80-acre parcel 20 (see Map 5 and 9) as well as the ROW for access to the previously mentioned 240 acre inholding (parcels 28 -32) located about a mile further north into the CBRA. This road provides access for local area residents along Dusty Loop Road and others, both for motor vehicle use and equestrian use. Other access points occur from private properties in this area. No widely used access points seem to occur from Gerking Market Road.

Area North of State Highway 126

The area has approximately 36 public access points. The majority of access points occur from State Highway 126, Buckhorn Road, and the relic portion of State Highway 126 extending west from Kingwood Road. Access points from the north side of the relic highway portion are well used, likely due to their proximity to Redmond. The proximity to Redmond is also a contributing factor to the high number of access routes on the west side of Buckhorn Road immediately north of State Highway 126. These routes lead to a north-south power line corridor, and the area under the power line has become a problem dumping area. Relatively few access points occur into the CBRA from the east side of Buckhorn Road, partly due to a fence constructed by the BLM in 2002. There are few public access points from the east, due to the dense residential development along 101st Street. One access point occurs at the west end of Maple Drive, and has seen increasing levels of vehicle use (Dial, March 19-20, 2007), mostly from local area residents. The majority of access in this area is from private parcels, including several moderately visible OHV hillclimbs.

There are about six access points into the CBRA from the north side of State Highway 126 west of Buckhorn Road. One of these is an approved ROW road (ROW road 4, Map 5) to parcel 49 on the north edge of the CBRA. This road also provides access into the top of Buckhorn Canyon, to an active mine and the Buckhorn Canyon grazing allotment. To reach the house (Parcel 49) on the north edge of the CBRA, the grazing allotment, and mine, travelers must first pass through private land (parcel 48) located ¼ mile north of State Highway 126. Continued access through this parcel is uncertain because the public and BLM do not currently have an access easement.

Further west on State Highway 126, there are several roads leading into Deep Canyon near the bottom of the highway grade. Full size vehicle access into the bottom of the canyon requires travel through a private parcel (parcel 41), and neither the public nor the BLM has legal rights to pass through this property. In total, there are three instances where private parcels block legal access on existing roads that head north from State Highway 126. This has resulted in over 4 miles of road that are not useable by the public or by BLM for administrative purposes.

BLM lands to the west of Deep Canyon include a portion of McKenzie Canyon and a large plateau between McKenzie and Deep Canyons. Public access into this area is limited, due to the lack of public roads adjacent to public lands. Some access has occurred from Quail Tree Drive, located immediately north of State Highway 126 along the western edge of the CBRA. There is an existing fence along Quail Tree Drive, but the fence is in poor condition and is mostly on the ground. While Quail Tree drive is posted as a private road, local area residents likely use this road to access public lands. To the north of Quail Tree Drive, McKenzie Canyon Road passes through BLM administered lands for approximately one mile, but the canyon walls and irrigation canal alongside the road limit widespread access. The area around McKenzie Reservoir is used as a staging area, particularly during hunting season. Other access points occur from private parcels in the Fadjur Lane/Sabrina Lane area. One right of way road leads from McKenzie Canyon Road up to the top of the Plateau between Deep Canyon and McKenzie Canyon. Although neither McKenzie Canyon Road nor the right of way roads are public roads, they are likely used by the public to access the area between the two canyons. BLM does not currently have an easement for public land access in this location.

Existing ROWs and ROW Needs

Table ROW 1: Parcels with Specific ROW Grant Requests

	Parcel Id No.	Township and Range	Tax Lot Number[1]	Address[1]	Acres[1]	Notes
A	42	T 15 S, R 11 E, Sec 2	1511000000700		40	No existing improved driveway, current route through parcel 41
B	49	T 14 S, R 11 E, Sec 25, 26, 35, 36	1411000006302	18700 Highway 126	560	Current ROW may be blocked by intervening private parcel (see Table ROW 4 – A). Property has legal access from Lower Bridge Road, but house location does not due to topography.
C	56	T 15 S, R 12 E, Sec. 16	1512000004700	67585 Cline Falls Hwy	167.54	Request to amend ROW to allow paving the entire route
D1	28	T 15 S, R 11 E, Sec. 34	1511000006500		40.11	Properties have existing, unused ROW. All properties rely on casual use of unimproved road and separate ROW (OR 52520) for access. All properties have easements through each other for access.
D2	29	T 15 S, R 11 E, Sec. 35	1511000006200	66950 Dusty Dirt Road	91.40	
D3	31	T 15 S, R 11 E, Sec. 35	1511000006203	66970 Dusty Dirt Road	39.18	
D4	32	T 15 S, R 11 E, Sec. 35	1511000006201	66980 Dusty Dirt Road	59.88	
D5	30	T 15 S, R 11 E, Sec. 35	1511000006202		10.26	
E	41	T 15 S, R 11 E, Sec. 3	1511000000900		91.66	Short section of improved road on north side of State Hwy. 126. Approx. 350 feet of mostly unimproved road on BLM managed land. Road also provides casual access to parcel 42 (See Table ROW 1 – A)

1. Source: Deschutes County Land Information (LAVA 5)

Table ROW 2: Parcels lacking Both ROWs and ROW Grant Requests

	Parcel Id No.	Township and Range	Tax Lot Number[1]	Address[1]	Acres[1]	Notes (Parcels with improved or maintained roads without grants are noted)
A	2	T 15 S, R 12 E, SE ¼ Sec 22	1512220000302	3008 SW Cline Falls Highway	9.31	Existing improved driveway
B	1	T 15 S, R 12 E, SE ¼ Sec 22	1512220000301	2092 SW Cline Falls Highway	4.98	Existing improved driveway to this parcel goes through BLM then through corner of parcel listed above (Table ROW 2 – A)
C	3	T 15 S, R 12 E, Sec 23	Multiple lots	Multiple lots	N/A	SW 83rd Street entrance to subdivision south of Eagle Crest Resort
D	21	T 16 S, R 11 E, Sec 12	1611120000401	19317 Dusty Loop	20.43	Existing improved driveway between ROW 28 (OR 35535) and parcel 21
E	26	T 16 S, R 11 E, Sec 12	1611120000500	19285 Dusty Loop	10.10	Existing improved driveway off Dusty Loop, approx 200 ft. long
F	23 25	T 16 S, R 11 E, Sec 12	1611120000501 1611120000600	19225 Dusty Loop 19275 Dusty Loop	9.48 10.17	Existing driveway off Dusty Loop, could provide access to both 19225 and 19285. Road continues south to provide access to 19275
G	24	T 16 S, R 11 E, Sec 12	1611120000700	19265 Dusty Loop	10.09	Existing 150 foot driveway off Dusty Loop
H	43	T 14 S, R 11 E, Sec 33	1411330000202	69580 Holmes Road	13.94	Existing 350 foot driveway through BLM that connects to McKenzie Canyon Road. Parcel has legal access to Holmes Road
I	44	T 14 S, R 11 E, Sec 33	1411330000203	69550 Holmes Road	12.78	Both 69550 and 69580 appear to have an existing improved driveway/frontage road for approx. 725 feet along the south side of Holmes Road through public land
J	39	T 15 S, R 11 E, SE ¼ Sec 11, SW ¼ Sec. 12, NW ¼ Sec. 13, NE ¼ Sec. 14	1511000002600	19419 W Hwy 126	160	4,700 feet of improved gravel driveway through public land. Driveway connects to Hwy 126 via relic portion of old hwy that goes through BLM for 2,300 feet, then through intervening private parcel (Parcel 45) and/or County land (Parcel 46) for 1,400 feet (total length is 8,400 feet/1.6 miles)
K	40	T 15 S, R 11 E, Sec 3, 10	1511000001000	18525 Hwy 126	150.41	No existing Improved Driveway, 530 feet of unimproved road provides casual access from State Highway 126 through BLM managed lands.

1. Source: Deschutes County Land Information (LAVA 5)

TABLE ROW 3: POSSIBLE FUTURE ROW NEEDS (ROW CORRIDORS)

	Parcel Id No.	Township and Range	Tax Lot Number[1]	Address[1]	Acres[1]	Notes
A	61	T 15 S, R 12 E, Sec. 32	1512000008200		77.76	Undeveloped County parcel adjacent and south of Thornburgh property
B	19	T 16 S, R 12 E, Sec. 1	1611010000300		62.35	Undeveloped parcel north of Dusty Loop
C	13	T 15 S, R 12 E, Sec 25	151236B003600		10.11	County parcel on west side of Deschutes River
D	17	T 16 S, R 12 E, Sec. 2	161202C000401		1.25	Parcel on west side of Deschutes River, ROW would be via existing ROW OR 19460

1. Source: Deschutes County Land Information (LAVA 5)

TABLE ROW 4: ACCESS ISSUES

	Parcel Id No.	Township and Range	Tax Lot Number[1]	Address[1] (if known)	Acres[1]	Notes
A	48	T 14 S, R 11 E, Sec. 1	1511000000300	19580 W Hwy 126	80.74	May block access to Parcel 49 (See Table ROW 1 – B), may block access to mining claim and grazing allotment.
B	41	T 14 S, R 11 E, Sec. 3	1511000000900		91.66	Blocks admin access to Deep Canyon north of Hwy 126. May block access to Parcel 42 (See Table ROW 1 – B)
C	40	T 14 S, R 11 E, Sec 3	1511000001000	18525 Hwy 126	150.41	Blocks admin access to Deep Canyon south of Hwy 126
D	45 46 47	T 14 S, R 11 E, Sec. 1 T 14 S, R 11 E, Sec. 1 T 14 S, R 11 E, Sec. 1	1511000000501 1511000000500 1511000000503		16.82 7.10	May block casual access to Parcel 39 (See Table ROW 2 – K). Blocks administrative access.
E	35	T 15 S, R 11 E, Sec. 28	1511280001100	67288 Fryrear Road	19.31	

1. Source: Deschutes County Land Information (LAVA 5)

Appendix 3 - Wildlife Species

Wildlife Species and Habitat Associations for Species Potentially Occuring in CBRA

Wildlife Species	Status	Habitat Associations					Assessment Type
(common name)	**Federally listed Threatened, Endangered or Proposed; or Bureau Sensitive/ PIF* Focal**	**Western Juniper Woodlands**	**Shrub-Steppe**	**Old Growth Juniper Woodland**	**Riparian**	**Documented Locally**	(SS) Single Species Or (HT) Habitat Type (multi-species)
Birds (references 1, 2, 6 and 7)							
American Coot	None				**X**	**X**	HT
American Crow	None	**X**	**X**	**X**		**X**	HT
American Goldfinch	None	**X**	**X**			**X**	HT
American Kestrel	None	**X**	**X**	**X**		**X**	HT
American Robin	None	**X**	**X**	**X**		**X**	HT
American Widgeon	None				**X**	**X**	HT
Ash-throated Flycatcher	None	**X**	**X**	**X**		**X**	HT
Bald Eagle	Sensitive		**X**		**X**	**X**	SS
Barn Owl	None	**X**	**X**				HT
Barn Swallow	None	**X**	**X**			**X**	HT
Belted Kingfisher	None				**X**	**X**	HT
Black-billed Magpie	None	**X**	**X**			**X**	HT
Black-capped Chickadee	None	**X**				**X**	HT
Black-chinned Hummingbird	None	**X**	**X**				HT
Blackheaded Grosbeak	None	**X**		**X**		**X**	HT
Black-throated Gray Warbler	None	**X**		**X**		**X**	HT
Blue-winged Teal	None				**X**	**X**	HT
Brewer's Blackbird	None	**X**	**X**	**X**		**X**	HT
Brewer's Sparrow	Focal	**X**	**X**	**X**		**X**	HT
Brown-headed Cowbird	None	**X**	**X**	**X**		**X**	HT
Burrowing Owl	Focal		**X**				HT
Bushtit	None	**X**	**X**			**X**	HT
California Quail	None	**X**	**X**			**X**	HT
Canada Goose	None				**X**	**X**	HT
Cassin's Finch	None	**X**		**X**		**X**	HT
Cassin's Vireo	None	**X**					HT
Chipping Sparrow	None	**X**		**X**		**X**	HT
Chukar	None		**X**			**X**	HT
Clark's Nutcracker	None	**X**		**X**		**X**	HT
Cliff Swallow	None	**X**	**X**				HT
Common Nighthawk	None	**X**	**X**	**X**		**X**	HT
Common Poorwill	None	**X**	**X**				HT

Common Raven	None	**X**	**X**	**X**		**X**	HT
Cooper's Hawk	None	**X**		**X**		**X**	HT
Dark-eyed Junco	None	**X**	**X**	**X**		**X**	HT
Dusky Flycatcher	None	**X**	**X**	**X**		**X**	HT
Eastern Kingbird	None	**X**	**X**				HT
Empidonax Flycatcher	None				**X**	**X**	HT
European Starling	None	**X**	**X**		**X**	**X**	HT
Evening Grosbeak	None	**X**				**X**	HT
Ferruginous Hawk	Focal	**X**	**X**			**X**	HT
Golden Eagle	None	**X**	**X**			**X**	SS
Gray Flycatcher	None	**X**	**X**	**X**		**X**	HT
Great Blue Heron	None				**X**	**X**	HT
Great Horned Owl	None	**X**	**X**			**X**	HT
Green-tailed Towhee	None	**X**	**X**	**X**		**X**	HT
Hairy Woodpecker	None	**X**					HT
Hammond's Flycatcher	None	**X**		**X**		**X**	HT
Hermit Thrush	None	**X**		**X**		**X**	HT
Horned Lark	None	**X**	**X**			**X**	HT
House Finch	None	**X**	**X**	**X**		**X**	HT
House Wren	None	**X**		**X**		**X**	HT
Killdeer	None		**X**			**X**	HT
Lark Sparrow	Focal	**X**	**X**			**X**	HT
Lazuli Bunting	Focal	**X**		**X**		**X**	HT
Lesser Goldfinch	None	**X**					HT
Lesser Scaup	None				**X**	**X**	HT
Loggerhead Shrike	Focal	**X**	**X**	**X**		**X**	HT
Long-Billed Curlew	None						HT
Long-eared Owl	None	**X**	**X**				HT
MacGillivray's Warbler	None	**X**					HT
Mallard	None				**X**	**X**	HT
Merlin	Strategic	**X**	**X**				HT
Mountain Bluebird	None	**X**	**X**	**X**		**X**	HT
Mountain Chickadee	None	**X**		**X**		**X**	HT
Mountain Quail	None	**X**	**X**				HT
Mourning Dove	None	**X**	**X**	**X**		**X**	HT
Northern Flicker	None	**X**	**X**	**X**		**X**	HT
Northern Goshawk	None	**X**				**X**	HT
Northern Harrier	None		**X**			**X**	HT
Northern Mockingbird	None		**X**				HT
Northern Pygmy-Owl	None	**X**					HT
Northern Saw-whet Owl	None	**X**				**X**	HT
Northern Shrike	None	**X**				**X**	HT
Oak/Juniper Titmouse	None	**X**					HT
Olive-sided Flycatcher	None	**X**				**X**	HT

Orange-crowned Warbler	None	**X**				**X**	HT
Osprey	None				**X**	**X**	HT
Pine Siskin	None	**X**					HT
Pinyon Jay	None	**X**		**X**		**X**	HT
Plumbeous Vireo	None	**X**					HT
Prairie Falcon	Focal	**X**	**X**			**X**	SS
Red Crossbill	None	**X**					HT
Red-breasted Nuthatch	None	**X**		**X**		**X**	HT
Red-tailed Hawk	None	**X**	**X**	**X**		**X**	HT
Ring-necked Pheasant	None		**X**				HT
Red-winged Blackbird	None		**X**		**X**	**X**	HT
Rock Wren	None	**X**	**X**	**X**		**X**	HT
Ruby-crowned Kinglet	None	**X**				**X**	HT
Rufous Hummingbird	None	**X**	**X**			**X**	HT
Rufous-sided Towhee	None	**X**				**X**	HT
Sage Sparrow	Focal		**X**	**X**		**X**	HT
Sage Thrasher	Focal	**X**	**X**			**X**	HT
Savannah Sparrow	None		**X**			**X**	HT
Say's Phoebe	None	**X**	**X**			**X**	HT
Scrub Jay	None	**X**			**X**	**X**	HT
Sharp-shinned Hawk	None	**X**					HT
Short-eared Owl	None	**X**	**X**				HT
Song Sparrow	None	**X**	**X**			**X**	HT
Spotted Sandpiper	None				**X**	**X**	HT
Spotted Towhee	None	**X**					HT
Steller's Jay	None	**X**					HT
Swainson's Hawk	None	**X**	**X**			**X**	HT
Townsend's Solitaire	None	**X**		**X**		**X**	HT
Townsend Warbler	None	**X**		**X**		**X**	HT
Tree Swallow	None	**X**					HT
Turkey Vulture	None	**X**	**X**			**X**	HT
Vesper Sparrow	None	**X**	**X**	**X**		**X**	HT
Violet-green Swallow	None	**X**					HT
Western Bluebird	None	**X**				**X**	HT
Western Kingbird	None	**X**	**X**			**X**	HT
Western Meadowlark	None	**X**	**X**	**X**		**X**	HT
Western Screech-Owl	None	**X**					HT
Western Scrub-Jay	None	**X**					HT
Western Tanager	None	**X**		**X**	**X**	**X**	HT
Western Wood-Pewee	None	**X**		**X**	**X**		HT
White-breasted Nuthatch	None	**X**				**X**	HT
White-crowned Sparrow	None	**X**	**X**			**X**	HT
White-throated Swift	None	**X**	**X**				HT
Wilson's Phalarope	None		**X**				HT

Yellow-rumped Warbler	None				**X**	**X**	HT
Mammals (references 3, 4, 5 & 7)							
Allen's Chipmunk	None	**X**	**X**				HT
American Badger	None	**X**	**X**			**X**	HT
Belding's Ground Squirrel	None	**X**	**X**			**X**	HT
Big Brown Bat	None	**X**	**X**			**X**	HT
Black Bear	None	**X**	**X**				HT
Black-Tailed Jackrabbit	None	**X**				**X**	HT
Brazilian Free-tailed Bat	None		**X**				HT
Bushy-Tailed Woodrat	None	**X**	**X**	**X**		**X**	HT
California Bighorn Sheep	None	**X**	**X**				HT
California Kangaroo Rat	None		**X**				HT
California Myotis	None	**X**	**X**			**X**	HT
Columbian Ground Squirrel	None	**X**	**X**				HT
Common Porcupine	None	**X**	**X**			**X**	HT
Dark Kangaroo Mouse	None		**X**				HT
Cottontail Rabbit	None	**X**				**X**	HT
Desert Woodrat	None	**X**	**X**			**X**	HT
Dusky-Footed Woodrat	None	**X**					HT
Fringed Myotis	Sensitive		**X**			**X**	HT
Golden-Mantled Ground Squirrel	None	**X**	**X**				HT
Great Basin Pocket Mouse	None	**X**	**X**			**X**	HT
Hoary Bat	None	**X**	**X**				HT
Kit Fox	Sensitive		**X**				HT
Least Chipmunk	None	**X**				**X**	HT
Little Brown Myotis	None	**X**	**X**			**X**	HT
Little Pocket Mouse	None		**X**				HT
Long-eared Myotis	None	**X**	**X**			**X**	HT
Long-Legged Myotis	None	**X**	**X**			**X**	HT
Long-Tailed Vole	None	**X**	**X**				HT
Long-Tailed Weasel	None	**X**					HT
Merriam's Ground Squirrel	None		**X**				HT
Merriam's Shrew	None		**X**				HT
Montane Vole	None		**X**			**X**	HT
Mule Deer	None	**X**	**X**			**X**	SS
North American Bobcat	None	**X**	**X**			**X**	HT
North American Coyote	None	**X**	**X**			**X**	HT
North American Mountain Lion	None	**X**					HT
Northern Grasshopper Mouse	None		**X**			**X**	HT
Northern Pocket Gopher	None	**X**	**X**			**X**	HT
Northern Pocket Mouse	None	**X**					HT
Nuttall's Cottontail Rabbit	None	**X**	**X**			**X**	HT
Ord's Kangaroo Rat	None	**X**	**X**			**X**	HT

Pallid Bat	Sensitive	**X**	**X**			**X**	HT
Piñyon Mouse	None	**X**				**X**	HT
Piute Ground Squirrel	None		**X**				HT
Preble's Shrew	None		**X**				HT
Pygmy Rabbit	Sensitive		**X**				HT
Rocky Mountain Elk	None	**X**	**X**				SS
Sagebrush Vole	None		**X**			**X**	HT
Small-footed Myotis	None	**X**	**X**			**X**	HT
Spotted Bat	Sensitive		**X**			**X**	HT
Townsend's Big-Eared Bat	Sensitive	**X**	**X**			**X**	HT
Townsend's Ground Squirrel	None	**X**	**X**			**X**	HT
Vagrant Shrew	None		**X**			**X**	HT
Western Harvest Mouse	None		**X**				HT
Western Pipistrelle	None	**X**	**X**			**X**	HT
Western Small-Footed Myotis	None	**X**	**X**				HT
White-Footed Deer Mouse	None	**X**	**X**			**X**	HT
Yellow Pine Chipmunk	None	**X**				**X**	HT
Yellow-Bellied Marmot	None	**X**				**X**	HT
Yuma Myotis	None	**X**	**X**			**X**	HT
Reptiles (references 3 & 5)							
Common Garter Snake	None	**X**	**X**				HT
Night Snake	None	**X**	**X**				HT
Northern Gopher Snake	None	**X**	**X**				HT
Rubber Boa	None	**X**	**X**				HT
Sagebrush Lizard	None	**X**	**X**			**X**	HT
Short-Horned Lizard	None	**X**	**X**				HT
Side-Blotched Lizard	None	**X**	**X**				HT
Southern Alligator Lizard	None	**X**	**X**				HT
Striped Whipsnake	None	**X**	**X**				HT
Western Fence Lizard	None	**X**				**X**	HT
Western Racer Snake	None	**X**	**X**				HT
Western Rattlesnake	None	**X**	**X**				HT
Western Skink	None	**X**	**X**			**X**	HT
Western Terrestrial Garter Snake	None	**X**	**X**				HT
Amphibians (references 3 & 5)		**(In vicinity of Aquatic Habitats)**					
Pacific Treefrog	None	**X**	**X**		**X**	**X**	HT
Great Basin Spadefoot	None	**X**	**X**		**X**	**X**	HT
Western Toad	None	**X**	**X**		**X**		HT
Long-toed Salamander	None	**X**	**X**		**X**		

1. Adamus, et. al., 2001
2. Miller, et. al., 1998
3. ODFW, 1994
4. Miller, et. al., 2005
5. Johnson, 2001
6. Reiher, et. al., 2000
7. Miller, et. al., 1997

Appendix 4 - Project Design Features for Vegetation Management.

The following Project Design Features (PDFs) will be included in the design of every vegetation treatment in the CBRA. The PDFs serve as a basis for resource protection in the implementation of the proposed action and would supplement the existing guidelines in the UDRMP. Guidelines in the UDRMP that are relevant to CBRA vegetation management include:

- UDRMP pg. 67 (Special Management Areas)
- UDRMP pg. 93 – 95 (Forest, Range, and Woodland Products)
- UDRMP pg. 101 – 102 (Visual Resources)
- UDRMP pg. 139 (Transportation and Utilities)
- UDRMP pg. 239 – 243 Appendix F (Best Management Practices)

Project Design Features/Mitigation Measures

Recreation (R)

R-1
Designated trails (existing and proposed) and proposed ROWs would be flagged in the field prior to vegetation treatments to allow for retention of trees that would provide shade and/or protect/ maintain the curvilinear nature of OHV trails. A higher density of junipers may be retained within approximately 125 feet of each side of motorized use trails to help define the trail system. However, where other substrates (e.g., rocks) are present fewer or no trees would be retained.

R-2
A travel management map will be created for each vegetation treatment plan. For administrative use during vegetation treatments, this map will show areas of cross country use, areas restricted to existing or designated routes, and access points and landings. Vehicle use for vegetation management activities will be managed as follows:

- Full size vehicles/equipment using existing and proposed OHV trails are limited to All-motor Trails only.
- Quads using existing and proposed OHV trails are limited to All-motor and Class 1/3 trails only
- No full size vehicle use would be allowed on designated, non-motorized trails less than 8 feet in width.
- Temporary roads for vegetation removal would be located outside of proposed trail corridors wherever feasible.
- If designated OHV trails are used for vegetative treatments, road improvements will generally not occur on trails designated as moderate or difficult level trails, unless the technical difficulty level can be reestablished as part of the vegetation treatment operation.

Special Management Areas (ACECs and State Scenic Waterway)

ACEC-1
A travel management map will be created for each vegetation treatment plan. For administrative use during vegetation treatments, this map will show areas of cross country use, areas restricted to existing or designated routes, and access points and landings. Vehicle use for vegetation management activities will be managed as follows:

No vehicle use off designated roads in the Pecks Milkvetch ACEC between March 1 and August 15 (URMP ROD, pg. 139)

Soils and Water Quality (SW)

SW-1
Trees that are cut should be felled away from all stream channels, including ephemeral draws, unless explicitly prescribed to be included into the channel network.

SW-2
Equipment operations would be limited to slopes of less than 20 percent.

SW-3
Soil moisture conditions would be monitored and operations would be suspended before unacceptable limits of compaction or displacement occur.

SW-4
For ground-based yarding, main arterial trails (over 3 round-trip passes) would be designated at a spacing of 100 feet or more apart.

SW-5
Soil impacts from operations (compaction, displacement) would be limited to less than 20 percent of the total acreage within the treatment unit.

SW-6
Previously disturbed areas would be used where available to establish landings.

SW-7
Areas within 300 to 600 feet of roads and other suitable travel routes would usually be managed (thinning and removing unwanted woody material) using the existing travel system with wheeled or track vehicles. Areas farther than 600 feet from an existing road may require use of temporary, primitive routes when removing woody material from the site occurs. Improvements to temporary routes would be limited to thinning of woody plants and movement of large rocks if needed for haul vehicle passage (unless these routes are part of the final proposed road or trail system). Travel by haul vehicles would be limited to designated routes which would be seeded, when necessary, upon completion of the management action. Light maintenance of existing roads may occur where necessary to allow haul vehicle use.

SW-8
Landings, temporary access routes, and primary skid trails would be closed, rehabilitated, and/or

disguised following use. Mounds and berms would be smoothed to the original contour.

SW-9
Rehabilitation methods for access routes, trails and landings could include seeding, scarification, and placing woody debris and/or boulders back onto the route.

SW-10
Rutted, rocky, and degraded portions of main access routes would be improved or rerouted when needed for operations or if prescribed for long-term road network improvements.

SW-11
Access roads would be maintained to the prescribed standard needed for operations, with a final maintenance treatment at the conclusion of operations. Maintenance could include such measures as adding fill to level the grade/facilitate drainage, blading, and dust abatement.

Visual Resources (VRM)

CBRA Wide PDFs
The following apply to vegetation treatments throughout the CBRA (i.e. areas designated as VRM Class 4), except where contradicted or revised for VRM Class 2 and 3 areas.

VRM -1
All vegetation treatment design would identify existing and proposed ROWs and include measures to partially screen built features (e.g., roads, structures, utility lines) from view of KOPs. Design of vegetation management projects will assess the change in contrast due to increased visibility of ROWs and adjacent structures and mitigate where needed to meet or exceed VRM standards.

VRM-2
Vegetation management actions will use BLM contrast rating methods and include completion of VRM Contrast Rating worksheets (Form 8400-4) in project design. Treatments will be designed to mimic patterns found in the characteristic landscape as well as to improve long distance scenic view opportunities.

VRM-2
Vegetation management actions would incorporate seen area mapping from KOPs as a tool to help locate actions that cause greater contrast such as landings, swamper burn piles, machine piles, etc. in order to meet or exceed VRM standards.

VRM-3
Early in each treatment design process, BLM will identify and use the following in designing all vegetation treatments:

- All proposed trails and who the intended user type is for each trail
- Trailhead locations
- Existing and proposed ROWs
- Additional or new KOPs (e.g., trails and trailheads)

VRM-4
In locations where trails or ROWs are visible or potentially visible as part of a wide, panoramic view, treatment design will consider locating treatment edges at or near these routes, to avoid routes bisecting cleared areas.

VRM-5
Identification and possible flagging of existing and proposed trail and ROW routes prior to vegetation management treatments would be done in order to ensure that sufficient screening vegetation may be left to meet or exceed VRM standards.

VRM – 6
Burn piles, landings, or other major features will not be located on existing or proposed trail corridors. Stumps within 200 feet of proposed tails will be no higher than four inches above ground level, uphill side. Cut faces of visible trees will be oriented away from the trail.

VRM Class 2 Areas
VRM Class 2 Areas include the Deschutes River Canyon, portions of the Buttes and Tumalo Canal ACEC, and portions of the canyons north and south of State Highway 126 (e.g., Deep, Dry, and Buckhorn Canyons). For VRM Class 2 areas that are visible from KOPs, the following effects were identified and mitigation measures are proposed.

VRM – 7
Within VRM Class 2 areas visible from KOPs, treatment methods that introduce High or Moderate to High levels of contrast would not be used for distance zones and slopes as identified in Table 64.

VRM – 8
Vegetation treatments will identify photo monitoring points, which will be used in the overall monitoring process to assess the length of short term visual impacts and how well VRM Class standards were met for the area.

Buttes within view of State Highway 126

Very little of the CBRA lands on the buttes are visible from State Highway 126. Most of the highly visible and most prominent views from the State Highway are of higher elevation lands on the north butte, which are private property. Lands on the middle and southern buttes are visible at greater distances – distances at which vegetation management activities may introduce variety in color by creating openings in a generally uniform and mottled dark green of junipers. Juniper thinning and creation of lighter color openings may help reduce the linear form created by the bottom of the Cline Buttes Rock Pit clearing and the CEC powerline ROW that extends from the northeast corner of the rock pit clearing and extends partway across the northern butte.

Project design features and mitigation measures to reduce the amount of contrast so that management activities do not attract attention of the casual observer include:

VRM-9
Use GIS 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 State Highway 126. On mid

slopes, limit burn pile number, size and location to that which can be effectively screened from State Highway 126 or from Cline Falls Highway.

VRM – 10
Leave adequate junipers along fencelines to avoid strong line and color contrast between BLM and Resort property, unless fuels can be treated simultaneously on BLM and adjacent resort property

VRM-11
Leave adequate junipers along property lines to partially screen views of structures that are currently screened from view from State Highway 126. For these areas, treat shrubs and ground fuels as a higher priority, consider limbing instead of complete removal of individual old growth juniper trees.

VRM-12
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, covering with branches, brush, boulders, etc. such that the trail is disguised and can be naturally revegetated or artificially seeded. No motorized vehicle use on slopes above 20 percent

VRM-13
On steeper, upper elevation slopes on the buttes, no use of skidders or other treatment methods that potentially have high or high/moderate contrast potential (see Table 64) or other mechanical treatments that leave vertical lines on the slopes.

VRM-14
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 ROW roads/utility lines serve to strengthen the dominance of these linear features, which contrast with the characteristic landscape.

VRM-15
Burn piles will not be used on slopes above 20 percent in immediate foreground view of KOPs, unless they can be strategically located to effectively screen them by placing in blind areas behind leave tree crowns.

Deep Canyon within view of State Highway 126

VRM-16
Limit heavy equipment use to existing roads and designated equipment trails within ¼ mile of State Highway 126 at Deep Canyon. Designated equipment trails would be rehabilitated following use. Rehabilitation would involve "erasing" the trail by pulling in berms, covering with branches, brush, boulders, etc. such that the trail is disguised and can be naturally revegetated or artificially seeded.

VRM-17
No motorized vehicle use on slopes over 20 percent

VRM-18
Burn piles will not be located in visible areas on canyon slopes within ¼ mile of State Hwy 126

VRM-19
Leave adequate junipers along fencelines to avoid strong line and color contrast between BLM and private property, unless fuels can be treated simultaneously on BLM and adjacent property

VRM-20
On steeper slopes, no use of skidders or other treatment methods that potentially have high or high/moderate contrast potential (see Table 64) or other mechanical treatments that leave vertical lines on the slopes.

Tumalo Canal ACEC

VRM-21
No motor vehicle use is allowed on pedestrian trails in the Tumalo Canal ACEC, except on the existing road that bisects the ACEC north to south.

VRM-22
Areas within the immediate foreground view of designated pedestrian/interpretive trails in the ACEC will be hand treated with no motor vehicle use allowed within 200 feet of the trail, with the possible exception of low-speed quad use in some areas outside the canal itself. In locations where designated pedestrian/interpretive trails provide elevated viewpoints, limitations on management actions will include areas greater than 200 feet if necessary to reduce visual contrast.

VRM-23
All stumps will be no higher than 4 inches on the uphill side within 200 feet of designated 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.

VRM-24
The relic canals would not be used for mechanized equipment travel used in treatment methods except at a minimum number of designated crossing points. Designated crossing points would be rehabilitated after vegetation treatments to restore the canal profile.

VRM-25
Hand cutting of trees within 200 feet of designated trails will include scattering of slash and moving of tree stems outside of immediate viewshed of trails and scattering sufficiently to reduce height below or equal to surrounding shrub vegetation. If no screening shrubs exist, trees will be removed outside the trail corridor and treated by lop and scatter, chipping or other methods.

VRM-26
All treatment designs will retain sufficient density of juniper adjacent to Thornburgh Resort to partially screen views of the resort development from designated interpretive trails.

VRM-27
Treatments would identify designated routes for motorized equipment and limit the density of these routes to the minimum necessary. Vehicle use would be limited to those with rubber tires.

VRM-28
Canal berms would be revegetated with a mixture of native grasses.

VRM-29
Recontouring and revegetation of canal berms and channels will occur at locations where motorized equipment is used in crossing the canal at designated locations.

VRM-30
Hand piling and burning would be done outside of the immediate foreground view of designated trails.

VRM-31
Prescribed broadcast burning would not be used within the Tumalo Canals ACEC to avoid the potential to burn wood structures along the relic canal corridor and due to the presence of contiguous old-growth juniper woodlands.

VRM-32
Public firewood cutting will not be used within the ACEC to avoid the creation of new travel routes and to avoid conflicts with recreational use.

VRM-33
Trees will not be cut and left dead/down without trimming and scattering slash sufficient to reduce height of downed trees to equal or less than surrounding vegetation.

Deschutes River Canyon

VRM-34
BLM will seek to use existing access road across private lands at 63rd Avenue to gain access and use to treat and remove junipers within the river canyon without creating additional routes or leaving large amounts of slash, whole trees or logs. The presence of a reasonable road down to the river's edge in this location allows for use of greater mechanized equipment to harvest, process and transport young junipers.

VRM-35
Treatments will consider the opportunity to retain junipers in locations specifically chosen to screen views of existing houses from both the river and from designated river access trails.
Improve and stabilize river access trails prior to conducting fuels treatments, particularly at Jaguar Road and the red cinder road (ROW OR 45975) access point, which has reasonable grades for stable access trails. Access trails may be used for access for hand crews and for material removal (hand crews or ATV with arch or small trailer, or mechanized walk behind equipment)

No use of skidders or other treatment methods that potentially have high or high/moderate contrast potential (see Table 64) or other mechanical treatments that leave vertical lines on the slopes over 20%.

VRM-36
Hand or machine pile and burn techniques will be used only on the flat benches above the Deschutes River Canyon.

VRM-37
Swamper Burn Piles may be located at widely scattered locations in the Deschutes River Canyon, but would be located so that no more than several would be visible from each public access points/trail leading down into the canyon.

VRM-38
Individual trees on mid or upper slopes of Deschutes River Canyon may be treated by hand cutting, using lop and scatter; or girdled, or individually burned and left as snags

VRM-39
Treatment on mid or upper slopes of Deschutes River Canyon may be limited to selective thinning of approximately 10 to 20 percent of trees in any one treatment entry by lop and scatter, with material reduced to the smallest size practicable. Some tree stems will be removed when practicable or used onsite for trail stabilization if needed. An alternative to selective thinning 10-20% of the stems would be to treat 10-20% of the sideslope on an area basis in any one entry to reduce sudden visual impact.

VRM-40
Cut stumps and tree stem faces may be painted an appropriate color selected from the BLM list of environmental colors and selected to match the surrounding landscape post treatment type. This mitigation will be based on post treatment evaluation of the visibility of cut stems from designated river access trails or the river edge.
Trees on lower slopes of Deschutes River, adjacent to the riparian zone may be removed where practicable, used on-site where needed, lopped and scattered in open non-visible areas, swamper burned in concealed locations, or disposed of with a combination of these methods.

VRM-41
Trees will not be skidded or hauled on the ground perpendicular to the canyon slope when this would create a long-term noticeable line.

VRM-42
Cut all stumps adjacent to riparian area at a height of no greater than 4 inches.

VRM-43
Site specific treatments within the canyon would be developed in cooperation with Oregon Parks and Recreation who administer the State Scenic Waterways. Options for treatment include: 1) cutting, lopping, and piling of branches where visible, creating small clearings (a few acres) over time or 2) thinning 20-30% of the total juniper at a time, extending the work over time until most of the young juniper has been cut. Option 2 may include thinning small juniper and letting them lie where they fall, providing fuel for a prescribed burn upon the next entry.

<u>VRM Class 3 Areas</u>

VRM-44
VRM Class 3 Areas include the immediate foreground view of the CBRA from State Highway 126. For this management class and in seen areas from KOPs, the following vegetation management and road/ trail activities would occur:

VRM-45
Concentrate burn piles beyond immediate foreground viewing distance of State Highway 126 or in locations where they are partially screened from view by topography or tree crowns.

VRM-46
Retain greater amounts of juniper between the State Highway and powerlines and between the state highway and the relic highway to screen views of these built features.

VRM-47
Use slash to break up linear disturbances made by harvest equipment and to break up existing linear features such as roads/trails that are slated for decommissioning

VRM-48
Junipers directly within riparian vegetation (i.e., competing with riparian species) would be girdled cut and left within riparian band or cut, lop and scattered within the riparian band. These methods would be performed by hand.

VRM-49
There are approximately 105 acres of vegetation classified as "shrub-steppe dominated by young juniper" within the canyon; these sites are more densely populated with young juniper. These sites within the river canyon would be treated by hand using a variety of methods, including: 1) cutting, lopping, and scattering, creating small clearings (a few acres) over time or 2) thinning 20-30% of the total juniper at a time, extending the work over time until most of the young juniper has been cut. Option 2 may include thinning small juniper and letting them lie where they fall, providing fuel for a prescribed burn upon the next entry, or using swamper burn piles in locations with low visibility.

VRM-50
One segment (east side of the river near 63rd Street) within the canyon is potentially accessible by vehicle by using a road that runs down the canyon. Specific project design feature are included for this area, to allow vehicular and mechanized treatments. These include allowing off-road vehicle use on the river terrace where slopes are less than 15% to load trees for removal, and would be limited to one pass off road during dry weather conditions. Tracks would be covered with slash and hidden to discourage further use. Trucks would not be allowed within 30 feet of the riparian area.

United States Department of the Interior
Bureau of Land Management
3050 N.E. 3rd Street
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Cline Buttes Recreation Area Plan and Environmental Assessment

September 2009

SPINE TEXT