North Steens Ecosystem Restoration Project Final Environmental Impact Statement

North Steens Ecosystem Restoration Project – Final Environmental Impact Statement

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Burns District Office
28910 Hwy 20 West
Hines, Oregon 97738

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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.

Cover Photo: Old-Growth Juniper on Steens Mountain.
Photo by Douglas D. Linn

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Burns District Office
28910 Hwy 20 West
Hines, Oregon 97738

IN REPLY REFER TO

2821 (OR-026/027) P

Dear Interested Party:

The Bureau of Land Management (BLM) is making the North Steens Ecosystem Restoration Project (North Steens Project) Final Environmental Impact Statement (EIS) available to the public for 30 days beginning with publication of the Environmental Protection Agency's Notice of Availability in the *Federal Register*. Following the availability period a Record of Decision (ROD) will be signed.

The goal of the project is to reduce the hazardous fuels created by an increase in western juniper and to restore appropriate natural fire regimes, native levels of western juniper trees, and appropriate land uses. Reintroducing the historic fire regime and restoring a more natural ecosystem would implement provisions of the Steens Mountain Cooperative Management and Protection Act of 2000 (Steens Act) and would conform with the recently completed Resource Management Plan for the Steens Mountain Cooperative Management and Protection Area (CMPA). This action would result in restored native habitats in aspen, sagebrush-grassland, old-growth juniper, mountain mahogany and riparian plant communities as well as increased forage for wild and domestic herbivores.

The proposed Project Area is located within the Andrews Resource Area, primarily within the Steens Mountain CMPA. The area includes 336,000 acres containing both private lands and public lands managed by the BLM. Coordination and cooperation with these private landowners are directed by the Steens Act (Section 121) and are essential for achievement of project objectives.

The Preferred Alternative consists of features extracted from two of the action alternatives: 1) The Full Treatment Alternative would be implemented in all portions of the Project Area including Wilderness Study Areas, but excluding Steens Mountain Wilderness; and 2) The Continuation of Current Management Alternative would be selected for the Steens Mountain Wilderness. Future proposals in Steens Mountain Wilderness would be in conformance with the Steens Act and the Wilderness Act.

Suggestions and comments received from private individuals, interest groups, other governmental entities, the Steens Mountain Advisory Council, and from cooperating agencies (including Harney County, Burns Paiute Tribe, Malheur National Wildlife Refuge, U.S. Fish and Wildlife Service Ecological Services, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Harney County Soil and Water Conservation District, and Eastern Oregon Agricultural Research Station) were thoroughly considered in the development of this Final EIS.

We look forward to your continued interest and participation. For additional information or clarification regarding this document or the EIS process, please contact Rhonda Karges at (541) 573-4400. If you would like to receive a copy of the ROD, please contact the Burns District Office or visit our Web site at www.blm.gov/or/districts/burns/plans/burns.php.

Sincerely,

Dana R. Shuford
District Manager

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

North Steens Ecosystem Restoration Project
Final Environmental Impact Statement

Prepared by

Burns District Office
Burns District
July 2007

Dana R. Shuford
Burns District Manager

Thomas R. Edgerton
Acting Andrews Resource Area Field Manager

North Steens Ecosystem Restoration Project
Environmental Impact Statement

1. Responsible Agency: United States Department of the Interior, Bureau of Land Management

2. Cooperating Agencies:

   Burns Paiute Tribe
   Harney County Court
   Harney Soil and Water Conservation District
   Malheur National Wildlife Refuge
   Oregon Department of Environmental Quality
   United States Department of Agriculture, Agricultural Research Service
   Oregon Department of Fish and Wildlife
   United States Fish and Wildlife Service Ecological Services

3. Draft ( ) Final (X)

4. Administrative Action (X) Legislative Action ( )

5. Abstract: The Bureau of Land Management, cooperating agencies, and private landowners propose to utilize a combination of prescribed fire, wildfire, juniper treatments, fencing, seeding, and planting to reduce juniper-related fuel loading and restore a healthier, more functional and productive ecosystem on Steens Mountain. The result would provide ecological and economic benefits to intermingled public and private property totaling over 336,000 acres. The alternatives detailed in this Environmental Impact Statement (EIS) propose landscape level juniper management of public land including wilderness, Wilderness Study Areas (WSAs), and Wild and Scenic River (WSR) corridors as well as on adjacent private lands. This would be a multiyear project with the extent and types of treatment varying from year to year. The Steens Mountain Cooperative Management and Protection Act of 2000 (Steens Act) requires restoration of the natural fire regime and management of juniper within the Cooperative Management and Protection Area (CMPA). Alternatives analyzed in the Final EIS represent a range of potential actions and approaches to these two aforementioned requirements. The No Treatment Alternative proposes no treatments in the Project Area. The Partial Treatment Alternative proposes extensive juniper management on private and public lands but no management within Steens Mountain Wilderness, WSAs, and WSR corridors. The Limited Treatment Alternative proposes extensive juniper management on private and public lands including limited juniper management within Steens Mountain Wilderness, WSAs, and WSR corridors. The Full Treatment Alternative proposes broad-scale juniper management on private and public lands and within Steens Mountain Wilderness, WSAs, and WSR corridors. The Continuation of Current Management Alternative (No Action) proposes to continue existing limited levels of juniper management within the Project Area. The Preferred Alternative is comprised of the following three elements: 1. The Full Treatment Alternative would be implemented in all portions of the Project Area including WSAs, but excluding Steens Mountain Wilderness. 2. The Continuation of Current Management Alternative would be selected for Steens Mountain Wilderness. 3. Future proposals in Steens Mountain Wilderness would be in conformance with the Steens Act and the Wilderness Act. The BLM has determined the No Treatment Alternative would not meet the objectives of the proposal, but is being analyzed for purposes of comparison.

6. Dates: The 30-day notice of availability will be announced in news releases, legal notices, and/or individual mailings and will begin upon publication of the Environmental Protection Agency's Notice of Availability of the Final EIS in the *Federal Register*.

   Public comments on the Draft EIS received during the 45-day comment period were reviewed by BLM specialists and Cooperating Agencies. Responses to public comments as well as summarized versions of the public comments are included in the Final EIS. Changes to the document made between draft and final were based on public comments and internal review.

7. For further information contact:

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Acronyms/Abbreviations

Reader note: *Please refer to the list below for acronyms/abbreviations that may be used in this document.*

ACRONYM	DEFINITION
ACEC	Area of Critical Environmental Concern
AMP	Allotment Management Plan
AML	Appropriate Management Level
AMU	Andrews Management Unit
Andrews/Steens PRMP/FEIS	Andrews Management Unit/Steens Mountain Cooperative Management and Protection Area Proposed Resource Management Plan and Final Environmental Impact Statement
AUM	Animal Unit Month
BIFZ	Burns Interagency Fire Zone
BLM	Bureau of Land Management
BMP	Best Management Practice
CD	Compact Disc
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMPA	Steens Mountain Cooperative Management and Protection Area
CO_2	Carbon dioxide
DEQ	Oregon Department of Environmental Quality
DEIS	Draft Environmental Impact Statement
DRC	Desired Range of Conditions
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOARC	Eastern Oregon Agricultural Research Center
ESA	Endangered Species Act
FAR	Functional At Risk
FEIS	Final Environmental Impact Statement
Five Creeks Project	Five Creeks Rangeland Restoration Project
FLPMA	Federal Land Policy and Management Act
FMP	Fire Management Plan
FRCC	Fire Regime Condition Class
GIS	Geographic Information System
HMA	Herd Management Area
HUC	Hydrologic Unit Code
ID	Interdisciplinary
LUP	Land Use Plan
Malheur NWR	Malheur National Wildlife Refuge
MDA	Minimum Decision Analysis
MFRI	Mean Fire Return Interval
mph	Miles Per Hour
NEPA	National Environmental Policy Act
NF	Nonfunctional
North Steens Project	North Steens Ecosystem Restoration Project
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-Highway Vehicle
ONHP	Oregon Natural Heritage Program
ORV	Outstandingly Remarkable Value
OSU	Oregon State University
PDE	Project Design Element
PFC	Proper Functioning Condition
PM	Particulate Matter
PNVG	Potential Natural Vegetation Groups

RA	Resource Area
RH	Relative Humidity
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
SMAC	Steens Mountain Advisory Council
SMA	Special Management Area
SMU	Species Management Unit
SRMA	Special Recreation Management Area
Steens Act	Steens Mountain Cooperative Management and Protection Act of 2000
TMDL	Total Maximum Daily Load
TR	Technical Reference
µg	Microgram
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management
WJMA	Wildlands Juniper Management Area
WSA IMP	Interim Management Policy for Lands under Wilderness Review
WSA	Wilderness Study Area
WSR	Wild and Scenic River
ybp	years before present

Summary and Reader's Guide

Introduction

Western juniper (*Juniperus occidentalis*) is a native plant species that occurs in the northwestern portion of the Intermountain West. Western juniper can be separated into old-growth and expansion age classes. Only a very small proportion of western juniper is considered old-growth throughout most of its range (an exception is the Mazama Ecological Province near Bend, Oregon where the old-growth age class dominates). The term "old-growth juniper" is generally applied to trees established prior to 1870 (a date suggested by researchers as a cut off between the two age classes); while expansion juniper refers to trees established after 1870.

The vast majority (90% in some cases) of western juniper in the proposed North Steens Ecosystem Restoration Project (North Steens Project) is under 140 years old and considered expansion. Old-growth juniper populations in the Project Area are generally limited to areas where fire is restricted by rock outcrops, rocky soil and a natural lack of fuel. Historically, most areas with sufficient fuel would have experienced regular natural fire events which efficiently kill young juniper; severely restricting the species ability to displace other plant species.

Western juniper populations have expanded into other plant communities at a rapid rate over the last 130-140 years. Relevant scientific literature identifies several main triggers to the recent expansion of juniper woodlands. These include climate shifts, fire suppression and past grazing practices. The replacement of sagebrush, wildflowers, grasses, and other plants has been a cause for concern for some time. Loss of these plant communities and associated increase in erosion, reduction of stream flow, reduction of forage, and overall modification of habitat have led to various management proposals for controlling juniper expansion on public and private lands.

Western juniper has reduced or eliminated much of the plant community once found in the understory. This reduction in understory (available fuels) has a reduced potential for natural fire to regulate juniper populations because fire cannot carry through the understory. As these populations of juniper continue to become denser, a new fuel arrangement can occur that would potentially allow higher intensity fires to carry through the juniper canopy. This type of fire would kill juniper, but fire intensity would be greater than historic levels which can impact post-fire recovery of the area.

The Steens Act directed BLM to reintroduce fire and the role of the natural fire regime into the Steens Mountain Cooperative Management and Protection Area (CMPA). The vast majority of the North Steens Project area falls within the CMPA. The Steens Act also directed BLM to manage western juniper on a landscape scale in the CMPA, including use of natural and prescribed burning.

The North Steens Project is a landscape-level project. The goal of this project is to reduce juniper-related fuels and improve ecological health and productivity by encouraging ecosystem function, appropriate fire regimes and productive forage resources.

The proposed Project Area is a 336,000-acre complex of private land and public land administered by the Bureau of Land Management (BLM) located within the Andrews Resource Area, primarily within the CMPA. The CMPA was established by the Steens Act and contains 496,136 acres of combined private and public lands. Coordination with private landowners is directed by the Steens Act (Section 121) and is essential for achievement of project objectives.

Project activities would primarily occur above 4,500 feet and below 7,200 feet, concentrating on the "juniper belt." The techniques used would depend on site-specific plant community objectives and project constraints. Reduction of juniper-related fuels is the foremost objective; however, this is inherently tied to the reintroduction of fire and the role of the historic fire regime. A fire regime within a historic range would promote ecosystem function through implementation of provisions of the Steens Act and the Steens Mountain CMPA Resource Management Plan/Record of Decision (RMP/ROD) (2005). Restoration of habitat and increased forage for wild and domestic herbivores would result from implementation of the project. Fire would be reintroduced into aspen, remnant aspen, sagebrush-bunchgrass, juniper, and riparian plant communities. Guidance and direction for projects of this type are provided for under Section 113

"LAND USE AUTHORITIES" of the Steens Act. Section 113 (c) of the Steens Act states, "The Secretary shall emphasize the restoration of the historic fire regime in the Cooperative Management and Protection Area and the resulting native vegetation communities through active management of juniper on a landscape level. Management measures shall include the use of natural and prescribed burning."

The BLM manages land for multiple uses. The BLM is not proposing to perfectly restore the Project Area based on a point in time where the influences of human activities had not yet impacted the landscape. The BLM is proposing to redirect the ecosystem back toward functionality that more closely reflects the historic range of natural variability while still providing for multiple uses including grazing and recreation. Redirection would take place through treatments that would be applied based on site-specific factors such as plant community type, juniper woodland successional stage, desired vegetation mosaics, and situation specific project design constraints.

The BLM understands that human activities and uses would continue to influence the landscape after project implementation. The intent of the proposal is to reduce fuels and provide for ecosystem functionality while still providing for all potential public land uses allowable by law and allocated through the CMPA RMP & ROD.

Proposed treatment techniques include managed wildfire, prescribed fire, juniper cutting or scoring, fencing, seeding, planting, and a combination of techniques intended to reduce fuel loads, restore vegetative communities, improve habitat, and increase forage. Both wildlife populations and domestic livestock operations would ultimately benefit. The project would include implementation of management actions across the Project Area that would restore (and maintain) plant communities to a desirable condition through return to the historic fire regime. Actions would center around lessening the potential for high intensity wildfires by reducing fuels and curtailing juniper expansion in mountain big sagebrush, low sagebrush, quaking aspen, mountain mahogany, old-growth juniper (established prior to 1870), riparian plant communities, and to a much lesser extent Wyoming big sagebrush. This is a multiyear project, and each year the extent of implementation would vary depending on resource considerations and climatic and operational conditions.

Proposed project treatments, including activities within the Steens Mountain Wilderness, Wild and Scenic River (WSR) corridors, and Wilderness Study Areas (WSAs) are arrayed in a range of alternatives found in Chapter 2 of this document. Descriptions of the Affected Environment (current ecological conditions) and analysis of potential effects from enacting each alternative are found in Chapters 3 and 4, respectively.

This EIS is tiered to the Andrews Management Unit (AMU)/Steens Mountain CMPA Proposed RMP and Final EIS (Andrews/Steens PRMP/FEIS, August 2004) and associated final land use decisions detailed in the AMU and CMPA RMPs and RODs (August 2005). Information and analysis contained in these documents are herein incorporated by reference.

The recent publication *Biology, Ecology and Management of Western Juniper* (Miller et al., 2005) was utilized to prepare significant portions of this summary. This work (Technical Bulletin 152) is a compilation of research on western juniper, much of which was conducted on Steens Mountain by researchers at Eastern Oregon Agricultural Research Center (EOARC).

The following is a brief overview of the document to assist in your review.

Chapter 1

Chapter 1 identifies the purpose and need (objectives) for action, briefly defines the Planning Area, discusses conformance with Land Use Plans and other legislation, addresses initial screening and scoping of issues, and lists the major relevant issues of the project.

Chapter 2

Chapter 2 presents the alternatives including the Preferred Alternative. The Final Environmental Impact Statement (FEIS) contains five alternatives and the Preferred Alternative.

The Steens Act directs BLM to reintroduce fire and the role of the natural fire regime into the CMPA. The vast majority (297,703 acres) of the proposed EIS Project Area falls within the CMPA; the remaining 33,034 acres of the Project Area are within the Andrews Management Unit (AMU).

The Steens Act also directs BLM to manage western juniper on a landscape scale in the CMPA and management would include use of natural and prescribed wildland fire.

The No Treatment Alternative would not comply with this direction from the Steens Act. The remaining Action Alternatives would comply with this direction from the Steens Act. Continuation of Current Management would also comply with the Steens Act, but at a greatly reduced rate. The real difference between the Action Alternatives (except the No Treatment Alternative) is how juniper would be managed within Special Management Areas (wilderness, WSAs and WSR corridors), on "regular" public lands (other than Special Management Areas) and on intermingled private lands.

The Steens Act directs BLM to enter into Cooperative Management Agreements with private landowners in the CMPA. The majority of these lands are within the northwest portion of the Project Area and do not include wilderness or WSAs. The proposed management for these lands is different in terms of rate and scale of treatment as you compare the Partial Treatment Alternative to the Limited and Full Treatment Alternatives. These lands would be far less limited than Special Management Areas in terms of the use of various treatments such as cutting juniper prior to utilizing prescribed fire.

The No Treatment Alternative does not propose any fuels reduction through juniper treatments. This alternative is not consistent with the AMU RMP or Steens Mountain CMPA RMP direction. This alternative does not meet objectives of the North Steens Project but is analyzed for purposes of effect comparison. Under this alternative expansion juniper would not be managed in the North Steens Project Area. Wildfires would still occur in the Project Area and would be managed in a manner consistent with the RMPs and the BLM Burns District's Fire Management Plan (FMP).

In the Partial Treatment Alternative BLM proposes to utilize only natural wildland fire to manage juniper in wilderness and WSAs. Additional methods are available outside of these areas, but rates and scale of landscape level treatment in the total Project Area would be expected to be slower.

In the Limited Treatment Alternative BLM proposes to add the use of prescribed fire to wilderness and WSAs. Additional methods are available outside of these areas, but rates and scale of landscape level treatment in the total Project Area are expected to be slower than the Full Treatment Alternative, but faster than the Partial Treatment Alternative.

In the Full Treatment Alternative BLM proposes to use juniper cutting treatments prior to the use of prescribed fire in wilderness and WSAs. The rates and scale of treatments and the extent of the treatments would be the greatest in all portions of the Project Area under this alternative.

The Continuation of Current Management Alternative proposes no increase in levels of juniper treatment in the Project Area, but allows current scale projects to continue. Under this alternative future project proposals would be evaluated site specifically with appropriate environmental documentation.

The Preferred Alternative is comprised of the following three elements: 1. The Full Treatment Alternative would be implemented in all portions of the Project Area including WSAs, but excluding Steens Mountain Wilderness. 2. The Continuation of Current Management Alternative would be selected for Steens Mountain Wilderness. 3. Future proposals in Steens Mountain Wilderness would be in conformance with the Steens Act and Wilderness Act.

Chapter 3

Chapter 3 provides a description of the existing situation for each resource program. It describes both the living and nonliving components that may be affected. Current management direction is briefly summarized for each program. Statistics such as acres, numbers, resource condition, and designations are presented in tables.

Chapter 4

Chapter 4 analyzes effects of management strategies (Chapter 2 alternatives) on existing condition (Chapter 3). The environmental consequences (effects) sections in the Andrews/Steens PRMP/FEIS describe potential environmental consequences to the North Steens Project Area and are incorporated into this document by reference in accordance with Council on Environmental Quality (CEQ) regulations § 43 Code of Federal Regulations 1502.2. Additional project-specific descriptions of potential environmental consequences are provided in Chapter 4.

A summary of the potential effects is provided in Table 1 below.

Table S.1. Summary of Potential Effects from Treatments

Measurement*	No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative**	Preferred Alternative***
Percent of all upland landscape estimated to actually be treated during the entire life of the project.	0%	25-30%	30-45%	45-65%	**	**45-65%**
Estimated maximum percent of Project Area potentially treated each implementation season.	0%	3%	4.5%	6%	**	**6%**
Estimated maximum acres of uplands that could potentially be treated each year.	0 acres	10,000 acres	15,000 acres	20,000 acres	**	**20,000 acres**
Estimated acres of sagebrush potentially treated over the life of the project (Includes early, mid and late transition juniper sites).	0 acres	86,924 acres	130,387 acres	188,336 acres	**	**~130,387-188,336 acres*** **
Estimated acres of early transition juniper/sagebrush potentially treated over the life of the project.	0 acres	48,680 acres	52,426 acres	103,587 acres	**	**~52,426-103,587 acres*** **
Estimated acres of mid to late seral stage juniper affected sagebrush potentially restored over the life of the project.	0 acres	38,244 acres	77,961 acres	84,749 acres	**	**~77,961-84,749 acres*** **
Estimated acres of juniper dominated sites potentially treated over the life of the project.	0 acres	29,724 acres	73,854 acres	81,396 acres	**	**~73,854-81,396 acres*** **
Could juniper cutting impacts occur in Wilderness and WSR corridors?	No	No	No	Yes	**	**No****
Could juniper cutting impacts occur in WSAs?	No	No	No	Yes	**	**Yes**
Could prescribed fire impacts occur in Wilderness and WSR corridors?	No	No	Yes	Yes	**	**No****
Could prescribed fire impacts occur in WSAs?	No	No	Yes	Yes	**	**Yes**

* Estimates do not include areas affected by wildfire events. Wildfire events could occur under all alternatives and may increase estimates given in this table. Estimates could also be affected by project design constraints which may reduce given estimates. Estimated acres are derived from general vegetation data and predicted treatment rates and scale.

** Any treatments would require appropriate environmental analysis and documentation.

*** Juniper cutting and prescribed fire treatments are not proposed in Steens Mountain Wilderness under the Preferred Alternative. The unmodified Full Treatment Alternative does, however, allow for these treatment types and their associated impacts. Steens Mountain Wilderness can still be treated under the Preferred Alternative, but only with managed wildfires; acre estimates include wildfire treated wilderness areas for the Preferred Alternative.

Table S.2 - Comparison Summary of Resource Effects by Alternative

Table S.2 has been prepared as a comparison summary of potential resource effects by alternative. This is only a summary and is not the complete analysis. The complete analysis can be found in Chapter 4.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Air Quality					
Wildfires could burn with greater intensity and for a longer duration. Over time an increase in fuels and fire intensity would amplify total emissions and duration of emissions of fire events. Wildfires would burn for longer periods and produce more smoke than average historic levels.	Air quality would be minimally affected by this alternative including effects from mechanical treatments. No Class 1 airsheds or nonattainment areas would be affected by prescribed fire actions. Within WSAs and wilderness effects would be the same as described under the No Treatment Alternative. Actions from this alternative would help reduce smoke emissions from fires by reducing fuel loading and continuity.	Short-term effects (3-5 years) on air quality from this alternative would be slightly greater than Continuation of Current Management or Partial Treatment Alternatives initially, but would be less in the long term (greater than 5 years) because of the reduction in risk of large-scale fires.	Short-term effects on air quality from the Full Treatment Alternative would be slightly greater than the other alternatives, but would be less in the long term 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 and wildland fire use.	Effects under this alternative on air quality would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on air quality are the same as described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on air quality within wilderness are the same as those described in the Continuation of Current Management Alternative.
Soils					
Effects under this alternative on soils could be significant if accumulation of juniper creates a situation where large-scale, high-intensity wildfire destroys much of the native vegetation. Increases in juniper would also add to the amount of bare ground beneath the woodland canopy, and erosion would increase.	By reducing buildup of fuels, chances of a large-scale, high-intensity fire and erosion would be reduced. There would be no significant effects to soils under this alternative. Treatment of juniper would reduce soil being moved offsite by erosion. This would also reduce sediment in streams and ultimately in the meadow system at lower elevations outside the Project Area.	The Limited Treatment Alternative would reduce juniper expansion in larger portions of the Project Area than the Partial Treatment Alternative. Effects from this alternative in treated areas would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.	This alternative would reduce the continued modification of vegetative communities by juniper expansion in larger portions of the Project Area than the Partial and Limited Treatment Alternatives. Effects in treated areas would be the same as those described in the Partial Treatment Alternative. Effects in untreated areas would be the same as those described in the No Treatment Alternative.	Effects under this alternative on soils would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on soils are the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on soils within wilderness are the same as those described in the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Wetlands, Riparian Areas and Water Quality					
Juniper would continue to expand within affected watersheds and would likely expand into previously unaffected watersheds. As juniper occupies a greater proportion of canopy and root zones of both uplands and riparian areas, the species is likely to assume control of ecological site processes, resulting in a positive feedback cycle in which hydrologic processes of affected watersheds can be severely disrupted.	Without wildfire, juniper stands would continue to expand and develop in riparian areas and associated uplands in all 6th field HUCs of the Donner und Blitzen River system upstream from Page Springs and in all or parts of the Mud, Bridge, Home, Kiger, McCoy, Threemile, and Wildhorse Creeks. Where juniper has been identified as contributing to at-risk riparian functioning condition, it is likely at-risk functioning conditions would persist. In streams where PFC has been achieved, but juniper was identified as a potential risk, continued development of juniper stands could imperil functioning condition. In watersheds where juniper is present but not yet established in riparian areas, the likelihood is great juniper would become established.	Expansion and development of juniper stands could be arrested in riparian areas and associated uplands in all 6th field HUCs of the Project Area. In streams where PFC has been achieved, but juniper was identified as a potential risk, juniper treatment may succeed in preventing loss of functioning condition in the future, if stands are not fireproof. In watersheds where juniper is present but not yet established in riparian areas, prescribed fire in uplands could ensure juniper does not become established at some future time.	Effects to riparian functioning condition of streams would be the same as with the Limited Treatment Alternative with a higher likelihood of success in achieving site-specific objectives for riparian areas. Likelihood of achieving the riparian objective for reducing expansion juniper in riparian areas is also higher than for other action alternatives.	Potential effects to riparian functioning condition would be generally the same as the Full Treatment Alternative, although it is likely treatments would be applied at a smaller scale to areas within Steens Mountain Wilderness. Nonmeasurable project objectives could be achieved as with the action alternatives. However, no measurable objectives with specific timeframes would be applied to the Project Area as a whole.	Effects to riparian function and water quality (outside wilderness) would be the same as the Full Treatment Alternative. Within wilderness, the full range of treatments would be available with additional NEPA analysis; however, projects implemented would likely be smaller, and number of acres treated lower. For untreated areas in wilderness, effects would be the same as the No Treatment Alternative.
Biological Soil Crusts					
Selection of the No Treatment Alternative could result in situations where large-scale, high intensity wildfire events burn entire areas without leaving a mosaic of unburned vegetation. If this occurs, natural recovery of biological soil crusts could be slowed considerably due to the reliance on recolonization from fewer unburned biological soil crust populations.	The Partial Treatment Alternative would reduce the continued modification of vegetative communities by juniper expansion in some portions of the Project Area. Biological soil crusts may benefit from reduced juniper population expansion and associated cover. The initial rate and scale of treatment would cause limited loss of biological soil crust cover, but as fire regimes and vegetation communities are restored, vegetation and biological soil crust mosaics would be established by wildfire.	This alternative would reduce the continued modification of vegetative communities by juniper expansion in more of the Project Area than the Partial Treatment Alternative. Biological soil crusts may see increased benefit (over decades) from reduced juniper population expansion and associated cover. The increased rate and scale of treatment would cause some initial loss of biological soil crust cover, but as fire regimes and vegetation communities are restored, vegetation and biological soil crust mosaics would be established by wildfire.	The Full Treatment Alternative would reduce the continued modification of vegetative communities by juniper expansion in most of the Project Area. Biological soil crusts may benefit (over decades) from reduced juniper population expansion and associated cover. The initial rate and scale of treatment would cause some loss of biological soil crust cover, but as fire regimes and vegetation communities are restored, vegetation and biological soil crust mosaics would be established by wildfire.	Effects under this alternative on biological soil crusts would be the same as described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on biological soil crusts are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on biological soil crusts within wilderness are the same as those described in the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Forestry and Woodlands					
Under the No Treatment Alternative, juniper would continue to expand into mountain big sagebrush, quaking aspen, low sagebrush, and riparian plant communities. Risk of erosion would be greatest in late transition to fully-developed woodlands. Conversion of mountain big sagebrush, quaking aspen, low sagebrush, and riparian plant communities to juniper woodlands simplifies the structure of vegetation. Increase in juniper would reduce presence and diversity of other plant species. Diversity of wildlife species would decrease and favor woodlands species.	Woodlands within wilderness and WSAs would continue to experience an increase in juniper producing effects similar to the No Treatment Alternative. Areas outside of wilderness and WSAs that have been cut, burned, or both, would transition toward sagebrush dominance. Initial stages would be dominated by herbaceous grasses. Ground cover would initially be the same as or slightly below pre-burn conditions. Overall, approximately 50-60% of expansion woodlands outside of wilderness and WSAs would be converted to sagebrush, quaking aspen, and riparian woodlands through the life of the project (approximately 25 years).	The Limited Treatment Alternative would have the same effects on woodlands as the Partial Treatment Alternative with the following exceptions. Additional areas could be treated with fire under this alternative. Treatment of these areas would help to return these woodlands to a condition closer to historic than is the present condition. Treatment of juniper in part of the Project Area would help to increase diversity at the plant community, watershed, and landscape levels. Animal species preferring shrub and herbaceous-dominated systems would increase in the Project Area following reestablishment of shrub cover. A larger area would be available for treatment than in the Partial Treatment Alternative.	The Full Treatment Alternative would have the same effects on woodlands as the Partial Treatment Alternative with the following exceptions. The Full Treatment Alternative would restore old-growth juniper woodlands at a faster rate than other alternatives.	Effects under this alternative on forestry and woodlands would be the same as those described under No Treatment. Individual projects may be proposed in the future. However, these projects would be based on narrow, site-specific issues.	Potential effects of the Preferred Alternative on forestry and woodlands are the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on forestry and woodlands within wilderness are the same as those described in the Continuation of Current Management Alternative.
Noxious Weeds					
Selection of the No Treatment Alternative could result in situations where large-scale, high-intensity wildfire events burn entire areas without leaving a mosaic of unburned vegetation. If this occurs, noxious weed establishment could be increased considerably. Over years this increase in noxious weeds could displace native species.	Selection of the Partial Treatment Alternative would limit some situations where large-scale, high-intensity wildfire events burn entire areas without leaving a mosaic of unburned vegetation. Noxious weed establishment could be decreased in treated areas. This decrease in noxious weed establishment would be dependent upon adequate weed treatments and reestablishment of native plant species and communities.	Selection of the Limited Treatment Alternative would limit more situations where large-scale, high-intensity wildfire events burn entire areas without leaving a mosaic of unburned vegetation. Noxious weed establishment could be decreased in treated areas. This decrease in noxious weed establishment would be greater than described under the Partial Treatment Alternative and would be dependent upon adequate weed treatments and reestablishment of native plant species and communities.	Selection of this alternative would potentially limit the widest variety of situations where large-scale, high-intensity wildfire events burn entire areas without leaving a mosaic of unburned vegetation. Noxious weed establishment could be greatly decreased in treated areas. This decrease in noxious weed establishment would be greater than that described under the Partial and Limited Treatment Alternatives and would be greatly dependent upon adequate weed treatments and reestablishment of native plant species and communities.	Effects under this alternative on noxious weeds would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on noxious weeds are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on noxious weeds within wilderness are the same as those described in the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Vegetation					
Selection of the No Treatment Alternative could result in continued disruption of the MFRI. If this occurs, conditions for reestablishment of appropriate complex age class and seral stages of vegetative communities would be decreased. The resultant ecological condition of the vegetation in the Project Area would be diminished.	Selection of the Partial Treatment Alternative could result in a return to a more historic MFRI. If this occurs, conditions for reestablishment of appropriate complex age class and seral stages of vegetative communities would be increased. The resultant ecological condition of the vegetation in the Project Area would be enhanced.	Selection of the Limited Treatment Alternative could result in a return to a more historic MFRI. If this occurs, conditions for reestablishment of appropriate complex age class and seral stages of vegetative communities would be increased in more portions of the Project Area than described in the Partial Treatment Alternative. The resultant ecological condition of vegetation in the Project Area would be similarly enhanced.	Selection of the Full Treatment Alternative could result in a return to a more historic MFRI. If this occurs, conditions for reestablishment of appropriate complex age class and seral stages of vegetative communities would be increased in more portions of the Project Area than described in the Partial and Limited Treatment Alternatives. The resultant ecological condition of vegetation in the Project Area would be similarly enhanced.	Effects under this alternative on vegetation would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on vegetation are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on forestry and vegetation within wilderness are the same as those described in the Continuation of Current Management Alternative.
Fisheries					
Adverse effects to fish from juniper-dominated riparian areas and uplands would occur within the short term (1-3 years) or several years following high peak flows that increase sediment load and reduce habitat complexity. Repeated events at greater frequency may result in accumulation of habitat changes from which fish populations may not easily recover. Long-term adverse impacts (beyond 3 years) to fish and fish habitat would occur over a period of years to decades if elevated levels of sediment become chronic, soil infiltration and groundwater recharge decreases, stream temperatures become elevated, and nutrient cycles that support fish prey become altered.	Adverse effects to fish and fish habitat are likely to accumulate within untreated areas over the next one or more decades unless wildfire occurs. In wilderness and WSAs where juniper has already been identified as contributing to at-risk riparian functioning condition, it is likely at-risk functioning conditions would persist and habitat condition for fish would deteriorate. Habitat conditions could deteriorate in the next several decades after which restoration of habitat conditions or perennial flows to support fish presence in low-order reaches would require manipulation of physical processes. Chronic, adverse effects to riparian functioning condition in wilderness and WSAs have potential to work in concert to produce adverse cumulative effects to fish populations in higher-order reaches. It is possible, or even likely, these adverse effects could overwhelm any beneficial effects from treating the rest of the Project Area. Effects could threaten persistence of fish in portions of some streams, and reduce the health of fish populations.	Expansion and development of juniper stands could be arrested in riparian areas and associated uplands in all 6th field HUCs. In streams where PFC has been achieved but juniper was identified as a potential risk, juniper treatment may succeed in maintaining or improving fish habitat, if stands are not already fireproof. In watersheds where juniper is present, but not yet established in riparian areas, prescribed fire in uplands could ensure juniper does not degrade fish habitat. Chronic, adverse effects to riparian functioning condition in wilderness and WSAs could still produce adverse effects to fish populations in higher-order reaches if prescribed fire without juniper cutting (or wildfire) does not meet site-specific objectives for improving riparian functioning condition. However, site-specific objectives would be achieved in at least some riparian areas, and it is less likely these adverse effects would overwhelm any beneficial effects from treating the rest of the watershed.	Effects to riparian functioning condition of streams would be the same as with the Limited Treatment Alternative with a higher likelihood of success in achieving site-specific objectives for riparian areas. Since all of the Project Area could be considered for the full range of treatment methods, chronic adverse effects to riparian functioning condition would not be permitted to develop in wilderness and WSAs. In comparison to other action alternatives, adverse effects to fish populations are not as likely to occur in higher-order reaches of 4th field HUCs. Prescribed fire with juniper cutting (or wildfire) is likely to meet site-specific objectives for improving riparian functioning condition wherever it is applied. Full treatment of watersheds recognizes critical links between uplands and riparian areas in influencing fish habitat, and is most likely to succeed in maintaining or improving fish habitat affected throughout 6th field HUCs.	Potential effects to fish and fish habitat as reflected by riparian functioning condition would be the same as the Full Treatment Alternative, although it is likely treatments would be applied at a smaller scale within wilderness following NEPA analysis. Although all of the Project Area could be considered for the full range of treatment methods, chronic adverse effects to riparian functioning condition could develop in wilderness and WSAs if treatments are not implemented far enough in advance of juniper expansion and stand development. In comparison to the Partial and Limited Treatment Alternatives, adverse effects to fish populations are not as likely to occur in higher-order reaches of 4th field HUCs. However, this would depend upon the actual proportion of the Project Area successfully treated through individual, project-level analysis.	Effects to fish and fish habitat in the Project Area (outside of wilderness) would be the same as with the Full Treatment Alternative. Within Steens Mountain Wilderness the full range of treatments would also be available. However, the scale of projects implemented would likely be smaller, and total number of acres treated lower within the same timeframe as that of the Full Treatment Alternative. For areas in wilderness left untreated, effects would be the same as those described under the No Treatment Alternative. The Preferred Alternative carries with it an inherent risk as treatments in special management areas may not occur in an adequate timeframe and at an adequate scale to avoid the onset of chronic effects to hydrologic cycles, riparian function, and fish habitat.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Migratory Birds					
Selection of the No Treatment Alternative would result in continued juniper expansion which would favor woodland species over other suites of migratory birds. Bird abundance and diversity would decrease over the years. If a wildfire occurs, grassland bird species would increase in the burned area. Size and completeness of the burn would determine the length of time before sagebrush returned to the burn as well as sagebrush-dependent bird species.	Selection of the Partial Treatment Alternative would result in a decrease in juniper and an increase in grasslands and over time an increase of sagebrush as it returns to burned areas. This would increase structural diversity in those areas outside wilderness and WSAs. Grassland- and sagebrush-dependent migratory bird species would have increased habitat while woodland species would have a reduction in habitat in treated areas. Bird species habitat in wilderness and WSAs would be affected the same as the No Treatment Alternative.	Selection of this alternative would result in a decrease in juniper and an increase in grasslands and over time an increase of sagebrush as it returns to burned areas. Prescribed fire could be used in wilderness and WSAs, so treatments would affect more of the landscape and the rate at which areas could be treated would increase. Grassland species would have increased habitat immediately after treatments while sagebrush-dependent species would have increased habitat about 15 years after treatment. Woodland species would have up to a 60% reduction in habitat.	Selection of the Full Treatment Alternative would result in decreased juniper and an increase in grasslands and over time an increase of sagebrush as it returns to burned areas. Cutting of juniper and prescribed fire could be used in wilderness and WSAs, so treatments would affect more of the landscape and the rate at which areas could be treated would increase. Grassland species would have increased habitat immediately after treatments while sagebrush-dependent species would have increased habitat about 15 years after treatment. Woodland species would have up to a 75% reduction in habitat.	Effects under this alternative on migratory birds would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, effects would be the same as the Partial Treatment Alternative except at a decreased rate of implementation.	Potential effects of the Preferred Alternative would be the same as the potential effects of the Full Treatment Alternative for areas outside wilderness. For wilderness areas potential effects would be the same as the potential effects described under the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Wildlife					
Selection of the No Treatment Alternative would result in continued juniper expansion which would affect habitat for most big game species through the reduction of foraging areas. This would affect big game habitat use yearlong especially during winter. Species diversity would decrease as juniper continues to expand into sagebrush habitat. If a wildfire occurs, juniper and sagebrush would decrease in the burned area and some wildlife species would benefit from the grassland that would persist for about 15 years. The size and completeness of the burn and elevation would determine the length of time before sagebrush returned to the burned area.	Selection of the Partial Treatment Alternative would result in a decrease in juniper and an increase in grasslands and over time an increase of sagebrush as it returns to burned areas. This would increase structural diversity in those areas outside wilderness and WSAs. Many wildlife species, especially big game, would benefit from the decrease in juniper and the early successional habitat created by treatments. Treatments in bitterbrush and Wyoming big sagebrush could affect mule deer fall and winter range. As sagebrush returns to treated areas, which depends on the size and elevation of the treatment, those species that are sagebrush dependent would benefit. Wildlife habitat in wilderness and WSAs would be affected the same as the No Treatment Alternative.	Selection of this alternative would result in a decrease in juniper (about 60%) and an increase in grasslands and over time an increase of sagebrush as it returns to burned areas. This would increase structural diversity in those areas outside wilderness and WSAs. With the use of only prescribed fire in wilderness and WSAs, there would be some increase in structural diversity but the reduction of juniper canopy would be less than where cutting and burning are used together. Many wildlife species, especially big game, would benefit from the decrease in juniper and the early successional habitat created by treatments. Treatments in bitterbrush and Wyoming big sagebrush could affect mule deer fall and winter range. As sagebrush returns to treated areas, which depends on the size and elevation of the treatment, those species that are sagebrush dependent would benefit.	Selection of the Full Treatment Alternative would result in a decrease in juniper (about 75%) and an increase in grasslands and over time an increase of sagebrush as it returns to burned areas. This would increase structural diversity throughout the Project Area. Many wildlife species, especially big game, would benefit from the decrease in juniper and the early successional habitat created by treatments. Treatments in bitterbrush and Wyoming big sagebrush could affect mule deer fall and winter range. The rate at which sagebrush returns to treated areas would be slower compared to the Limited Treatment Alternative due to the amount of area treated each year.	Effects under this alternative on wildlife would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, effects would be the same as the Partial Treatment Alternative except at a decreased rate of implementation.	Potential effects of the Preferred Alternative on wildlife would be the same as the potential effects of the Full Treatment Alternative for areas outside wilderness. For wilderness areas potential effects would be the same as the potential effects described for the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Special Status Species: Fauna					
Under the No Treatment Alternative, there would be no affect to bald eagles or their habitat and habitat for wolverine, bats, long-billed curlews, and burrowing owls would not be affected. Loss of habitat through the increase in juniper, which would affect sagebrush, aspen, and riparian/ wetland habitat, would affect Columbia spotted frog, sage-grouse, northern goshawk, Swainson's hawk, Preble's shrew, and bighorn sheep.	Under the Partial Treatment Alternative, there would be no affect to bald eagles or their habitat and habitat for wolverines and bighorn sheep would not be affected. Since there would be no actions proposed in wilderness and WSAs, sage-grouse, Columbia spotted frog, and Preble's shrew would lose habitat in these areas due to the increase in juniper. In treated areas, reduction of juniper would improve habitat for Columbia spotted frog, some bats, Swainson's hawk, long-billed curlew, and burrowing owls. As treated areas return to sagebrush cover, sage-grouse and Preble's shrew would benefit and northern goshawk would benefit as aspen stands are treated and healthier stands return. Sage-grouse and Preble's shrew would be affected by loss of some habitat in big sagebrush areas with little or no juniper treated.	Under this alternative, there would be no affect to bald eagles or their habitat and habitat for wolverines would not be affected. Only prescribed fire would be proposed in wilderness and WSAs, which would not reduce canopy cover of juniper as much as cutting and burning in other treated areas. Sage-grouse and Preble's shrew would lose habitat in these areas due to the increase in amount of big sagebrush burned to reduce juniper cover. In areas treated with cutting and burning of juniper, the reduction of juniper would improve habitat for Columbia spotted frog, some bats, Swainson's hawk, long-billed curlew, burrowing owls, and bighorn sheep. As treated areas return to sagebrush cover, sage-grouse and Preble's shrew would benefit and northern goshawk would benefit as aspen stands are treated and healthier stands return. Sage-grouse and Preble's shrew would be affected by loss of some habitat in big sagebrush areas with little or no juniper treated.	Under the Full Treatment Alternative, there would be no affect to bald eagles or their habitat. Areas treated with cutting and burning of juniper would improve habitat for Columbia spotted frog, some bats, Swainson's hawk, long-billed curlew, burrowing owls, and bighorn sheep. As treated areas return to sagebrush cover, sage-grouse and Preble's shrew would benefit and northern goshawk would benefit as aspen stands are treated and healthier stands return. Sage-grouse and Preble's shrew would be affected by loss of some habitat in big sagebrush areas with little or no juniper treated. Wolverine may be affected by the loss of some habitat depending on the extent of treatments occurring in wolverine habitat.	Effects under this alternative on Special Status Species-Fauna would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, effects would be the same as the Partial Treatment Alternative except at a decreased rate of implementation.	Potential effects of the Preferred Alternative on Special status Species-Fauna would be the same as the potential effects of the Full Treatment Alternative for areas outside wilderness. For wilderness areas potential effects would be the same as the potential effects described for the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Wild Horses and Burros					
Effects from this alternative would likely decrease the amount of available forage. Effects to wild horse populations could be pronounced if climatic or operational restraints delay gathers. Increased competition between wild horse populations and other animal populations could be exacerbated. Increased wild horse utilization could stress understory plant species causing them to decline. With continued forage decline, AMLs could be reduced decreasing herd size. Reduced population size could affect herd genetic diversity. However, available forage for wild horses could increase. As a result of increasing dense vegetation, wildfire could destroy sagebrush and juniper woodlands. This expanded grassland could result in more available forage and wild horse concentration in the area would be expected to increase.	In untreated areas, there could be decreased forage available to all herbivores. Effects to wild horse populations could be pronounced if climatic or operational restraints delay gathers. Increased competition between wild horse populations and other animals could be exacerbated. In other areas where increased juniper management is proposed, available forage would increase. Effects to wild horse populations could be pronounced if gathers need to occur on shorter, sensitive timelines or if climatic or operational restraints delay gathers. Competition between wild horses and other animals could be lessened if the Partial Treatment Alternative is selected. Future proposed activities could further benefit wild horse habitat. Future wild horse population management could also improve wild horse health characteristics.	In some areas, this alternative could increase forage available to all herbivores. Effects to wild horse populations could be pronounced if climatic or operational restraints delay gathers. Increased competition between wild horse populations and other animals would be less than under the Partial Treatment and No Treatment Alternatives, but could still be exacerbated if the Limited Treatment Alternative is selected. In areas where increased juniper management is proposed, forage available to all herbivores would increase. Effects to wild horse populations would be the same as those described in the Partial Treatment Alternative. Future proposed activities could further benefit wild horse habitat. Wild horse population management could also improve wild horse health characteristics.	In limited site-specific areas, this alternative could increase available forage. Effects to wild horse populations could be pronounced if climatic or operational restraints delay gathers. Competition between wild horse populations and other animals would be less than under the Partial and Limited Treatment Alternatives and greater under the Continuation of Current Management Alternative. In areas where juniper management is proposed, available forage would increase. Effects to wild horse populations could be pronounced if gathers need to occur on shorter, sensitive timelines or if climatic or operational restraints delay gathers. Competition between wild horse and other animal populations would be reduced. Future proposed activities could further benefit wild horse habitat and improve wild horse health characteristics.	Effects on horses would be the same as those discussed in the No Treatment Alternative. Limited treatments could occur under other environmental documentation and would result in potential effects the same as those described in the Partial Treatment Alternative.	Potential effects on wild horses are the same as those described in the Full Treatment Alternative.
Cultural Heritage					
Selection of this alternative would result in greater intensity and longer duration burns during wildfire events. This would increase damage to sites and site constituents within the fire path. Sites and site constituents are a nonrenewable and nonreplaceable resource. Effects of wildfire events are the permanent loss of site constituents and commensurate data for future generations.	The Partial Treatment Alternative could result in less site and site constituent loss such as those found in uncontrolled wildfire events. Cumulative effects could include greater site disturbance in designated untreated areas through intensifying use by livestock and recreationists. Limited effects within planned treated areas could include greater exposure of site constituents.	The Limited Treatment Alternative could result in less site and site constituent loss such as those found in uncontrolled wildfire events. The potential effects and cumulative effects of the Limited Treatment Alternative are the same as those for the Partial Treatment Alternative.	The Full Treatment Alternative could result in less site and site constituent loss such as those found in uncontrolled wildfire events. The potential effects and cumulative effects of the Limited Treatment Alternative are the same as those for the Partial Treatment Alternative.	Effects under this alternative on cultural heritage would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on sites and site constituents are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on sites and site constituents within wilderness are the same as those described in the Continuation of Current Management Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Visual Resources					
Visual resources would not be affected by human-caused fires. Wildfires could still occur creating contrasts in form, line, color, and texture with areas left unburned.	Visual resource effects for WSAs and Wilderness would be the same as the No Treatment Alternative. Treatments in the rest of the Project Area would create some visual contrasts associated with juniper cutting and burning.	Visual resource effects for WSAs and wilderness would be the same as the No Treatment Alternative given prescribed burning without juniper cutting would mimic the appearance of wildfire. Treatments in the rest of the Project Area would create some visual contrasts associated with juniper cutting and burning.	All treatments could occur throughout the Project Area and would create some visual contrasts associated with juniper cutting and burning.	Types of effects would be the same as those under the Full Treatment Alternative; however, fewer acres would likely be treated than under the Full Treatment Alternative and would require additional site-specific analysis.	All treatments could occur throughout the Project Area except in wilderness and would create some visual contrasts associated with juniper cutting and jackpot or pile burning. For wilderness, further site-specific analysis would be required for any proposed treatments in the future.
Wild and Scenic Rivers					
No effects to the free-flowing character of WSRs are expected in any of the alternatives. For all alternatives WSR lands in wilderness would be treated the same as wilderness. The ORVs could be negatively affected if large, standing-replacing fires occur or if juniper expansion continues to the point ORVs are lost.	Same as the No Treatment Alternative except treatments to Riddle Brothers Ranch could help protect this site from wildfire.	Same as the Partial Treatment Alternative; however, prescribed fire could also be used as a treatment. Effects to WSRs would mimic natural, lower-intensity wildfires and reduce the chances of a large, standing-replacing fire.	All treatments could occur throughout the Project Area and would create some disturbance to ORVs primarily associated with cutting and burning juniper. Negative effects associated with large, stand-replacing wildfires would be less likely to occur.	Types of effects would be the same as those under the Full Treatment Alternative; however, fewer acres would likely be treated than under the Full Treatment Alternative and would require additional site-specific analysis.	For areas outside of wilderness, effects would be the same as those described for the Full Treatment Alternative. Within wilderness, further site-specific analysis would be required for any proposed treatments in the future.
Wilderness					
Some wilderness values could decline in areas where juniper expansion continues to the point native shrubs and grasses are suppressed or lost, especially if large, stand-replacing wildfires occur.	Same as the No Treatment Alternative.	Same as the No Treatment Alternative except some areas can be treated with prescribed burning. Prescribed burning could enhance wilderness values by mimicking lower- to moderate-intensity wildfires, limiting juniper expansion and reducing the chances of stand-replacing fires.	Wilderness values could be affected by juniper treatments in the short term (years) but would be enhanced in the long term (decades) by helping to restore a more natural fire regime and limit juniper expansion to their historic range.	Further site-specific analysis would be needed before any treatments in wilderness would occur.	Further site-specific analysis would needed before any treatments in wilderness would occur.
Wilderness Study Areas					
Some wilderness values could decline in areas where juniper expansion continues to the point native shrubs and grasses are suppressed or lost, especially if large, stand-replacing wildfires occur.	Same as the No Treatment Alternative.	Same as the No Treatment Alternative except some areas can be treated with prescribed burning. Prescribed burning could enhance wilderness values by mimicking lower- to moderate-intensity wildfires, limiting juniper expansion and reducing the chances of stand-replacing fires.	Wilderness values could be affected by juniper treatments in the short term (years) but would be enhanced in the long term (decades) by helping to restore a more natural fire regime and limit juniper expansion to their historic range.	Same as those described for the Full Treatment Alternative, except further site-specific analysis would be needed and fewer acres would likely be treated.	Same as those described for the Full Treatment Alternative.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Parcels with Wilderness Characteristics					
Some wilderness values could decline in areas where juniper expansion continues to the point native shrubs and grasses are suppressed or lost, especially if large, stand-replacing wildfires occur.	Same as the No Treatment Alternative.	Same as the No Treatment Alternative except some areas can be treated with prescribed burning. Prescribed burning could enhance wilderness values by mimicking lower- to moderate-intensity wildfires, limiting juniper expansion and reducing the chances of stand-replacing fires.	Wilderness values could be affected by juniper treatments in the short term (years) but would be enhanced in the long term (decades) by helping to restore a more natural fire regime and limit juniper expansion to their historic range.	Same as those described for the Full Treatment Alternative, except further site-specific analysis would be needed and fewer acres would likely be treated.	Same as those described for the Full Treatment Alternative.
Fire Management					
Wildfires would burn with greater intensity due to increased fuel loading and could potentially burn over larger areas because of greater fuel continuity. Wildfires would also become more difficult to suppress because of greater fuel loading. 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.	Treatment of some areas in the Project Area would help to return the area to an appropriate fire regime and condition class. This could help fire crews with suppression because of lower flame lengths and fire line intensity. As larger areas are restored, naturally-ignited fires may be considered for wildland fire use. Some crews required to suppress wildfires in juniper woodlands may be able to be shifted to other areas because of lower fire intensity. The likelihood of large-scale, high-intensity fires would be reduced compared to the No Treatment Alternative. Partial treatment of western juniper woodlands would alter the fuels structure and reduce connectivity. Fire may become more common following treatment, but fires would be lower intensity and severity.	Mechanical and prescribed fire treatments would reduce dominance of juniper in mountain big sagebrush, quaking aspen, and riparian plant communities. Mechanical treatments in dense juniper may be coupled with late fall, winter, and early spring burning of heavy fuels accumulations. Treatment would help to return the area to an appropriate fire regime and condition class. This could help fire crews with suppression because of lower flame lengths and fire line intensity. As larger areas are restored, more wildfires may be considered for wildland fire use. Crews could be sent to higher priority fires when the area has been converted to appropriate fire regimes.	Effects from the Full Treatment Alternative would be the same as the Limited Treatment Alternative with the following exceptions: Wildland fire use would be implemented after agency treatments reestablish appropriate plant communities. Suppression actions may be greater than other alternatives. Suppression would be implemented to protect current projects and ensure management actions achieve desired results. Treatment would return the area to an appropriate fire regime and condition class. This alternative would achieve this goal faster than the other alternatives. Fire line intensity and flame lengths would be less in areas dominated by herbaceous or shrubby vegetation. This could help fire crews with suppression because of lower flame lengths and fire line intensity.	Effects under this alternative on fire management would be the same as those described under No Treatment. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur.	Potential effects of the Preferred Alternative on fire management are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on fire management within wilderness are the same as those described under the Continuation of Current Management.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Livestock Grazing Management					
Rangeland conditions would continue to deteriorate resulting in further adverse effects on forage production. Viability of livestock operations would be increasingly difficult to maintain, negatively adding to already struggling local-area ranching operations.	This alternative would help slow deterioration of current rangeland conditions. Improvement of such conditions would lead to better forage for both wildlife and domestic animals. This improvement would enhance conditions for grazing operations.	Results of adopting this alternative would be the same as for the Partial Treatment Alternative with the exception rangeland health would also improve within wilderness and WSAs. There would be an increase in forage production but less than where cutting and burning are used together.	Results of adopting this alternative would be the same as the Partial and Limited Treatment Alternatives except the Full Treatment Alternative would achieve this goal faster than other alternatives.	Effects under this alternative on livestock grazing management would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, effects would be the same as the Partial Treatment Alternative except at a decreased rate of implementation. Within wilderness, treatments would be analyzed and implemented on a case-by-case basis.	Potential effects of the Preferred Alternative on livestock grazing management would be the same as potential effects described under the Full Treatment Alternative, in areas outside wilderness. Within wilderness the effects would be the same as those described under Continuation of Current Management Alternative.
Recreation					
Overall the different types of recreation would not be affected. The quality of the recreation experience could be reduced and visitors could be displaced for many years if larger, stand-replacing fires occur.	Recreation resource effects for WSAs and wilderness would be the same as the No Treatment Alternative. Treatments in the rest of the Project Area would create some disturbance to recreational activities associated with juniper cutting and burning.	Recreation resource effects for WSAs and wilderness would be the same as the No Treatment Alternative; however, timing and location of prescribed burning could be better managed to reduce disturbance to recreational activities. Treatments in the rest of the Project Area would create some disturbance to recreational activities associated with juniper cutting and burning.	All treatments could occur throughout the Project Area and would create some disturbance to recreational activities associated with juniper cutting and burning.	Effects under this alternative on recreation would be the same as those described under the Full Treatment Alternative; however, additional site-specific analysis would be needed and fewer acres would likely be treated.	Same as those described for the Full Treatment Alternative, except in wilderness further site-specific analysis would be needed prior to any treatments.
Transportation and Roads					
The Project Area would remain susceptible to high-intensity fires. Exposure of bare soil from fires would increase overland water flow, causing route surfaces to erode and possible landslides to occur blocking routes. Impacts to travel routes would be short term pending maintenance normally occurring within a few months. Some primitive routes may not be maintained until they pose a safety concern. This lack of maintenance may limit some visitor motorized travel.	Project implementation may temporarily restrict access during burning activities. Routes used as fire lines and access to burn areas may experience heavy use resulting in limited to moderate damage. Damaged routes would be maintained as needed, consistent with identified maintenance standards. Most routes would receive maintenance within 1-year of project implementation. Untreated areas within WSAs and wilderness could expect erosion impacts described under the No Treatment Alternative.	Effects to this resource are the same as the Partial Treatment Alternative except treated areas in WSAs and wilderness are expected to increase; therefore, erosion effects to routes should decrease under this alternative.	Project implementation may temporarily restrict access during burning activities. Routes used as fire lines and access to burn areas may experience heavy use resulting in limited to moderate damage. Damaged routes would be maintained as needed, consistent with identified maintenance standards. Most routes would receive maintenance within 1-year of project implementation.	Project implementation may temporarily restrict access during burning activities. Routes used as fire lines and access to burn areas may experience heavy use resulting in limited to moderate damage. Damaged routes would be maintained as needed, consistent with identified maintenance standards. Most routes would receive maintenance within 1-year of project implementation. Untreated areas could expect erosion impacts like those described under the No Treatment Alternative.	Potential effects on transportation/roads are the same as those described under the Full Treatment Alternative in areas outside wilderness. Routes within or bounded by wilderness are susceptible to erosion impacts described under the Continuation of Current Management.

No Treatment Alternative	Partial Treatment Alternative	Limited Treatment Alternative	Full Treatment Alternative	Continuation of Current Management Alternative	Preferred Alternative
Social and Economic Values					
Rangeland conditions would continue to deteriorate resulting in further adverse effects on forage production. Viability of livestock operations would be increasingly difficult to maintain, negatively adding to an already struggling local economy. Deteriorating conditions would also affect recreational opportunities as the area would likely become less attractive to recreationists. Declining ecological conditions would negatively affect wildlife, decreasing recreational opportunities associated with hunting, fishing, and wildlife observation, such as bird watching.	Adoption of this alternative would help slow, and to a certain extent, reverse deterioration of rangeland conditions. Improvement of such conditions would lead to better forage for both wildlife and domestic animals. This improvement would enhance conditions for grazing operations and recreational opportunities, and in turn have a positive effect on the local economy.	Consequences of adopting this alternative would be the same as for the Partial Treatment Alternative with the exception that rangeland health improvement, and attenuating positive social and economic effects, would also occur within wilderness and WSAs.	Consequences of adopting this alternative would be the same as for the Partial and Limited Treatment Alternatives.	Effects under this alternative on social and economic values would be the same as those described under the No Treatment Alternative. In areas where future treatments are proposed and implemented, some minimalization of the Partial, Limited and Full Treatment Alternative effects would occur. Within wilderness, treatments would be analyzed and implemented on a case-by-case basis.	Potential effects of the Preferred Alternative on social and economic values would be the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. Within wilderness the effects would be the same as those described under Continuation of Current Management Alternative.

Chapter 5

Chapter 5 lists cooperating agencies and specialists who prepared this document.

Chapter 6

Chapter 6 contains the glossary, bibliography, and index to assist the reader.

Chapter 1 Introduction: Purpose of and Need for Action

1 Introduction: Purpose Of And Need For Action

The Oregon BLM, Burns District Office manages 3,275,694 acres of public lands located primarily in Harney County, southeastern Oregon. The Burns District BLM is divided into two Resource Areas (RAs) – the Andrews and Three Rivers RAs. The CMPA falls primarily within Andrews RA, but a portion is contained within Three Rivers RA.

1.1 Summary of the Proposal

The proposed Project Area is located primarily within the CMPA, although a small portion (33,034 acres) lies within the Andrews Management Unit (AMU) of the Andrews RA. The Project Area is a complex of private land and public land administered by the BLM (see Chapter 3 for a more detailed description of the planning area).

The North Steens Project is a landscape-level project, the goal of which is to reduce juniper related fuel loading and improve the ecological health of the area by encouraging a healthy functioning ecosystem through appropriate land uses. Treatment techniques would include a combination of prescribed fire, juniper treatments, fencing, seeding, and planting to reduce fuel loads, restore vegetative communities, improve habitat and increase forage. Both wildlife and domestic livestock operations would ultimately benefit. The project would include implementation of management actions across the Project Area that would direct plant communities toward a desirable condition through return of the historic fire regime. Actions would center on lessening effects of potential severe wildfires by reducing fuels and curtailing juniper expansion in mountain big sagebrush, low sagebrush, quaking aspen, mountain mahogany, old-grown juniper, riparian plant communities, and limited acres of Wyoming big sagebrush. This is a multiyear project, and each year the extent of implementation would vary depending on variables such as staff limitations, resource considerations and climatic and operational conditions.

The CMPA was established by the Steens Act and contains 496,136 acres of combined private and public lands. The Steens Act clearly states in Section 113(c), "JUNIPER MANAGEMENT", direction for the BLM to actively manage juniper. Project activities would primarily occur above 4,500 feet and below 7,200 feet, concentrating on the "juniper belt." The techniques used would depend on site-specific objectives and project constraints.

Proposed project treatments, including activities within Steens Mountain Wilderness, Wild and Scenic River (WSR) corridors, and Wilderness Study Areas (WSAs) are arrayed in a range of alternatives detailed in Chapter 2 of this document. Descriptions of the affected environment (current ecological conditions) and analysis of management actions and potential effects from enacting each alternative are found in Chapters 3 and 4, respectively.

The proposed Project Area is approximately 336,000-acres and is a complex of private land, and public land administered by the BLM. Coordination with private landowners is directed by the Steens Act (Section 121) and is essential for achievement of project objectives. Sideboards for coordination and cooperation would be established prior to project implementation, and when possible, these efforts would establish treatment units based on geographic and vegetative features rather than ownership lines. Private landowner cooperation is strictly voluntary and all management activities on private land would be conducted in accordance with landowner management objectives.

Eastern Oregon Agricultural Research Center (EOARC) would work cooperatively with the BLM by placing intensive research sites on selected areas within the Project Area. The EOARC is jointly operated by Oregon State University (OSU) and U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS). The BLM proposes to work closely with EOARC to monitor project results. Other monitoring could be established based on available staffing and funding.

Because of the size and complexity of the proposed project, the BLM determined there would be a significant (beneficial) effect on the environment. Therefore, analysis of management actions and potential effects would require an Environmental Impact Statement (EIS). This EIS analysis is tiered to the Andrews/ Steens PRMP/FEIS, and associated final land use decisions detailed in the AMU and CMPA RMPs and RODs. Information and analysis contained in these documents are herein incorporated by reference.

1.2 Background

Historic management of Steens Mountain has included fire suppression and past grazing practices, which along with other factors (including mid-1800's climate shifts); have contributed to the expansion of western juniper range and density. This expansion has resulted in a modified fuel arrangement and reduction in understory of many vegetation communities and habitats. The Project Area has lost, and is losing, aspen, mountain big sagebrush, and associated shrubs and grasses and is at risk for losing mountain mahogany and old-growth juniper stands.

Many plant communities in southeastern Oregon have been altered since human population increased in the area in the latter half of the 1800s. Western juniper density and cover have significantly increased over the past 140 years. These trends are readily apparent across Steens Mountain. Prior to 1870, juniper was primarily limited to rocky ridge tops or shallow soil areas with sparse vegetation (West, 1984). As a result of many factors including past grazing practices, wildfire suppression and climatic influence, large areas of mountain big sagebrush and quaking aspen have shifted to dominance by juniper which can have dramatic implications on soil stability, wildlife habitat, forage resources, and overall ecosystem functionality.

Fluctuations in the historic range and density of juniper have occurred in the past as indicated by macrofossils from wood rat middens, lake sediments and fossil pollen records. The magnitude and rate of woodland expansion during the last 140 years exceeds anything that has occurred in a similar length of time during the last 5,000 years (Miller and Wigand, 1994).

Lack of fire influence due to suppression is one of the differential factors between prehistoric and historic juniper increases. Domestic livestock were introduced during the 1860s and their numbers increased dramatically from the 1870s through the early 1900s (Miller et al., 2005). Domestic grazing may have influenced juniper expansion by reducing fine fuels, which also alters the fire regime (Miller and Rose, 1999). Increases in juniper have also altered fuel loading and structure of many plant communities.

The rapid increase in juniper over the past 140 years has modified plant communities and subsequently, wildlife habitat. Most of the increase in juniper has been at the expense of big sagebrush plant communities. Sagebrush obligate species (those plants, birds and animals which are dependent on sagebrush for microclimate, cover and forage) have experienced dramatic reductions in sagebrush and associated vegetation. However, early stages of juniper expansion can also provide diverse wildlife habitat.

Image 1.1. Western juniper expansion into riparian and upland areas.

Image 1.2. Reduced understory resulting from juniper expansion.

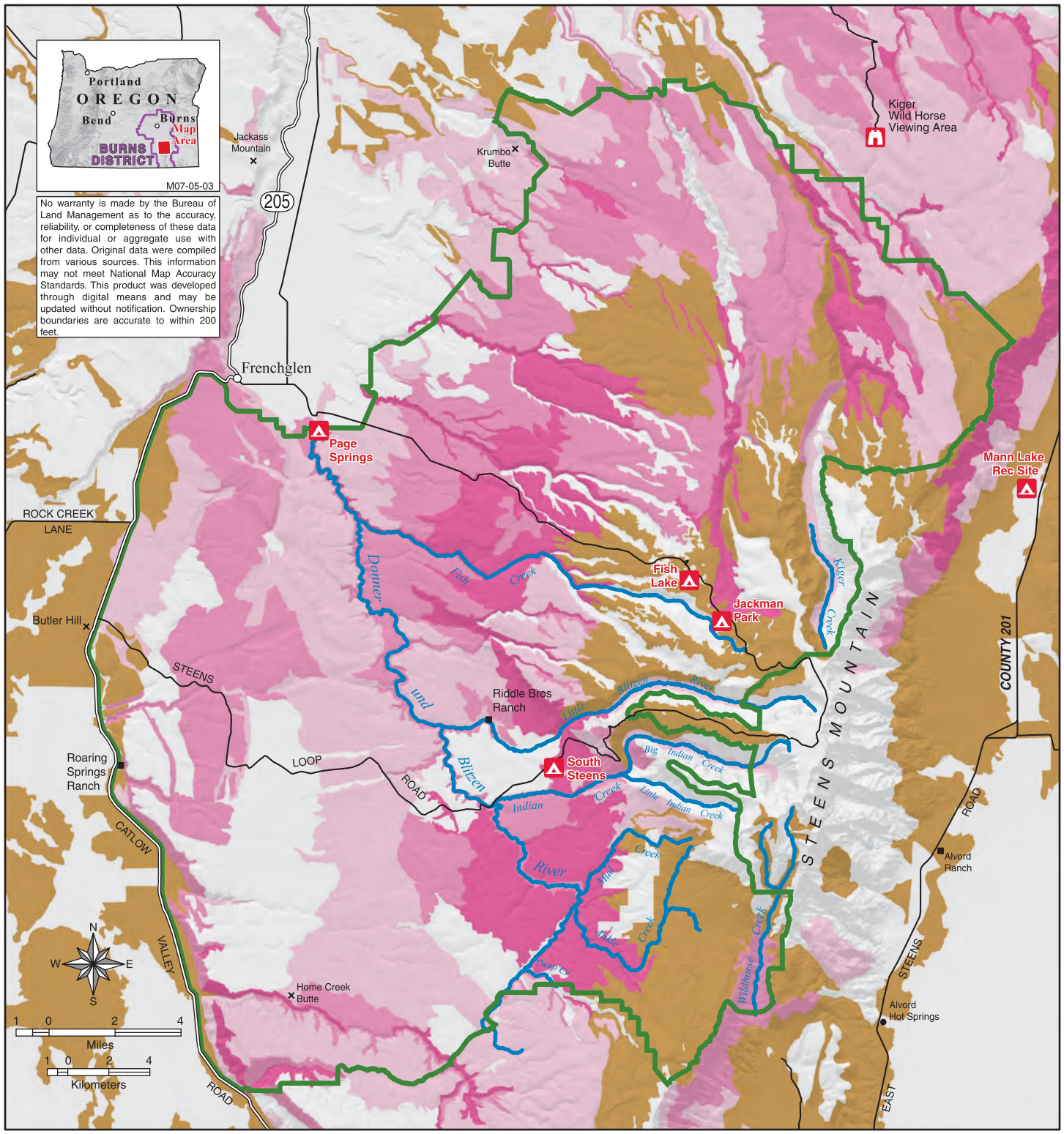
Approximately 100 animal species at some point in their life cycle utilize open juniper woodlands for thermal and hiding cover, nesting, and food (Miller, 2001).

Wildlife diversity in juniper communities relates strongly to diversity and abundance of understory plant species. However, this open juniper woodland is only a transitory stage. Stands currently in this condition are moving toward closed woodlands. The rate of this progression is dependent on site-specific productivity.

As juniper cover increases from less than 3% to 10-25% (see Maps 1.1 and 1.2), much understory vegetation must compete for water, soil nutrients and sunlight, and is eventually lost. Continued loss of understory vegetation and increased rate of loss make treatment of dominating juniper woodlands a priority to revitalize sagebrush communities.

1.3 Purpose of and Need for Action

Natural vegetative systems have been altered in many different ways. Effective management which restores conditions under which native species evolved can minimize or compensate for these changes. The proposal's overarching objective is to reduce juniper-related fuels and restore various plant communities through restoration of habitat. Increased forage for wild and domestic herbivores would result. Fire, as well as mechanized and nonmechanized treatments, would be used in aspen, remnant aspen, sagebrush-bunchgrass, juniper, and riparian plant communities to reestablish historic type fire regimes. Guidance and direction for projects of this type are provided for under Section 113 "LAND USE AUTHORITIES" of the Steens Act. Section 113 (c) states: "The Secretary shall emphasize the restoration of the historic fire regime in the Cooperative Management and Protection Area and the resulting native vegetation communities



North Steens Project Area Boundary

Current Sagebrush Vegetation

Juniper Cover Classes by Percent

- 0.5 - 3.0
- 3.1 - 10.0
- 10.1 - 23.8

Campground

Watchable Wildlife

Paved Road

Non-Paved Road

Wild and Scientific River

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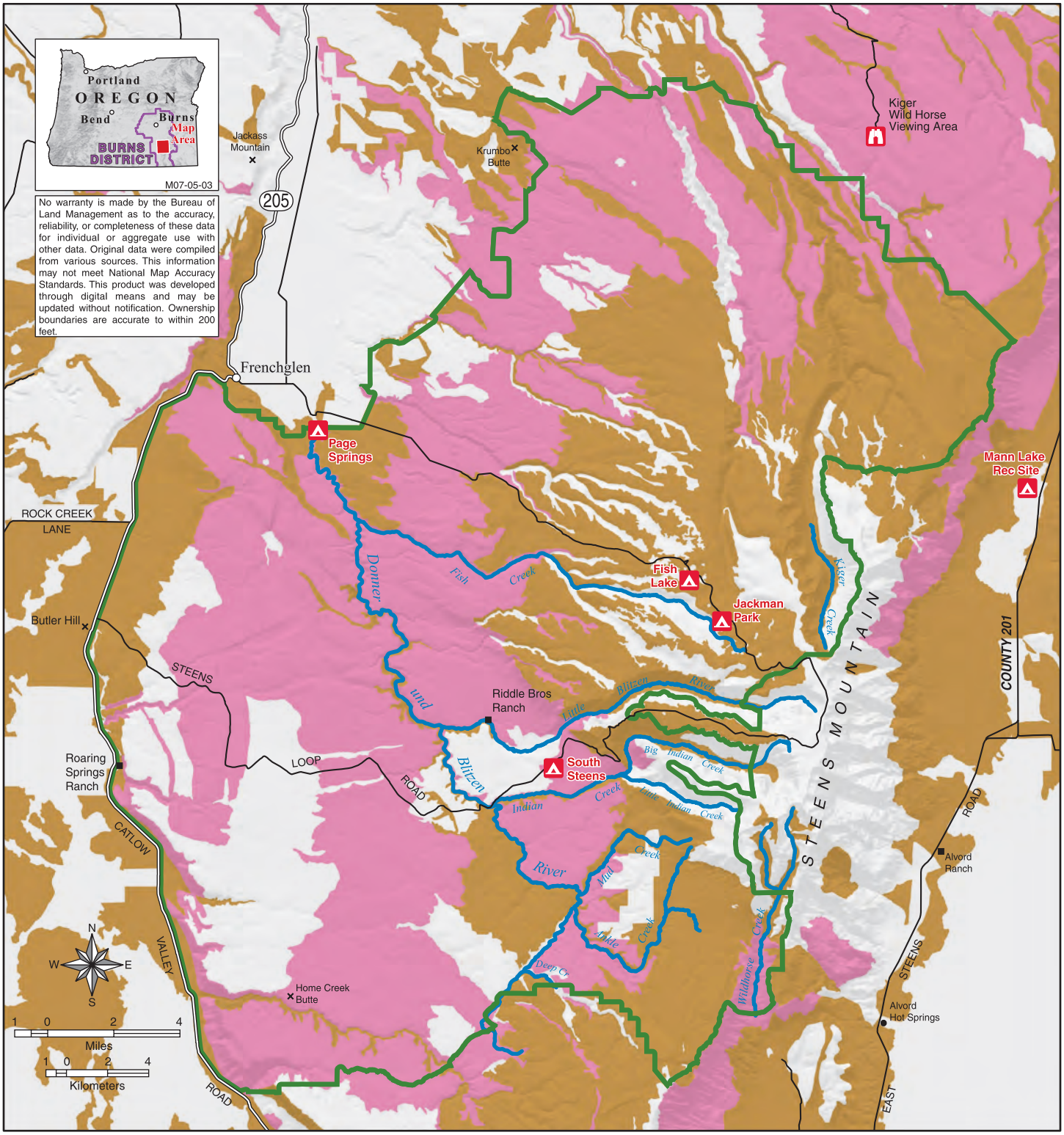
Map 1.1: Current Sagebrush Vegetation and Juniper Expansion



North Steens Project Area Boundary

Current Sagebrush Vegetation

Juniper Cover Class by Percent

10.1 - 23.8

Campground

Watchable Wildlife

Paved Road

Non-Paved Road

Wild and Scenic River

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Map 1.2: Juniper Expansion Eighty Years

through active management of juniper on a landscape level. Management measures shall include the use of natural and prescribed burning."

As juniper has expanded in spatial range and population density, the health of plant communities on which wildlife and domestic livestock depend has been adversely altered. This in turn is negatively affecting the economic and social fabric of the area. If the project is not implemented, the downward trend would continue. Ecological conditions on Steens Mountain would continue to deteriorate and the Desired Range of Conditions (DRC) would not be achieved.

Findings from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) support the objectives and need for implementing the project. In discussing emphasis on active restoration ICBEMP states, "For the most part, ecological integrity improves following restoration activities." The document concludes "Management practices aggressively restore ecosystem health through strategies resembling natural disturbance processes, such as insects, disease, and fire…Healthy ecosystems are better able to meet society's social and economic needs…," and "Restoration activities are economically beneficial whenever possible." (Highlighted Scientific Findings of the Interior Columbia Basin Ecosystem Management Project 1997).

The decision criteria for selection of actions to satisfy objectives of the proposal must support goals and objectives of the RMP, purposes of the Steens Act and be in conformance with FLPMA. Project implementation would achieve relevant objectives of the Steens Act.

Compliance with the Steens Mountain Cooperative Management and Protection Act of 2000:

This proposal is in compliance with the purpose, objectives and direction contained in the Steens Act. Specific portions have been cited below. See the Steens Act in its entirety for other portions not specifically cited below.

Section 1 (b) "PURPOSES- The purposes of this Act are the following:

(1) To maintain the cultural, economic, ecological, and social health of the Steens Mountain area in Harney County, Oregon"
(5) "To provide for and expand cooperative management activities between public and private landowners in the vicinity of the Wilderness Area and surrounding lands."
(10) "To maintain and enhance cooperative and innovative management practices between the public and private land managers in the Cooperative Management and Protection Area.
(11) To promote viable and sustainable grazing and recreation programs on private and public lands.
(12) To conserve, protect, and manage for healthy watersheds and the long-term ecological integrity of Steens Mountain."

Section 102

"(a) - PURPOSE.- The purpose of the Cooperative Management and Protection Area is to conserve, protect, and manage the long-term ecological integrity of Steens Mountain for future and present generations.
(b) - OBJECTIVES..."
"(1) to maintain and enhance cooperative and innovative management projects, programs and agreements between tribal, public and private interests in the Cooperative Management and Protection Area;"
"(4) to ensure the conservation, protection, and improved management of the ecological, social, and economic environment of the Cooperative Management and Protection Area, including geological, biological, wildlife, riparian, and scenic resources; and
(5) to promote and foster cooperation, communication, and understanding and to reduce conflict between Steens Mountain users and interests."

Section 113 - "LAND USE AUTHORITIES."

> (b)(2) "LIMITED EXCEPTION.- The Secretary may authorize the removal of trees from Federal lands in the Cooperative Management and Protection Area only if the Secretary determines that the removal is clearly needed for purposes of ecological restoration and maintenance or for public safety. Except in the Wilderness Area and the wilderness study areas referred to in Section 204(a), the Secretary may authorize the sale of products resulting from the authorized removal of trees under this paragraph."
>
> (c) "JUNIPER MANAGEMENT. - The Secretary shall emphasize the restoration of the historic fire regime in the Cooperative Management and Protection Area and the resulting native vegetation communities through active management of Western Juniper on a landscape level. Management measures shall include the use of natural and prescribed burning."

Section 121 - "COOPERATIVE MANAGEMENT AGREEMENTS.

> (a) COOPERATIVE EFFORTS.- To further the purposes and objectives for which the Cooperative Management and Protection Area is designated, the Secretary may work with non-Federal landowners and other parties who voluntarily agree to participate in the cooperative management of Federal and non-Federal lands in the Cooperative Management and Protection Area."

Analysis of proposed management activities in this EIS is linked to management goals and objectives of the Steens Mountain CMPA RMP. In the ***Riparian and Wetlands*** section (Page RMP-24) the goal is: ***"Maintain, restore, or improve riparian vegetation, habitat diversity, and geomorphic stability to achieve healthy, productive riparian areas and wetlands and associated structure, function, process and products that provide public land values such as forage, water, cover, structure and security necessary to meet the life history requirements of fish and wildlife; public recreation and aesthetics; water quality and quantity; and livestock forage and water."***

The ***Woodlands*** section (Page RMP-27) goals include: ***"Maintain or improve ecological integrity of old growth juniper woodlands." Maintain, restore, or improve the ecological integrity of mountain mahogany and quaking aspen stands/groves." "Manage woodland habitat so that the forage, water, cover, structure, and security necessary to meet the life history requirements of woodland-dependent and woodland-associated wildlife species are available on public lands."*** Objectives under this section include: "Maintain or improve late seral stage ecological characteristics in old growth western juniper woodlands," "Reduce the component of western juniper and other associated woody plant species in quaking aspen and mountain mahogany stands,." and "Reduce the influence of western juniper trees less than 120 years old to restore riparian and sagebrush habitats."

Under the ***Fire Management*** section (Page RMP-56) Goal 2 is to ***"Restore and maintain the integrity of ecosystems consistent with appropriate fire regimes and land uses."*** Objective 1 states: "Implement management actions across the CMPA that maintain or return plant communities to the historic fire regime…the appropriate fire regime will be determined based upon current conditions."

Included in the ***Rangelands*** discussion (Page RMP-30) is the goal to: ***"Maintain, restore or improve the integrity of desirable vegetation communities including perennial, native, and desirable introduced plant species. Provide for their continued existence and normal function in nutrient, water, and energy cycles."*** Objectives to meet this goal include: "Maintain or restore native vegetation communities through sound landscape management practices. Manage desirable nonnative seedings to meet resource objectives. Rehabilitate plant communities that do not have the potential to meet the DRC through management. Increase species and structural diversity at the plant community and landscape levels in the big sagebrush communities. Provide multiple successional stages within the landscape."

A second goal in the last section is: ***"Manage rangeland habitats so that forage, water, cover, structure, and security necessary to meet the life history requirements of wildlife are available on public lands."*** The objectives to meet this goal include these: "Manage big sagebrush, quaking aspen, and western juniper plant communities to meet habitat requirements for wildlife," and "Manage big sagebrush communities

to meet the life history requirements of sagebrush-dependent species." For example, healthy sagebrush communities are high priority for maintaining viable greater sage-grouse populations.

When choosing a final alternative, the decision maker must ask the following questions in relation to each alternative being considered. Comparison of the answers to the following questions would give the decision maker information needed to select an alternative among the many analyzed. Decision criteria specific to the North Steens Project would be considered by the decision maker. The decision criteria and rationale utilized for selection of an alternative (or component thereof) would be explained in the ROD.

1. Primary Decision Criteria:

A. To what degree does the alternative reduce fuel loading and effectively treat western juniper in the Project Area?
B. To what degree would the alternative reduce the likelihood of high intensity and severity wildfires in the Project Area?
C. To what degree does the alternative conform to the purposes of the Steens Act? (Steens Act, Section 1 (b))
    1. Would the alternative maintain the cultural, economic, ecological, and social health of the Steens Mountain area in Harney County, Oregon?
    2. Would the alternative provide for and expand cooperative management activities between public and private landowners in the vicinity of the Steens Wilderness Area and surrounding lands?
    3. Would the alternative maintain and enhance cooperative and innovative management practices among public and private land managers in the Cooperative Management and Protection Area?
    4. Would the alternative promote viable and sustainable grazing and recreation programs on private and public lands?
    5. Would the alternative conserve, protect, and manage for healthy watersheds and the long-term ecological integrity of Steens Mountain?
    6. Does the alternative manage WSAs in a manner consistent with FLPMA as directed by the Steens Act? (Section 603C WSA Management)
D. To what degree does the alternative conform to the goals and objectives of the CMPA and Andrews AMU RMPs and RODs?
    1. Would the alternative restore and maintain the integrity of ecosystems consistent with appropriate fire regimes and land uses?
    2. Would the alternative maintain, restore, or improve riparian vegetation, habitat diversity, and geomorphic stability to achieve healthy, productive riparian areas and wetlands and associated structure, function, process and products?
    3. Would the alternative maintain or improve ecological integrity of old-growth juniper woodland, mountain mahogany and quaking aspen stands/groves? In addition, would the alternative manage woodland habitat so forage, water, cover, structure, and security necessary to meet life history requirements of woodland-dependent and woodland-associated wildlife species are available on public lands?
    4. Would the alternative maintain, restore or improve the integrity of desirable vegetation communities including perennial, native, and desirable introduced plant species?
    5. Would the alternative manage rangeland habitats so that forage, water, cover, structure, and security necessary to meet the life history requirements of wildlife are available on public lands?
    6. Would the alternative meet social and economic goals and objectives?
    7. Would the alternative provide forage where S&Gs are not being met?
E. Would the alternative conform to the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* (2005)?
F. Would the alternative conform to the *Management Guidelines for Greater Sage-Grouse and Sagebrush Steppe Ecosystems* (2000)?
G. Does the alternative conform to the Steens Mountain Wilderness and Wild and Scenic River Plan (July, 2005)?

2. Supplemental Decision Criteria:

A. What is the recommendation of the Steens Mountain Advisory Council (SMAC)?

B. Does the alternative support partnerships?

Mountain sagebrush, aspen, remnant aspen, and mountain mahogany stands are priority areas for treatment in accordance with goals/objectives of the RMP. Aspen and remnant aspen communities are dependent on regular fire events for regeneration; this regenerated habitat is critical to wildlife species such as neotropical birds and many other nongame species. Aspen communities are also important to elk and deer for browse and cover. Prescribed fire, combined with other juniper treatments, would result in a mosaic of multiple vegetation successional stages across the landscape thus increasing species, structure, and habitat diversity. This optimal resulting condition is titled the Desired Range of Conditions (DRC) (see the Andrews/Steens PRMP/FEIS at 2-3 to 2-4).The DRC described in the Andrews/Steens PRMP/FEIS includes the desirable social and economic quality of life that would be maintained for Steens Mountain landowners, local residents, and visitors pursuant to the Steens Act. Achievement of the DRC would also support purposes and objectives of the CMPA stated below.

For a detailed discussion concerning western juniper, see the recent publication *Biology, Ecology and Management of Western Juniper* (Miller et al., 2005).

1.4 Compliance with Land Use Plans and Other Legislation

The proposal is in conformance with objectives and land use allocations in the AMU and Steens Mountain CMPA RMPs and RODs. The proposal is in conformance with objectives of the Standards for Rangeland Health and Guidelines for Livestock Management for Public Land administered by the BLM in the States of Oregon and Washington (S&Gs). These objectives are "to promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions…and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands." The proposal is also in conformance, or does not conflict, with all pertinent Federal, State, local and Tribal land use plans, laws and regulations.

This project also complies with directives in the Federal Land Policy and Management Act of 1976 (FLPMA), the Wilderness Act of 1964, Public Rangelands Improvement Act of 1978 (PRIA), the National Environmental Policy Act of 1969 (NEPA), and other laws.

1.5 Initial Screening and Scoping of Issues

The North Steens Project has been discussed and developed by BLM personnel over several years, and many changes to project design have occurred. The SMAC has been provided project updates, site tours, and opportunities for input and recommendation to BLM under its authority as provided in the Steens Act (Section 131). The project was originally called the Bridge Creek Project and was approximately 40,000 acres. That project evolved into the current proposal.

Multiple Interdisciplinary (ID) Team meetings were held during development and internal screening of this project. A notice of public scoping was posted on the Burns District internet site on January 5, 2005 and published in the Burns Times-Herald. A mailing with project information and draft alternatives was sent to 238 organizations and individuals nationwide. The public scoping period occurred over 43 days and generated a wide variety of issues/concerns.

The BLM initially considered this an Environmental Assessment (EA) level project, but because of input gathered in public scoping and the enlarged scope and scale of the project, the BLM determined an EIS should be prepared. As a result in change of level of analysis the Notice of Intent (to prepare an EIS) published in the *Federal Register* (July 21, 2005) provided for an additional 15-day public scoping period on the proposal. The second scoping period did not generate a large response.

A Notice of Availability (NOA) was published in the *Federal Register* on February 10, 2006 announcing the availability of the Draft North Steens Project EIS. This publication initiated a 45 day public comment period which ended on March 27, 2006. Copies of the Draft EIS were sent to organizations and individuals nationwide. Additional copies were requested by individuals and groups during the 45-day public comment period. The public comment period included two public meetings held in Burns and Diamond on February 22 and 23, 2006, respectively.

A Notice of Availability (NOA) will be published in the *Federal Register* announcing a 30-day period of availability of the Final North Steens Project EIS.

Private landowners have been invited to participate in the project. In addition Harney County, Burns Paiute Tribe, Harney County Soil and Water Conservation District, Oregon Department of Fish and Wildlife (ODFW), U.S. Fish and Wildlife Service (USFWS) Ecological Services and Malheur National Wildlife Refuge (Malheur NWR), Oregon Department of Environmental Quality (DEQ), and USDA EOARC have agreed to participate as cooperating agencies as defined in Council on Environmental Quality (CEQ) regulations.

1.6 Issues

Table 1.1. Issues and Questions Related to the Project Proposal.

Issues & Questions.	Addressed in the December 2005 Draft North Steens EIS.	Addressed in the 2004 Andrews/Steens PRMP/ FEIS.	Addressed in the 2007 Final North Steens EIS.*
Fuel loading and wildfire concerns.	Sections 1.2, 3, & 4; 3.4.2; all of chapters 2 & 4 with emphasis on 4.2.2, 4.4.2, 4.6.2, 4.8.2, 4.10.2, 4.11, 4.13.2, 4.15.2, 4.17.2 4.19.2, & 4.21.2.	Sections 2.5, 6 & 16; 3.5, 6 & 16; 4.5, 6 & 16.	Sections 1.2, 1.3, all of Chapter 2, Sections 3.2.5.1 & all of Chapter 4 with emphasis on 4.2.5.1
Air quality concerns.	Sections 3.3.2, 4.1.2, 4.3.2, 4.5.2, 4.7.2, 4.9.2, 4.12.2, 4.14.2, 4.14.2, 4.16.2, 4.18.2, & 4.20.2.	Sections 2.2, 3.2 & 4.2.	Sections 3.2.1.1 & 4.2.1.1
Effects of juniper treatments, wildfires and prescribed fire on wildlife habitat & populations.	Sections 4.1.8, 4.2.11 &14; 4.3.8, 4.4.11 &14; 4.5.8, 4.6.11 &14; 4.7.8, 4.8.11 & 14; 4.9.8, 4.10.11 &14; 4.12.8, 4.13.11 &14; 4.14.8, 4.15.11 &14; 4.16.8, 4.17.11 & 14; 4.18.8, 4.19.11 & 14; 4.20.8, 4.21.11 &14.	Sections 2.5, 6, 7, & 16; 3.5, 6, 7, & 16; 4.5, 4.6 & 4.16.	Sections 3.2.2, 3.2.3, 4.2.2, & 4.2.3
Historical and cultural concerns.	Sections 3.3.3, 4 & 7; 4.1.3, 4 & 7; 4.3.3, 4 & 7; 4.5.3, 4 & 7; 4.7.3, 4 & 7; 4.9.3, 4 & 7; 4.12.3, 4 & 7; 4.14.3, 4 & 7; 4.16.3, 4 & 7; 4.18.3, 4 & 7; 4.20.3, 4 & 7.	Sections 2.8, 9 & 10; 3.8, 9 & 10; 4.8, 9 & 10.	Sections 3.2.4.1 & 4.2.4.1
Riparian vegetation and water quality concerns.	Sections 3.3.10, 4.1.10, 4.3.10, 4.5.10, 4.7.10, 4.9.10, 4.12.10, 4.14.10, 4.16,10, 4.18.10, 4.20.10.	Sections 2.5.1 & 2; 3.5.1 & 4.5.1 & 2.	Sections 3.2.1.3 & 4.2.1.3
What are the potential effects of the alternatives on WSAs or parcels with wilderness characteristics?	Sections 3.3.13, 4.1.13, 4.3.13, 4.5.13, 4.7.13, 4.9.13, 4.12.13, 4.14.13, 4.16,13, 4.18.13, 4.20.13, & 4.23.	Section 4.23	Sections 3.2.4.5, 3.2.4.6, 4.2.4.5 & 4.2.4.6
What are the potential effects of the proposed treatments on wilderness values?	Sections 3.3.12, 4.1.12, 4.3.12, 4.5.12, 4.7.12, 4.9.12, 4.12.12, 4.14.12, 4.16,12, 4.18.12, 4.20.12.	Section 4.22	Sections 3.2.4.4 & 4.2.4.4
What are the potential effects of the proposed treatments on livestock operations?	Sections 3.4.5, 4.2.5, 4.3.13, 4.4.5, 4.6.5, 4.8.5, 4.10.5, 4.13.5, 4.15.5, 4.17.5, 4.19.5.	Section 4.15	Sections 3.2.5.2 & 4.2.5.2
What are the potential effects of taking no action in the Project Area?	Sections 4.1 and 4.3	See analysis of Alternative A throughout Chapter 4 of the Andrews/Steens PRMP/FEIS.	See analysis of the "No Treatment Alternative" throughout Chapter 4
Were citizens WSA proposals considered in the Project Area?	Yes, documentation for each proposed WSA is available at the Burns BLM District Office.	Yes, during the prior Andrews/ Steens RMP planning process.	Yes, documentation for each proposed WSA is available at the Burns District Office.

* The responses to public comments on the Draft EIS are located in Appendix A of this document.

Chapter 2
Alternatives Including the Proposed Action

2 Alternatives Including the Proposed Action

2.1 Purpose of Chapter 2

Chapter 2 describes all alternatives and provides a framework for analysis and includes a summary of potential effects of enacting the alternatives. This chapter also discusses the concept of adaptive management, a management system that would be utilized during project implementation.

2.2 Adaptive Management

Adaptive management is 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 would best ensure outcomes are met. This learning process builds on current knowledge, observation, and experimentation. A continuous feedback loop allows for mid-course corrections in management to meet planned objectives. In addition, the process provides a model for adjusting objectives as new information and public input arise. As a landscape-level project is implemented, opportunities to fine-tune proposed treatments and approaches increase due to the scale of the project and length of time required until implementation is complete. Experience gained during earlier phases of implementation can result in better management practices. Project implementation flexibility is necessary for addressing and adapting to issues, situations, and new knowledge which can emerge during implementation activities.

The BLM (along with cooperators and private landowners) proposes to study representative habitat types and plant communities and how they may respond to various treatments (see Measurable Objectives Common to all Action Alternatives).

2.2.1 Adaptive Management Objectives:

1. Where feasible, utilize multiple treatment approaches that can be implemented simultaneously to provide parallel learning opportunities, allowing ready comparison and more rapid adaptation over time.
2. Utilize minimum monitoring methodologies to provide before-after comparisons of specific responses to fire and juniper treatments.
3. Support the overall objectives of the AMU/CMPA RMPs.
4. Implement Section 113 (c) of the Steens Act through the use of adaptive management practices.

2.2.2 Adaptive Management Common to all Action Alternatives

Monitoring is critical to adaptive management. The minimum level of monitoring for this proposal would be as stated in the measurable objectives section of this chapter. Additional monitoring would be established by implementing the monitoring plan (see Chapter 4) or could be established as additional questions arise or cooperating researchers implement further studies. The data resulting from these studies would be utilized to determine how, when, and where to best apply the range of proposed treatments analyzed in this EIS. The result would be a strong knowledge of the Project Area responses to treatments.

2.3 Development of Alternatives

Alternatives were developed based on land use plan decisions in the AMU and CMPA RMPs/RODs and on implementation of Section 113 of the Steens Act that directs management of juniper on a landscape level. Central considerations utilized in developing alternatives included rate and scale of treatment. The ID team determined that given different management considerations for wilderness, WSAs, and WSR corridors,

juniper management on a landscape scale would be partially driven by possible management constraints within those Special Management Areas (SMAs). The team identified five possible basic approaches to landscape-scale management:

1. Stop current activities and perform no treatment activities in the Project Area;
2. Continue current management and take no additional actions beyond existing levels of juniper-related fuels management;
3. Manage juniper beyond current levels outside of SMAs. Within SMAs treatment would be limited to managed wildfire only*;
4. Manage juniper over the entire Project Area, but limit treatment methods used in the SMAs; and
5. Manage juniper over the entire Project Area and use a wider set of treatment methods in the SMAs.

The ID team also spent many months considering issues generated internally and externally.

* Managed wildfire would be possible in all areas under all alternatives.

2.4 Project Objectives Common to all Action Alternatives (except the No Treatment Alternative):

Objective - a description of a desired condition for a resource. Objectives can generally be quantified and measured and, where possible, have established timeframes for achievement.

1. Reduce juniper-related fuels on a landscape scale within the North Steens Project Area. This can be accomplished through landscape level management of expansion juniper (post-1870). By enacting management direction found in the CMPA RMP, RMP goals and objectives for landscape level management would be met.
2. Implement Section 113 (c) of the Steens Act which states, "The Secretary shall emphasize the restoration of the historic fire regime in the Cooperative Management and Protection Area and the resulting native vegetation communities through active management of juniper on a landscape level. Management measures shall include the use of natural and prescribed burning." This goal is consistent with the purpose of the CMPA as stated in the Steens Act Section 102a which states, "The purpose of the Cooperative Management and Protection Area is to conserve, protect, and manage the long-term ecological integrity of Steens Mountain for future and present generations."
3. Improve sagebrush/bunchgrass habitats by removal of expansion juniper and move the North Steens ecosystem toward healthier functionality. The restoration of ecosystem processes improves habitat for not only greater sage-grouse but numerous other wildlife species as well as domestic species.
4. Create a mosaic of plant communities and seral stages with tree, shrub, grassland, and herbaceous components resulting in improved ecosystem functionality on a landscape scale, thereby increasing structural, biological, and habitat diversity.
5. Manage aspen and remnant aspen stands for multiple age classes where live overstory currently exists and for the reestablishment of these communities on the landscape.
6. Reestablish mountain big sagebrush-bunchgrass communities through the reintroduction of fire where expansion juniper is currently in transition to fully-developed juniper woodlands.
7. Improve and protect the integrity of watershed function, improve watershed stability, and decrease accelerating erosion by establishing diverse plant communities. Increase vegetation cover, litter, and reduce the amount of exposed soil over time resulting in healthier ecosystem functionality.
8. Improve riparian condition and maintain or improve stream functionality by expanding aquatic herbaceous and deciduous riparian woody species within communities currently competing with expansion juniper.
9. Improve or maintain aspen, remnant aspen, mountain big sagebrush-bunchgrass, and riparian communities to create diverse habitat for wildlife species. Create and maintain through repeated treatment a dynamic mosaic of seral stages that would meet the forage and cover requirements for elk, mule deer, pronghorn antelope, greater sage-grouse, neotropical birds, other mammals, amphibians, and reptiles.

10. Maintain or improve water quality while striving toward meeting State of Oregon water quality standards.
11. Increase available forage for wild and domestic grazing herbivores in the Project Area.
12. Maintain or improve vegetation condition beneficial to fish habitat resulting in healthier ecosystem functionality. Special consideration would be given for Great Basin redband trout and mountain whitefish habitat requirements.

2.5 Measurable Project Objectives Common to all Action Alternatives (except the No Treatment Alternative):

Low Sagebrush Community

There are approximately 102,905 acres in the Project Area identified as low sagebrush/grassland communities and 47,421 acres of juniper/low sagebrush. The objective in these plant communities is to reduce expansion juniper by 75-100% and protect the integrity of the low sagebrush flats. This objective applies to early, mid and late-successional juniper sites.

Landscape level objective:

1. Over a 5-year period, treat at least 5,000 acres of low sagebrush communities.

Big Sagebrush Community

There are approximately 40,684 acres identified as mountain big sagebrush/grassland communities, 51,992 acres as big sagebrush/shrublands, 43,390 acres as juniper/big sagebrush, and 3,352 acres as big sagebrush/annual grassland in the Project Area. The objective in these plant communities is to reduce expansion juniper by 75-85% which would restore and enhance existing big sagebrush communities. This objective applies to early, mid and late-successional juniper sites.

Burn mosaic percentage objectives are specific to the juniper transition stage of the plant community.

1. Early-transitional juniper sites in mountain big sagebrush – Under 50% of the plant community would be treated.
2. Mid-transitional juniper sites in mountain big sagebrush – Up to 70% of the plant community would be treated.
3. Late-transitional juniper sites in mountain big sagebrush – Up to 70% (or greater in some cases) of the plant community would be treated.

Landscape level objective:

1. Over a 10-year period, increase mountain big sagebrush habitat by 15,000 to 40,000 acres.

Other important plant communities occurring within these sites include mountain mahogany and bitterbrush stands. The objective in these areas is to reduce expansion juniper by 75-85 % while retaining existing mountain mahogany and dense bitterbrush populations. This objective applies to early, mid and late-successional juniper sites.

Landscape level objective:

1. Over a 5-year period, treat at least 250 acres of juniper invaded mountain mahogany.

Aspen Community

Many aspen stands within the Project Area are being affected by juniper. The objective in these areas is to reduce aspen overstory by at least 50% to open understory and facilitate suckering. This objective applies to early, mid and late-successional juniper sites within aspen stands.

Landscape level objective:

1. Over a 5-year period, treat at least 250 acres of aspen stands to facilitate suckering.

Old-Growth Juniper Community

Many old-growth juniper sites within the Project Area are being infiltrated by younger juniper.

The objective in this community is to reduce expansion juniper by 75-85% while retaining existing old-growth juniper. This objective applies to early, mid and late-successional juniper sites within old-growth juniper populations.

Landscape level objective:

1. Over a 5-year period, reduce expansion juniper in up to 500 acres of old-growth juniper

Riparian Plant Community

Riparian habitat has been modified by expansion juniper. The proposal in these treatment areas is to reduce expansion juniper.

Riparian habitat objectives include:

1. Reduce expansion juniper by 75-85%. This objective applies to early, mid and late-successional juniper sites within riparian habitat.

Landscape level objective:

1. Over a 5-year period, treat at least 10 miles of riparian habitat.

Minimum monitoring for the aforementioned landscape objectives would include photo points or density transects to determine if project objectives are being met. Monitoring data would be utilized as part of adaptive management. Additional monitoring could be established, but would be subject to budgetary and staffing constraints.

2.6 Project Design Elements (PDEs) Common to all Action Alternatives (except the No Treatment Alternative)

The PDEs are prescribed to meet the project objectives above. These PDEs are preliminary and are subject to change during the adaptive management process. Any changes, additions or deletions would be made through coordination with cooperating agencies and by appropriate BLM specialists and reviewed and approved by the Authorized Officer (BLM Andrews RA Field Manager). Not all PDEs are appropriate and applicable to all on-the-ground situations. Applicable PDEs would be applied as appropriate following advice and recommendations from the ID Team. These recommendations would be provided to the Field Manager who makes the decision based on a review of the prescription and other factors.

1. **Safety** - Public and firefighter safety is the number one priority. This PDE applies to all alternatives including the No Treatment Alternative.

2. **Wildlife Habitat Modification** - Wildlife habitat descriptions and considerations in Appendix P of the Andrews/Steens PRMP/FEIS would be utilized to ensure project implementation properly considers wildlife requirements and moves toward the DRC described in the Andrews/Steens PRMP/FEIS.
3. **Special Status Species** - Special Status Species are to be protected throughout the life of the project; some species require no additional protection. Special Status plant populations would be avoided within mechanically-treated areas and may be protected during deployment of prescribed fire by black-lining resources and use of appropriate ignition techniques. Special Status wildlife species habitat would be protected throughout the life of the project through conformance with the State and National sage-grouse strategies and establishment of greater ecosystem functionality.
4. **Greater Sage-Grouse Leks** - Invasive juniper would be treated aggressively within greater sage-grouse 2-mile lek buffers. Treatment methods would be limited to cutting and individually burning juniper within the buffer area. Treatments within the 2-mile buffer area would not take place from March 1 to June 15.
5. **Big Game Cover** - Suitable big game hiding and thermal cover within mechanical fuels reduction areas are to be maintained. Mechanical treatment areas would continue to function as big game cover following treatment.
6. **Big Game Browse** - Burned acreage within prescribed fire project units supporting big game browse could be limited in some cases. This PDE would not apply to project units that contain juniper woodlands in a late stage of development.
7. **Old-Growth Juniper** - Old-growth juniper stands are to be retained. Additionally 10-15% of expansion juniper is to be retained to provide hiding and thermal cover for mule deer and elk and to provide for future old-growth.
8. **Old-Growth Juniper Characteristics** - Cutting of juniper with old-growth characteristics or obvious wildlife occupation (cavities or nests) would be avoided in all situations. See Chapter 3 for a description of old-growth juniper.
9. **Bitterbrush** - Juniper would be treated mechanically in areas where bitterbrush is healthy and a major component of a site. Individual tree burning could also be used.
10. **Bitterbrush** - Areas currently supporting bitterbrush and treated during project implementation may require planting or seeding with bitterbrush. Burned rangeland (outside of wilderness or WSAs) may be seeded with a rangeland drill, while burn piles or jackpots in the mechanically-treated project units may be seeded without site preparation. Where feasible, bitterbrush would be seeded alone (rather than within a seed mix) in order to reduce competition with other species and increase likelihood of establishment.
11. **Mountain Mahogany** - Juniper would be treated mechanically in mountain mahogany stands. Individual tree burning could also be used.
12. **Low Sagebrush** - Individual expansion juniper would be cut or burned in most low sagebrush sites. Complete removal of expansion juniper would be prescribed in many of these low sagebrush areas which are important habitat for greater sage-grouse. Broadcast burning would be avoided in low sage communities.
13. **Wyoming Big Sagebrush** - Wyoming big sagebrush sites (lower elevation sites) for the most part are not included in the Project Area; those with substantial cheatgrass in the understory would not be burned in most cases. Treatment by other means such as juniper cutting or mastication would be undertaken. Wyoming big sagebrush sites with minimal cheatgrass in the understory may be burned and consideration given to reseeding the area with appropriate perennial grass species.
14. **Early Transition to Juniper Woodlands** - Big sagebrush stands with scattered juniper would not be treated by broadcast burning unless the prescription calls for under 50% blackened acres.
15. **Adjacent Treatments** - Treated mountain big sagebrush communities should attain 10-15% sagebrush cover (as defined in the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon*) on average before any additional treatments would be considered within the same individual treatment unit or a contiguous adjacent unit.
16. **Paleontological Resources** - Prior to treatment implementation, areas determined to be of high probability for location of paleontological artifacts would be surveyed. Paleontological properties would be protected throughout the life of the project through removal of paleontological site area(s) from treatment.
17. **Cultural Resources** - Prior to treatment implementation, a cultural resource inventory would be completed. A stratified survey sample would be employed to minimize cost and time while ensuring location of cultural resource properties. Cultural resource properties would be protected throughout the

life of the project. Only heavy equipment using rubber tires would be utilized within site boundaries. No heavy equipment would be allowed within cultural site boundaries during wet or soil saturated conditions. Sites containing artifacts or features susceptible to fire damage or destruction would be protected during treatment through black-lining adjacent resources and appropriate ignition techniques.

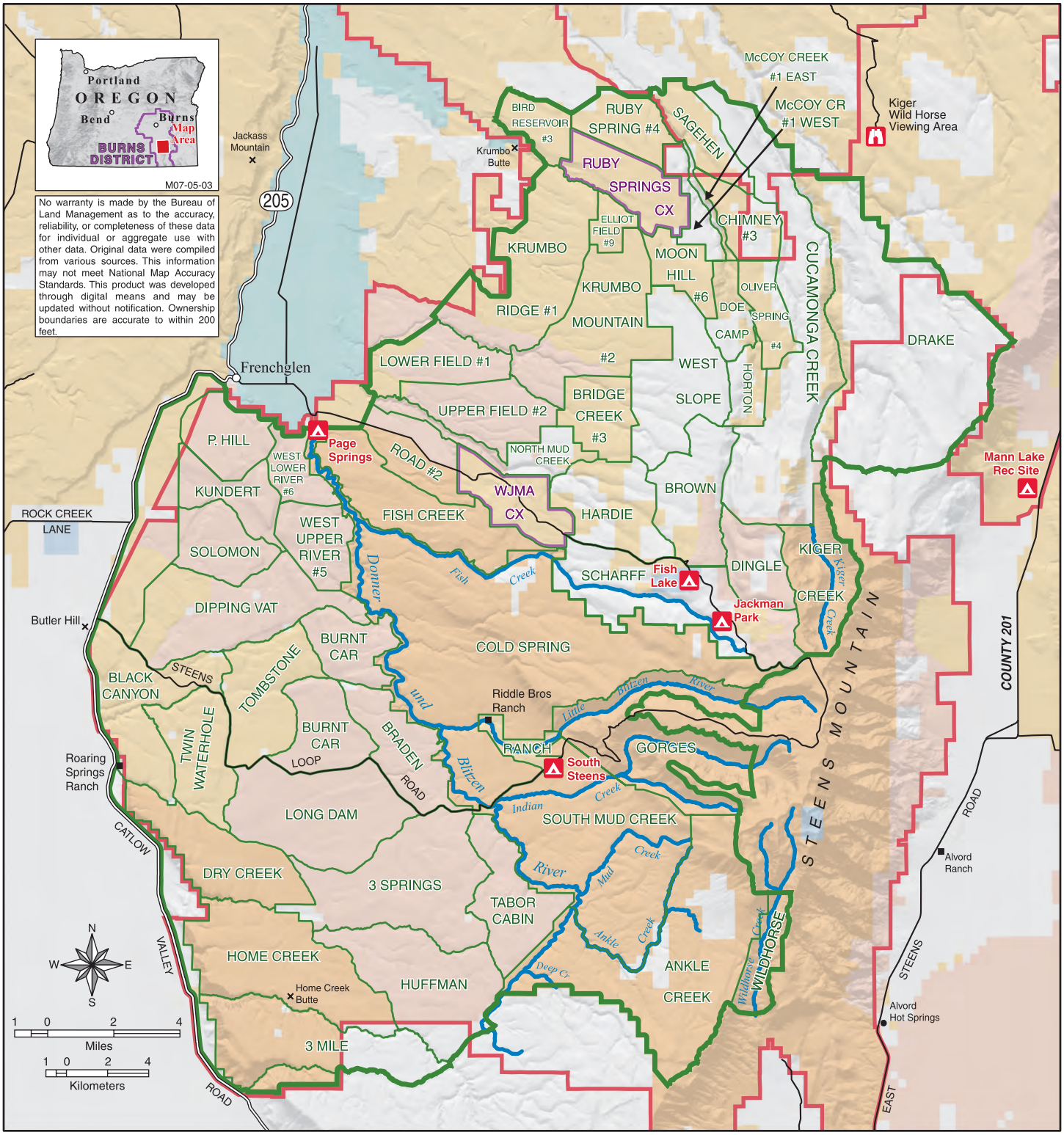
18. **American Indian Traditional Practices –** Government-to-Government consultation concerning potential effects to American Indian traditional practices would occur prior to implementation.
19. **Noxious Weeds** - Prior to implementation of prescribed fire and mechanical treatment within proposed project units, noxious weed populations in the area would be inventoried. Weed populations identified in or adjacent to the Project Area would be treated using appropriate methods.
20. **Noxious Weeds** - Following treatment of prescribed fire and mechanically-treated project units, the areas would be monitored for noxious weed invasions.
21. **Noxious Weeds** - All vehicles and equipment used during implementation would be cleaned before and following treatments to guard against spreading noxious weeds. Vehicles may also be cleaned again prior to re-entry into the Project Area if they have been utilized for any additional activities following post-treatment cleaning.
22. **Seeding** - Sites lacking sufficient understory species, such as fully-developed juniper woodlands, or areas that have burned at a high severity may require seeding following a prescribed fire treatment to attain the desired post-fire response. As they are available, mixtures of native grass, forb, and shrub seed may be applied to designated areas with aerial or ground-based methods. If native seeds are not available in sufficient quantity, suitable nonnative species may be seeded. Candidate sites for seeding would be determined on a case-by-case basis as pre-treatment prescriptions are developed and/or as monitoring data are gathered.
23. **Riparian Areas** - Where juniper are present along riparian stream banks and where pre-burn cutting may cause dried fuels to accumulate within deciduous woody components, juniper would not be pre-treated by cutting prior to burning. Expansion juniper would be cut following the burn treatment.
24. **Riparian Areas** - Project unit treatments would be spread between drainages based on site-specific post-treatment evaluation to reduce the potential of any adverse cumulative effects to riparian areas, water quality, and fish.
25. **Riparian Areas** - Riparian areas would be evaluated by a fisheries biologist or hydrologist prior to implementation of fuels reduction activities. Site-specific recommendations would be made for sensitive or degraded areas. Shade providing vegetation would be measured before and after treatments.
26. **Riparian Areas** - Riparian areas that have not made substantial recovery within two seasons of rest after treatment would continue to be rested or fenced as necessary until vegetation has recovered to at least 2 desirable perennial plants per $10ft^2$
27. **Riparian Areas** - Juniper trees would be felled and left as large woody debris to protect riparian vegetation, provide shade by being felled over the stream, and provide cover for fish where needed in areas where stream channels are determined to be stable.
28. **Recreation**- Where possible to still meet project objectives, individual juniper trees providing vegetative screening around known campsites would be left in tact.
29. **Visual Resources** - Individual treatments would be designed to meet the VRM class objective(s) for the project unit in order to protect visual resources throughout the life of the project.
30. **Visual Resources** - Where possible to still meet project objectives, individual juniper trees providing vegetative screening around unnatural features would be left intact.
31. **Visual Resources –** Where possible, design treatment boundaries to be irregular in shape to help mimic more natural variations in vegetation that would occur with wildfire.
32. **Visual Resources –** On Visual Resource Management Class I and II lands, juniper tree stumps would be left no higher than 12 inches. Where possible and feasible, cutting the stumps shorter than 12 inches and carving the smooth surface from the stump could be considered.
33. **Roads and Trails in the CMPA** - "No new road or trail for motorized or mechanized vehicles may be constructed on Federal lands in the Cooperative Management and Protection Area unless the Secretary determines that the road or trail is necessary for public safety or protection of the environment." (Steens Act Section 112 (d) (1)).
34. **Road Condition and Maintenance** - Maintain safe conditions throughout the duration of the North Steens Project. Several roads would be maintained consistent with assigned maintenance levels. Roads may be graded, graveled, rocks removed, ditches cleaned, and culverts or rock crossings installed to prevent accelerated erosion and to provide easier access for firefighting personnel and administration.

Existing roads would be used as fire lines and safety zones. Roads determined to be essential for success of the project, but determined to be closed in the Travel Management Plan, would be improved for the duration of the project and reclaimed upon project completion.

35. **Wilderness Study Areas** - Use of ways by motorized vehicles and equipment would be the minimum necessary to meet project objectives.
36. **Wilderness Study Areas** - Wilderness values of naturalness and opportunities for primitive and unconfined recreation or solitude found in WSAs would be protected. Any proposed project activities within any WSA would comply with the FLPMA and Steens Act.
37. **Wilderness Study Areas** - "The wilderness study areas referred to in subsection (a) shall continue to be managed under section 603(c) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782(c)) in a manner so as to not impair the suitability of these areas for preservation as wilderness." (Steens Act Section 204 (b)).
38. **Steens Mountain Wilderness Area –** Actions proposed within Steens Mountain Wilderness would conform to the Steens Act and Wilderness Act. A Minimum Decision Analysis (MDA) would be completed and documented using a Minimum Requirement Decision Guide (MRDG) worksheet. A MDA would only be used for actions proposed within Steens Mountain Wilderness.
39. **Public Notification** - When possible, adequate and timely notification to the public of the scope, location, and timing of proposed activities throughout the life of the project and of any closures that may result would be provided. Methods of notification could include, but may not be limited to, press releases, newsletters, BLM Web site if available, and bulletin boards within and near the CMPA.
40. **Project Progress/Results** - Project progress and results of implementation would be monitored and documented and, optimally, published on a recurring 3- to 5-year basis.
41. **Post-Treatment Resting** - Livestock grazing would not occur for a minimum of two growing seasons in pastures treated with prescribed fire.
42. **Pre-Treatment Resting** - One season of rest from grazing may be necessary prior to treatment with prescribed fire to allow for development of a fine fuel ignition source.
43. **Burn Plan Objectives** - Prescribed fire treatments within a specific allotment should achieve burn plan objectives during a single season if possible. Potential negative economic effects on grazing permit holders could be minimized through this approach.
44. **Project Maintenance and Follow-Up Treatments** - Re-entry into an area may be essential in many cases to achieve any/all project objectives. Follow-up treatments would be the same as those analyzed in this EIS.
45. **Fisheries –** Temperature probes would be placed into streams within burn units one year before burning, during prescribed fire, and for one year after burning to record stream temperatures.
46. **Wyoming Big Sagebrush** - Wyoming big sagebrush sites next to existing crested wheatgrass seedings should not be treated with broadcast burning. Jackpot burning of cut juniper, burning of individual juniper trees or mastication could be allowed in some situations.
47. **Biological Soil Crusts –** Mosaic burning patterns should be utilized where soil crust communities are present to promote a mosaic of biological soil crust seral stages. In low sage communities cutting activities would be considered preferable to burning as biological soil crusts in these sites experience fire on a much less frequent basis. In very limited cases, small areas may be flagged for treatment avoidance. This PDE functions as project specific Best Management Practices (BMP) for biological soil crusts.
48. **Wild and Scenic Rivers** - Acreage (322) outside Steens Mountain Wilderness and Riddle Brothers Ranch Historic District would be treated according to the underlying land management designation (CMPA, WSA, or Page Spring Campground) and to meet any fuel management concerns.

2.7 Treatment Prioritization and Project Units Common to all Action Alternatives (except the No Treatment Alternative)

The Project Area contains numerous proposed project units (see Map 2.1: Project Units and Land Administration). Many factors may influence the timing, location and objectives of treatments including cooperators with outside funding, applicable PDEs, and budgetary and operational constraints. These factors and others would be considered by the Field Manager who would coordinate implementation efforts with the on-the-ground Project Implementation Lead. Final decision factors for implementation



Campground
Watchable Wildlife
Project Unit
Area Analyzed under Separate Process
Paved Road
Non-Paved Road
Wild and Scenic River
North Steens Project Area Boundary
Cooperative Management and Protection Area Boundary

Administered Land

Bureau of Land Management
Wilderness
Wilderness Study Area
U.S. Fish and Wildlife Service
State
Private

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

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Map 2.1: Project Units and Land Administration

timing and location would include PDE recommendations from the ID Team; the Field Manager makes the determination as to which PDEs apply to a given treatment or burn plan.

Project unit acreage objectives would be determined by the Field Manager based on recommendations of an ID team and contained in the burn plan for that specific project unit.

2.8 Alternatives Including the No Action Alternative

This EIS analyses one No Action Alternative and five action alternatives. The No Treatment Alternative is an action alternative in that the action is to change management in the Project Area resulting in no treatments. This alternative proposes no fuels reduction through juniper treatments in the Project Area. This alternative is not consistent with the AMU or Steens Mountain CMPA RMP directions.

The No Action Alternative is the Continuation of Current Management Alternative. This alternative proposes a continuation of current levels of juniper management defined in the description of the alternative below.

2.8.1 No Treatment Alternative

This alternative proposes cessation of fuels reduction through juniper treatments in the Project Area. This alternative is not consistent with the AMU or CMPA RMP directions. The alternative does not meet the objectives of the proposal but is discussed for purposes of comparison of management actions and effects analyses.

Under this alternative expansion juniper and related changes to fuels would not be managed in the Project Area. Wildfires would still occur in the Project Area and would be managed in a manner consistent with RMP and Fire Management Plan (FMP) direction.

2.8.2 Partial Treatment Alternative

The Partial Treatment Alternative proposes proactive juniper management through fuels reduction (e.g., prescribed burning and mechanical treatments) on a landscape level on private and public lands outside of wilderness, WSAs, and WSR corridors. Management of naturally-occurring fires to achieve project objectives would occur in all areas under this alternative.

Assumptions:

1. Native, shrub-dominated plant communities would be restored where fire is capable of operating as an ecosystem process. Due to treatment limitations in wilderness, WSAs, and WSR corridors, approximately 25-30% of the identified upland communities over the entire landscape could be effectively burned (black area) to create a mosaic of seral stages. Private land objectives may differ and would reflect landowner management objectives.
2. An approximate range of up to 10,000 acres (~3% of the total Project Area) could be targeted for treatment during each season of implementation. This target is subject to multiple constraints including operational.

Important Features of the Partial Treatment Alternative:

1. All implementation timelines for project completion are dependent upon funding.
2. Under this alternative expansion juniper and associated excessive fuel loading in Steens Mountain Wilderness, WSAs or WSR corridors would be managed on a landscape level using wildfire in accordance with the RMPs and Burns Interagency FMP.
3. Treatments in the Riddle Brothers Ranch Historic District (Ranch Project Unit) could include other treatments if deemed necessary for historic preservation purposes.

Table 2.1. Summary of Actions in the Partial Treatment Alternative

Habitat Type	Proposed Management	Actions Analyzed
Aspen	• Reduce Fuel Loading • Restore Aspen Stands	• Prescribed Fire • Temporary Fencing • Fire Use • Juniper Cutting*
Mountain Mahogany	• Reduce Fuel Loading • Restore Mountain Mahogany	• Temporary Fencing • Fire Use • Juniper Cutting*
Sagebrush	• Reduce Fuel Loading • Restore Sagebrush Habitat	• Prescribed Fire • Fire Use • Permanent Fencing • Temporary Fencing • Juniper Cutting* • Planting/Seeding
Riparian	• Reduce Fuel Loading • Restore Riparian / Wetlands	• Prescribed Fire • Fire Use • Temporary Fencing • Juniper Cutting* • Planting/Seeding
Old-Growth Juniper	• Reduce Fuel Loading • Maintain / Improve Old-Grown Juniper Woodlands	• Juniper Cutting* • Fire Use
All	• Commercial Use of Cut Juniper	• Removal of cut juniper** • Wildfire Management
All	• Reduce Fuel Loading in **Wilderness**, **WSR corridors and WS**As	• Fire Use

* All references to "juniper cutting" refer to the reduction of expansion juniper.
** Section 113(b) (2) of the Steens Act authorizes the removal of cut juniper for commercial use. This use applies only to non-wilderness and non-WSA portions of the CMPA.

Through implementation of this alternative, some fires ignited by lightning would be managed for project objectives. Prescribed fire (outside of wilderness, WSAs, and WSR corridors) would be introduced into quaking aspen communities, mountain big sagebrush communities, and riparian communities in various stages of decadence or transition to fully-developed juniper woodlands.

Quaking aspen plant communities in transition toward juniper woodlands would be given a high priority for reintroduction of fire. Implementation of prescribed fire alone may not be sufficient due to fuel structure. Cut trees would help to build burnable fuel on the site. Other areas that would be given a priority for prescribed fire would be deep soil areas with a juniper overstory with dying shrubs. Deep soil sites with a juniper overstory or with a high density of expansion juniper with a stressed, dying, or dead shrub component and those segments of riparian habitat being affected by expansion juniper would be high priorities for juniper cutting and fire reintroduction.

Prescribed fire burn plans would be designed to utilize natural fuel breaks such as talus slopes and rim rock. Project unit design would control fire distribution so the acres of actual burn may vary. The burn plan would encompass buffer areas not initially targeted for treatment in which additional fire effects would not be detrimental. Use of these buffers would allow fires to go out naturally without artificial control lines, thereby resembling wildfire events.

Prescribed fire on public and private lands would be managed simultaneously when cost sharing and signed cooperative agreements are in effect. Allotments and pastures within the Project Area would be rested from livestock grazing prior to burning to establish fine fuels and for a minimum of two growing seasons following burning. During this rest period cattle could be trailed through these pastures to adjoining pastures or other grazing areas as agreed to through cooperative agreements. Additional rest or adjustments to the timing of livestock grazing could be implemented as needed to ensure riparian and upland objectives are being met.

Elk, deer, and other wildlife species are attracted to burned areas because of the succulent herbaceous growth of grasses and forbs and high palatability of new shrub and aspen sprouts. Experience with burns in similar habitat has shown larger burns help protect aspen and other palatable species by distributing browsing animals over larger areas. Activities proposed under the Partial Treatment Alternative would require a number of years to complete depending on climatic factors, funding, and amount of juniper cutting required to accomplish objectives. Post-burn juniper cutting, as well as additional burning, may be required in certain situations to achieve objectives.

Image 2.1. Lupine response following a natural wildland fire event.

Image 2.2. Aspen response following a wildland fire event (young aspen are visible in the foreground).

Detailed Activity Descriptions (these methods are incorporated into all action alternatives except the No Treatment Alternative):

Prescribed Burning

Prescribed burning would be used to varying degrees in most resource treatments (see Project Design Elements [PDEs] for constraints). These treatments would include activities such as jackpot burning, broadcast burning, piling (machine or hand) and burning, and/or single-tree burning.

Burning prescriptions would vary depending on specific objectives and would allow adequate fire behavior to reduce the stocking of fully and partially developed juniper woodlands, and reduce size classes of dead and down fuel within previously cut juniper control units and cut/piled units. Piling and burning and single-tree burning would occur in areas where jackpot burning and broadcast burning would not meet resource objectives. This might include areas where fire-sensitive assets such as range improvements, greater sage-grouse leks or cultural resources occur. This treatment may also be used to improve the effectiveness of holding actions near a unit or property boundary.

Tools such as drip torches, fusees, All-Terrain Vehicle (ATV) ignition, aerial ignition, and other firing devices are typically used to ignite prescribed burns. Broadcast burns are generally implemented in the fall (September, October) to moderate undesirable fire behavior. Roads, natural barriers, and mechanically-constructed fire lines may be utilized as fire breaks at the boundaries of burning units. Two-track, 4-wheel drive roads that are positioned along burn unit boundaries may be bladed to improve their ability to function as a control line. Broadcast burning operations would be monitored to ensure PDEs are properly observed and resource objectives are being achieved. Once resource objectives are attained within targeted vegetation communities, no remaining acres within that community type would be treated by broadcast burning within the burn units. All burn plans would include an escaped fire suppression plan and a smoke management plan. Prior to beginning operations requiring any fuel tanks or fuel handling at the site a spill contingency plan would be developed and submitted to the authorized officer.

Jackpot Burning

Jackpot burning is the application of prescribed fire to concentrations of woody fuels typically during the time of year when the probability of fire spread is very low (in the late fall through early spring when soil moisture is high or the ground is frozen). Jackpot burning is the method used in units where fuel loads are discontinuous or the ability of fire to spread is low. Jackpot burning may also be applied in areas where natural fuel concentrations exist in isolated areas. This method would burn the fine fuels, limit the ability of fire to spread, and prevent soil sterilization from excessive heat. It is conducive to maintaining the shrub component on the site and the herbaceous plant species growing under the downed junipers.

Jackpot burning would be a principal activity throughout sagebrush-bunchgrass dominated plant communities where prescribed broadcast burning is not applicable. It may also be utilized within units of previously cut juniper that exist in limited portions of the Project Area or as preparation for holding a broadcast burn

Broadcast Burning

Broadcast burning is the controlled application of fire to wildland fuels within a predetermined area during specific environmental conditions in order to attain resource management and fuels reduction objectives. Broadcast burning would be another form of prescribed fire applied under the proposed action.

Portions of shrubland communities in middle to late juniper woodland transitional stages would require mechanical pretreatment to create ladder fuels that allow fire to spread. Individual trees would be periodically felled against standing trees and allowed to cure; creating a ladder allowing ground fire to move into canopies of standing uncut trees. Sites not supporting large trees typical of communities in earlier stages of juniper woodland development would not require mechanical treatment prior to application of prescribed fire. Other pretreatment activities that may occur within or near broadcast burn units include wetlining, blacklining, jackpot burning, and handline construction around interior leave islands and fire-sensitive assets such as range improvements or cultural resources or to decrease heat from the broadcast burn in some communities. Holding operations near property boundaries may be accomplished with pretreatment using small amounts of jackpot burning, juniper cutting, and/or piling and burning.

Scheduling of burning during the 7 to 15-year implementation period is dependent upon resource objectives, weather, fuel conditions, project funding, and arrangements with grazing permittees and other private property owners. These factors, especially weather, make it difficult to accurately project number of acres burned in a given year. Broadcast burning operations require one growing season of rest from livestock grazing prior to treatment and at least two growing seasons of rest following treatment. The duration of the rest period would be determined by the Field Manager based on rangeland monitoring by a BLM ID Team of plant community response.

Pile Burning

Mechanical piling and/or hand piling would be used to reduce fuel loading and continuity in previously cut juniper units. However, these actions may also occur in other areas. Machine piles are usually 12 feet tall by 16 to 22 feet wide and are constructed by grapple equipped excavators or dozers. Piling would take place when the ground is frozen or during dry soil conditions. Piles would be burned within 2 years of construction during late fall, winter, or spring, preferably when the ground is frozen or wet. A mixture of native and nonnative grasses, forbs, and shrub species would be seeded at these piles following burning.

Single-Tree Burning

Single-tree burning involves ignition of individual trees with backpack flame throwers, terra torches, torches mounted to vehicles or ATVs, or other firing devices. In this treatment, juniper trees less than 8 feet tall and/or basally sprouting multi-stemmed trees would be burned individually to prevent recovery from manual or mechanical cutting. Only torching of individual trees would occur under this treatment to prevent fire movement from crown to crown. Single-tree burning would be an activity employed primarily in low sagebrush-bunchgrass communities. Single-tree burning would have limited application under the proposed action and would be implemented on a relatively infrequent basis.

Wildland Fire Use (Fire Use)

Wildland Fire Use (Fire Use) is management of naturally-ignited wildland fire to accomplish resource management objectives. There are three primary objectives for allowing wildland fire use:

- Provide for health and safety of firefighters and the public.
- Maintain natural ecosystems of a given area and allow fire to play its natural role in those ecosystems.
- Reduce risks and consequences of unwanted fire.

Other factors considered include the necessity of emergency stabilization and rehabilitation actions, number and complexity of concurrent fire incidents, potential for additional fire events, and availability of personnel to manage the wildland fire use incident. Wildland fire use incidents are not eligible for emergency stabilization or rehabilitation action. Implementation of wildland fire use strategies implies resources within the fire perimeter would benefit from fire. Post-fire seeding, shrub planting, and facility repair would not be approved under the Emergency Stabilization and Rehabilitation program of the BLM. Actions to restore plant communities and wildlife habitat and repair destroyed or damaged facilities must be funded from other sources. Only areas where post-fire, native perennial plant response would meet management objectives would be considered for wildland fire use. Areas dominated by introduced annual plants or have potential to be dominated by introduced annual plants following a fire would not be considered for wildland fire use. However, as areas dominated by annual plants are rehabilitated, they would be included in areas for wildland fire use.

Juniper Cutting – Fall and Leave (No burning)

In some situations, juniper would be felled and left on site under the proposed action. There would be no follow-up burning when this treatment is applied. This treatment would only be applied where risks associated with increasing hazardous fuels are considered to be low (determined on a site-specific basis), such as in low sagebrush communities in early stages of transition to juniper woodland or as a strategy to reduce juniper encroachment within stands of mountain mahogany, bitterbrush, aspen and riparian communities.

Potential Treatment Methods (these methods are incorporated into all action alternatives except the No Treatment Alternative):

Ignition methods for prescribed fire may include drip torches, aerial ignition techniques, and the use of hand held and vehicle mounted (where appropriate) ignition devices.

1. Broadcast burning – Prescribed fire is utilized through an entire area identified in the burn plan using a prescription designed to achieve specific habitat and fuel loading objectives.
2. Jackpot and pile burning – Accumulations of fuels are burned while other vegetation remains unburned. This method would be implemented in the late fall, winter, or early spring when the potential for fire spread is low. Fuels could be piled by hand or machine.
3. Individual tree burning –This includes prescribed fire that is implemented using an ignition device (flamethrower or terra-torch).
4. Fencing (permanent and temporary) – Areas could be fenced where response of vegetation (following treatment) could be slowed by grazing and browsing. Ideally, all temporary fencing would be removed within one season after vegetative recovery objectives have been met. Permanent fencing may be used to change grazing patterns following treatment as determined necessary.
5. Reseeding (crested wheatgrass) – Maintenance seeding with crested wheatgrass could be utilized in existing crested wheatgrass seedings to provide additional forage or to accomplish other project objectives. There are very few acres of existing crested wheatgrass seedings in the proposed Project Area.
6. Reseeding (native species / nonnative species) – Selected treated areas could be seeded with native seeds in addition to nonnatives to accomplish project objectives and offset potential temporary loss of plant species from sections of project units.
7. Planting – Areas could be planted with native species including riparian woody species.
8. Total juniper reduction (cutting and piling) - The treatment consists of cutting all expansion juniper within portions of a project unit. Juniper could be cut and piled prior to follow-up treatments; this could be accomplished by nonmotorized or motorized means.
9. Commercial use of cut expansion juniper - Downed expansion juniper could be collected for firewood, ornamental use, or other uses. Section 113(b) (2) of the Steens Act allows for the removal of legally downed juniper in the CMPA outside of wilderness and WSAs.
10. Selective juniper reduction (cutting and piling) - Treatments could vary from cutting every third tree in juniper pockets to limbing and girdling expansion juniper found in dense stands. Juniper could be cut and piled prior to follow-up treatments; this could be accomplished by nonmotorized or motorized means.
    - Every third tree cutting involves felling trees into juniper pockets to provide ladder fuels for remaining junipers. This method has worked well in areas with moderately dense juniper, steep slopes, and remnant ground fuels to carry fire between juniper pockets. In areas of moderate slopes this technique may be limited as fire needs more ladder fuels and a mechanism such as high or up-slope winds to carry fire through surrounding tree canopies.
    - Droop cutting involves cutting the lower limbs of expansion juniper so they droop to the ground. The limbs are not severed from the tree bole; instead they are cut three-fourths through from the top down. This method results in ladder fuels still attached to the base of standing trees. As fire carries through juniper stands, dead limbs ignite and carry fire into the tree canopy. This technique is limited by topography and fuel conditions required to carry fire between juniper pockets. Advantages to this technique include a minimized cutting time to treat stands of juniper, and the majority of fuels is left in a vertical arrangement above ground surface thereby reducing heat effects to soils and other resources (primarily cultural). A further advantage is the post-treatment Project Area resembles the result of a wildfire.
    - The limb and girdle method involves scoring and cutting limbs around the base of the juniper as well as cutting through the cambium layer. This technique results in dead material at the base of juniper trees providing a receptive fuel bed for fire, while increasing chances of killing the trees. The limb and girdle method works well in dense stands of juniper with little to no understory to carry fire. As with droop cutting, the limb and girdle method results in juniper remaining upright which keeps the majority of the fuels away from fragile soils and mimics the lower intensity of a wildfire event.
11. Combination treatments - Any or all treatment methods.

Image 2.3. Selective cutting resembles some visual results of a natural wildland fire event.

12. Adaptive Management Treatments – should other technology or treatment methods become available that meet project objectives and have fewer impacts than those already analyzed, they may be used.

2.8.3 Limited Treatment Alternative

The Limited Treatment Alternative incorporates applicable actions and features of the Partial Treatment Alternative; the text is not repeated to avoid redundancy. Differences between the alternatives are described in the text below and in the Important Features and Assumption sections contained in this alternative.

The Limited Treatment Alternative proposes active juniper management through fuels reduction on a landscape level on private and public lands. Management of naturally-occurring fires would occur in all areas under this alternative. Use of prescribed fire for juniper management may occur in wilderness, WSAs, and WSR corridors. This alternative does not propose juniper cutting or mechanized or motorized piling in wilderness, WSAs or WSR corridors.

Assumptions:

1. Native, shrub-dominated plant communities would be restored where fire is capable of operating as an ecosystem process. Because of additional available treatment methods in wilderness, WSAs, and WSR corridors, approximately 45-65% of the identified upland communities could be burned (black area) to create a mosaic of seral stages. Private land objectives may differ and would reflect landowner management objectives.
2. An approximate range of up to 15,000 acres (4.5% of the total Project Area) could be targeted for treatment during each season of implementation. This target is subject to multiple constraints including operational.

Table 2.2. Summary of Actions in the Limited Treatment Alternative

Habitat Type	Proposed Management	Actions Analyzed
Aspen	• Reduce Fuel Loading • Restore Aspen Stands	• Prescribed Fire • Temporary Fencing • Fire Use • Juniper Cutting*
Mountain Mahogany	• Reduce Fuel Loading • Restore Mountain Mahogany	• Temporary Fencing • Fire Use • Juniper Cutting*
Sagebrush	• Reduce Fuel Loading • Restore Sagebrush Habitat	• Prescribed Fire • Fire Use • Permanent Fencing • Temporary Fencing • Juniper Cutting* • Planting/Seeding
Riparian	• Reduce Fuel Loading • Restore Riparian / Wetlands	• Prescribed Fire • Fire Use • Temporary Fencing • Juniper Cutting* • Planting / Seeding
Old-Growth Juniper	• Reduce Fuel Loading, • Maintain / Improve Old-Growth Juniper Woodlands	• Juniper Cutting* • Fire Use
All	• Preserve Wilderness Values Within **WSA**s	• Wildland Fire Use • Prescribed Fire • Temporary Fencing
All	• Enhance **Wilderness and WSR Corrido**rs	• Wildland Fire Use • Prescribed Fire
All	• Reduce Fuel Loading • Commercial Use of Cut Juniper	• Removal of Cut Juniper**

*All references to "juniper cutting" refer to the reduction of expansion juniper outside of wilderness and WSA boundaries.
** Section 113(b) (2) of the Steens Act authorizes the removal of cut juniper for commercial use. This use applies only to nonwilderness and non-WSA portions of the CMPA.

Important Features of the Limited Treatment Alternative:

1. All implementation timelines for project completion are dependent upon funding and operational constraints.
2. Wilderness and WSR corridors would be included in the project.
   - Seeding would not be proposed unless desired to follow high severity wildfire where there is no reasonable expectation of natural healing; only native or naturalized species would be utilized in this case. Seeding would be accomplished using aerial or hand broadcast techniques.
   - Only wildland fire use would be allowed in wilderness and WSR corridors for the first 3 to 5 years to achieve project objectives. During the project review at 3 to 5-year intervals, prescribed fire could be considered if wildland fire use did not achieve objectives.
   - Naturally-ignited fires would be utilized to restore a more naturally-functioning ecosystem. Clear direction for use of fire for ecosystem restoration comes from numerous sources.
     Appendix B of House Report 101-405 on the Arizona Desert Wilderness Act of 1990 gives Congressional guidelines for use of fires in wilderness in Section 14 where it states: "Management of Fire: The objectives of fire management in wilderness are to: (a) permit lightning-caused fires to play, as nearly as possible, their natural ecological role within wilderness and (b) reduce, to an acceptable level, the risks and consequences of wildfire within wilderness or escaping from wilderness. Fire ignited by lightning would be permitted to burn or would be suppressed as prescribed in an approved plan. Prescribed fires ignited by man may be permitted to reduce unnatural buildup of fuels only if necessary to meet objectives (a) and (b) above. Although additional benefits may result from man-ignited prescribed fire, vegetative manipulation would not be used to justify such fires."

- The Steens Act also provides specific legal direction regarding treatment of juniper in the CMPA. It states in Section 113 (c), "JUNIPER MANAGEMENT – the Secretary shall emphasize the restoration of the historic fire regime in the Cooperative Management and Protection Area and the resulting native vegetation communities through active management of Western Juniper on a landscape level. Management measures shall include the use of natural and prescribed burning."
- Steens Mountain Wilderness and WSRs Plan under Fire Management Objectives states as an objective: "To restore and maintain the integrity of ecosystems by establishing appropriate fire regimes." It further states under Fire Management Direction that the BLM would "Develop guidance in the Burns District FMP that addresses management of fire in Steens Mountain Wilderness and WSRs. Emphasis is given to restoring appropriate fire regimes and ecosystem integrity, while still protecting human life, private property or other significant resource values. Appropriate rehabilitation guidelines associated with protecting wilderness resources will also be developed as needed."
- The BLM Manual 8560, "Management of Designated Wilderness Areas" Section .35, Fire Management, provides for the use of fire in subsection 2, Natural Fire, and states: "Natural Fire – Natural fire (i.e., lightning-caused) is normally a part of the ecology of the wilderness, and human efforts to ban this agent may have resulted in significant ecological changes in the flora and fauna of some areas. In order to return some ecosystems to a more natural state, it may be appropriate to allow natural fire to burn, but only in conformity with an approved FMP and the over-riding fire guidance."
- The BLM Manual 8560, Section .35, subsection 3, Prescribed Burning, gives direction as:

  a. Ignition by Bureau Personnel.

     Where wildfire under prescription does not meet wilderness fire management objectives, prescribed burning ignited by Bureau personnel may be allowed on a case-by-case basis for the following purposes;

     (1) To reintroduce or maintain the natural condition of a fire-dependent ecosystem,
     (2) To restore fire where past strict fire control measures had interfered with natural, ecological processes,
     (3) Where a primary value of a given wilderness will be perpetuated as a result of the burning, or
     (4) Where it will perpetuate a threatened or endangered species.

- Prescribed fires are allowed only in conformity with an approved FMP. As noted in the WSRs Act under Section 10 (a): "Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its esthetic, scenic, historic, archaeological, and scientific features. Management plans for any such component may establish varying degrees of intensity of its protection and development, based on the special attributes of the area."
- Further direction for the protection of Outstandingly Remarkable Values (ORVs) is provided in BLM Manual 8351 – "Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, and Management" in Section .5.51 A.1. – "Management for Wild River Areas: Management of wild river areas should give primary emphasis to protecting the values which make it outstandingly remarkable while providing river-related outdoor recreation opportunities in a primitive setting."
- The BLM Manual 8351 also provides for cutting of trees in a wild river corridor for fire control (and other) purposes as provided for in Section .51 A. 2. a.
- The WSAs would be included in the project.
- Seeding would not be proposed in WSAs as part of this alternative. In the event of a stand-replacing fire, where there is no reasonable expectation of natural healing, the area may be seeded with native species following AMU and CMPA RMPs and Steens Act direction.
- Wildland fire use and prescribed fire would be allowed in WSAs.

Specific Project Design Elements:

1. Treatments outside of wilderness, WSAs or WSR corridors:
   - All available treatment methods listed in the Partial Treatment Alternative could be utilized in these areas to achieve resource objectives.
2. Treatments in the Riddle Brothers Ranch Historic District (Ranch Project Unit):
   - Treatments in this project unit would include preventative measures and may include treatment of the WSR corridor. The WSR corridor treatments would be for fuels management, natural habitat restoration, and historical preservation.

2.8.4 Full Treatment Alternative

The Full Treatment Alternative incorporates applicable actions and features of the Partial and Limited Treatment Alternatives. The text is not repeated to avoid redundancy. Differences between alternatives are described in the Important Features, PDEs, and Assumption Sections contained in this alternative.

The Full Treatment Alternative proposes active juniper management through fuels reduction on a landscape level on private and public lands including wilderness, WSAs, and WSR corridors. Management of natural and prescribed fires would occur in all areas under this alternative. Additional treatment methods in wilderness and WSR corridors could be considered after the project review 3 to 5-year interval and could include use of hand tools, motorized or mechanized equipment, and nonmotorized transportation if recommended following the completion of a Minimum Decision Analysis. Juniper treatment methods in WSAs would be considered and could include use of hand tools, motorized or mechanized equipment, and nonmotorized transportation.

Assumptions:

1. Native, shrub-dominated plant communities would be restored where fire is capable of operating as an ecosystem process. Due to other available treatment methods in wilderness, WSAs, and WSR corridors, approximately 45-65% of identified upland communities could be burned (black area) to create a mosaic of seral stages. Private land objectives may differ and would reflect landowner management objectives.
2. An approximate range of up to 20,000 acres (~6% of the total Project Area) could be targeted for treatment during each season of implementation. This target is subject to multiple constraints including operational.

Important Features of the Full Treatment Alternative:

1. All implementation timelines for project completion are dependent upon funding and operational constraint.
2. Wilderness and WSR corridors would be included in the project.
   - Seeding would not be proposed as part of this alternative. In the event of high severity fire, where there is no reasonable expectation of natural healing, seeding would occur following CMPA RMP direction. Seeding would be accomplished using aerial or hand broadcast techniques.
3. Treatments in wilderness and WSR corridors would be utilized in the following order:
   - Wildland fire use would be allowed for the first 3 to 5 years to achieve project objectives in lower priority areas (areas outside of aspen stands and mountain mahogany populations). During project review at 3- to 5-year intervals, additional methods could be considered if wildland fire use did not achieve objectives. Volunteer groups or contractors could be utilized to accomplish treatment of some high priority areas. Treatments in high priority areas such as mid to late transition juniper encroachment sites, aspen, low sage, and riparian areas could initially include use of other analyzed tools.
   - Treatments including use of pack stock, motorized equipment, and hand tools could be used in all areas in addition to wildland fire use.

Table 2.3. Summary of Actions in the Full Treatment Alternative

Habitat Type	Proposed Management	Actions Analyzed
Aspen	• Reduce Fuel Loading • Restore Aspen Stands	• Prescribed Fire • Temporary Fencing • Fire Use • Juniper Cutting*
Mountain Mahogany	• Reduce Fuel Loading • Restore Mountain Mahogany	• Temporary Fencing • Fire Use • Juniper Cutting*
Sagebrush	• Reduce Fuel Loading • Restore Sagebrush Habitat	• Prescribed Fire • Fire Use • Permanent Fencing • Temporary Fencing • Juniper Cutting* • Planting / Seeding
Riparian	• Reduce Fuel Loading • Restore Riparian / Wetlands	• Prescribed Fire • Fire Use • Temporary Fencing • Juniper Cutting* • Planting / Seeding
Old-Growth Juniper	• Reduce Fuel Loading • Maintain / Improve Old-Growth Juniper Woodlands	• Juniper Cutting* • Fire Use
All	• Reduce Fuel Loading • Preserve Wilderness Values Within WSAs	• Juniper Cutting* • Use of Nonmotorized Transport • Use of Nonmechanized Equipment • Use of Mechanized or Motorized Equipment • Wildland Fire Use • Prescribed Fire • Temporary Fencing
All	• Reduce Fuel Loading • Enhance Wilderness and WSR Corridors	• Juniper Cutting* • Use of Nonmotorized Transport • Use of Nonmechanized Equipment • Use of Mechanized or Motorized Equipment • Wildland Fire Use • Prescribed Fire • Temporary Fencing
All	• Reduce Fuel Loading • Commercial Use of Cut Juniper	• Removal of cut juniper**

* All references to "juniper cutting" refer to the reduction of expansion juniper.
** Section 113(b) (2) of the Steens Act authorizes the removal of cut juniper for commercial use. This use applies only to nonwilderness and non-WSA portions of the CMPA.

4. WSAs would be included in the project.
   - Seeding would not be proposed in WSAs as part of this alternative. In the event of a stand-replacing fire, where there is no reasonable expectation of natural healing, the area may be seeded with native species following AMU and CMPA RMPs and Steens Act direction.
5. Treatments in WSAs would be considered in the following order:
   - Treatments in high priority areas such as mid to late transition juniper encroachment sites, aspen, low sage, and riparian areas could initially include use of other analyzed tools.
   - Prescribed fire treatment would be used.
   - Prescribed fire treatment involving temporary vehicle uses that do not create undue or unnecessary surface disturbance would be employed.
   - During the 3- to 5-year interval project review, additional methods, including temporary use of motor vehicles cross-country and juniper cutting or other mechanical treatment could

be considered if wildland fire use and prescribed fire treatment did not achieve objectives. Unnecessary and undue degradation would be avoided.

Specific Project Design Elements:

1. Treatments outside of wilderness, WSAs or WSR corridors:
   - All available treatment methods listed in the Partial Treatment Alternative could be utilized in these areas to achieve resource objectives.
2. Treatments in the Riddle Brothers Ranch Historic District (Ranch Project Unit):
   - Treatments in this project unit would include preventative measures and may include treatment of the WSR corridor. The WSR corridor treatments would be for fuels management, natural habitat restoration, and historical preservation.

2.8.5 Continuation of Current Management Alternative (No Action Alternative)

Under this alternative, current management activities would continue and site-specific treatments, including wilderness, would require additional NEPA analysis. The additional proposed management in the action alternatives would not be implemented. Expansion juniper in the Project Area could be treated on a landscape level, but at a greatly reduced rate. Most future treatments would continue to encompass 2,000 to approximately 4,500 acres, although the precedent of a single EA encompassing 60,000 acres did occur under past management and would be permitted under this alternative. The Continuation of Current Management Alternative recognizes juniper treatments in the Project Area would continue to occur on a smaller scale. The NEPA categorical exclusion authority may be utilized in these types of situations where appropriate under the authority of the Healthy Forest Initiative (2002).

Naturally-ignited fires would still be managed in accordance with AMU and CMPA RMPs and FMP guidance. Not all fires would be suppressed. Some wildfires would be managed for resource benefits. Factors to be considered include, but are not limited to, threats to human life, fire behavior, potential final fire size, concurrent incidents, available equipment and qualified personnel, and proximity to private lands.

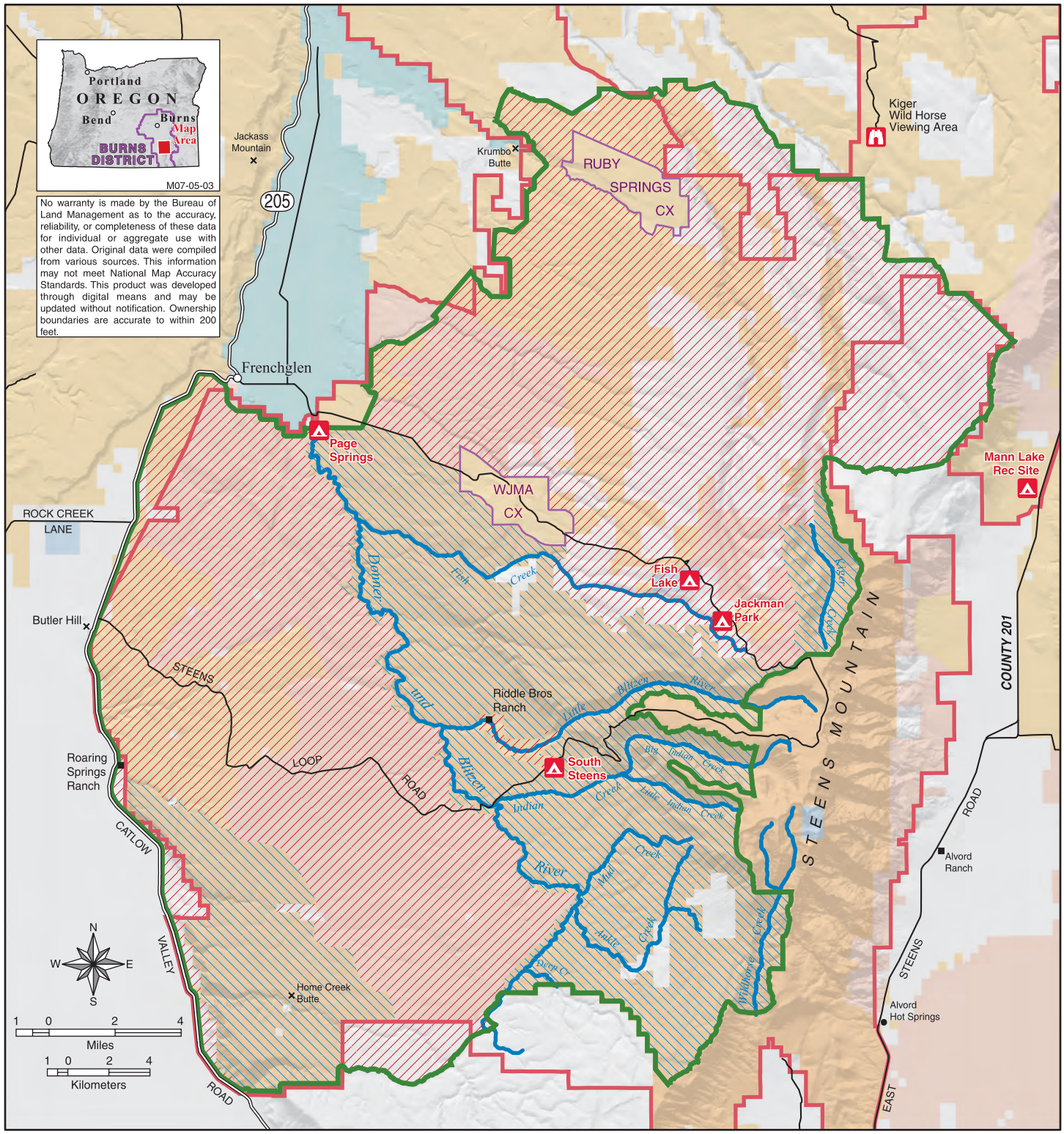
Private lands would be subject to fire management (prescribed and natural ignitions) in accordance with private landowner management objectives. Wildfires originating on private lands that threaten or move onto Federally-administered lands may be suppressed based on current policy unless cooperative agreements are in place. Coordination of prescribed fire management efforts between public land managers and private landowners would still occur.

2.8.6 Preferred Alternative

The BLM has selected as the Preferred Alternative, the Full Treatment Alternative with modifications as outlined below. Proposed components of the Preferred Alternative do not contain elements not previously addressed under other alternatives.

The Full Treatment Alternative, as described in the FEIS, would be implemented in all portions of the Project Area including WSAs, but excluding Steens Mountain Wilderness (see Map 2.2: Preferred Alternative). For effects analysis discussions pertaining to the Full Treatment Alternative component of the Preferred Alternative, see Chapter 4 of this document.

Pre-burning treatment methods selected for implementation in WSAs would be the minimum analyzed methods required to achieve project objectives. The Project Implementation Lead, fuels specialists and ID Team members (including a WSA specialist) would recommend the minimum pre-treatment method to the Field Manager who would determine which method is most appropriate for that particular project unit or portion thereof.



Treatment Options

- Continuation of Current Management Alternative Area
- Full Treatment Alternative Area
- Paved Road
- Non-Paved Road
- Wild and Scenic River
- North Steens Project Area Boundary
- Cooperative Management and Protection Area Boundary
- Area Analyzed under Separate Process

Administered Land

- Bureau of Land Management
- Wilderness
- Wilderness Study Area
- U.S. Fish and Wildlife Service
- State
- Private*

**Private lands are managed in accordance with private landowners' management objectives. Cooperation is strictly voluntary.*

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

BURNS DISTRICT

North Steens Project Final Environmental Impact Statement
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Map 2.2: Preferred Alternative

Project implementation within Steens Mountain Wilderness (see Map 2.2: Preferred Alternative) would be consistent with that described under the Continuation of Current Management Alternative. For effects analysis discussions (including cumulative effects) pertaining to the Continuation of Current Management Alternative component of the Preferred Alternative, see Chapter 4 of this document. Proposed implementation measures in Steens Mountain Wilderness would be in conformance with the Steens Act and Wilderness Act. Within the Project Area, the Minimum Decision Analysis (MDA) process would be utilized only for actions proposed within Steens Mountain Wilderness. The Steens Mountain Advisory Council recommended the MDA be used only for wilderness and not for WSAs.

Under the Preferred Alternative, opportunity exists for cooperators and volunteers to participate directly in fire operations. However, cooperators and volunteers must meet all agency training and physical standards for the appropriate position (NWCG 2006). Minimum standards (class numbers are shown) for Firefighter Type 2 (FFT2) are:

- Person must be at least 18 years old
- Introduction to Incident Command System (ICS) – I
- 100
- Human Factors on the Fireline – L180
- Introduction to Wildland Fire Behavior – S190
- Firefighting Training – S130
- Annual Fireline Safety Refresher – RT130
- Arduous Physical Fitness Level – Duties involve fieldwork requiring physical performance calling for above-average endurance and superior conditioning. These duties may include an occasional demand for extraordinarily strenuous activities in emergencies under adverse environmental conditions and over extended periods of time. Requirements include running, walking, climbing, jumping, twisting, bending and lifting more than 50 pounds; the pace of work typically is set by the emergency situation. Fitness level is assessed through a pack test - 45 pound pack carried for 3 miles in 45 minutes. Individuals must also pass medical screening.
- Persons at FFT2 level must work under the direct supervision of a more experienced firefighter.

2.9 Treatment Application under the Preferred Alternative

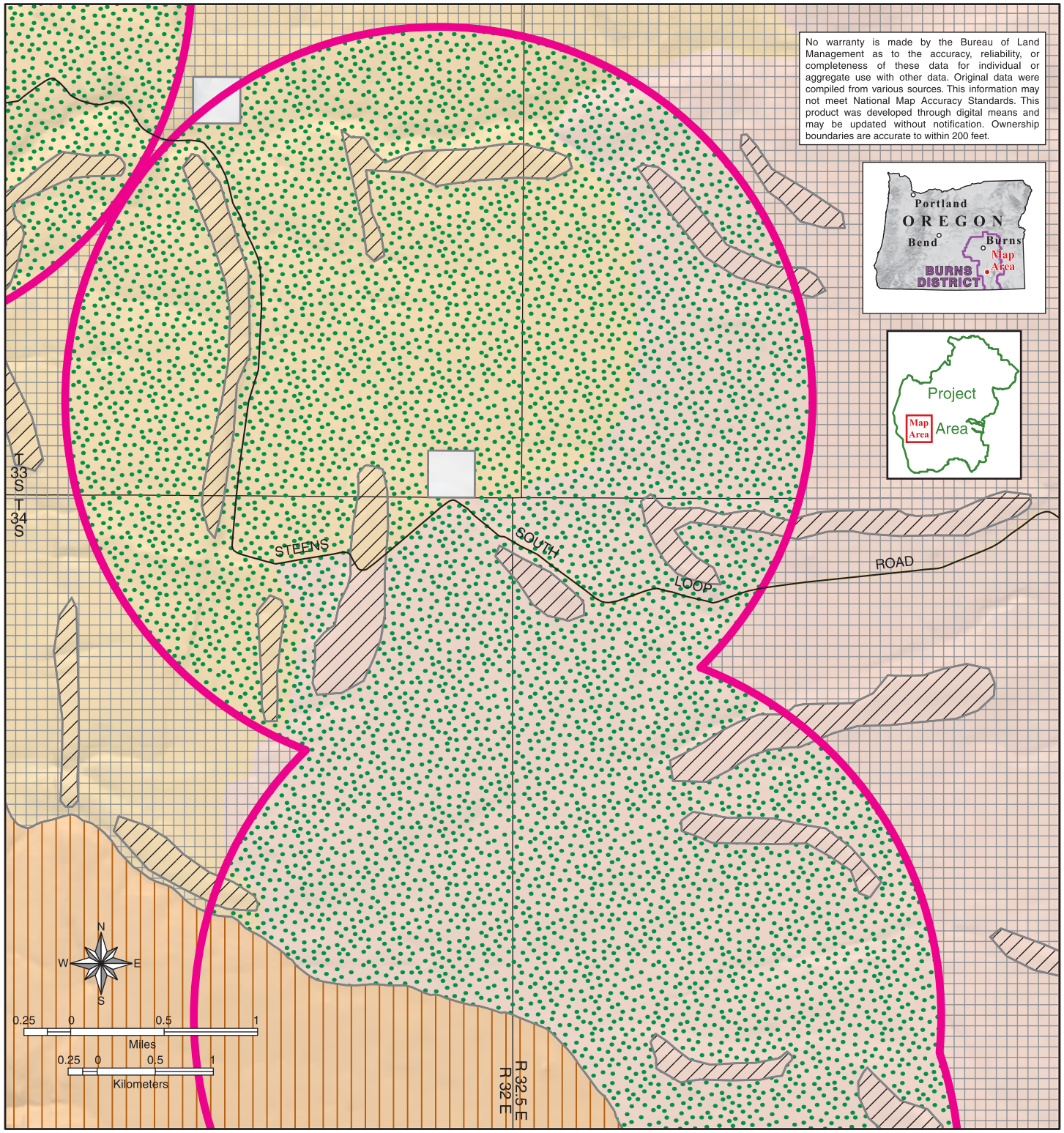
The applied treatments of the Preferred Alternative would differ depending on plant community and site-specific conditions within treatment units. An example is shown on Map 2.3: Preferred Alternative Example Treatment Applications to visually represent the site-specific application of treatments, as they would be applied to a representative portion of the Project Area.

2.10 Alternatives Considered but Eliminated from Further Analysis

The alternatives presented in Chapter 2 represent a range of alternatives. Additional alternatives (Rapid Treatment and Removal of Grazing Alternatives) were considered, but eliminated from further study.

Rapid Treatment Alternative

The Rapid Treatment Alternative proposed aggressively treating significantly larger portions of the landscape each year, and higher percentages of individual burn units. This alternative was determined to be unachievable for a number of reasons. It is not a practical objective to burn high percentages (e.g., 80-90%) of an identified burn unit with prescribed fire. Prescribed fire specialists maintain it is not usually possible to burn such a high percent of any given burn unit due to the presence of fire-resistant landscapes or vegetation. Other resource specialists oppose detailed consideration of this alternative due to likely large-scale, wildlife habitat modification and inadequate recovery intervals. A specific wildlife concern is sage-grouse habitat which must be managed in conformance with the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* (August 2005). Rapid treatment of large acreages of sagebrush habitat would not be in conformance with the aforementioned strategy. Additional concerns are the considerable potential for simultaneous disruption to multiple private operations in the Project Area. Offsite forage could be difficult to obtain. Seasons of rest in treated areas of public lands would occur over large areas involving multiple allotments simultaneously and could be very disruptive to private operations.



Treatment Applications
- Cut* and Jackpot Burn
- Cut* and Jackpot or Broadcast Burn
- No Treatment for Wildlife
- No Treatment for Wilderness

*Cut Treatment Areas with Old-Growth Juniper Left

Two-Mile Lek Buffer Extent

Administered Land
- Bureau of Land Management
  - Wilderness
  - Wilderness Study Area**
- Private

**Cutting in WSAs would be the Minimum Required to Carry Fire

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Map 2.3: Preferred Alternative Example Treatment Applications

Removal of Grazing Alternative:

The North Steens Project is a landscape level proposal to reduce juniper related fuel loading, thereby improving the ecological health within the Project Area, while maintaining appropriate land uses. A Removal of Grazing Alternative in conjunction with juniper cutting and various forms of prescribed fire was considered but eliminated from detailed analysis. While the Removal of Grazing Alternative has been considered, restructuring of planning area level grazing management does not address project objectives, and is not proposed or analyzed as part of the project. Adopting a removal of grazing management regime in the Project Area would not conform to direction in, or meet objectives of, the Steens Act which states as one of its purposes: "To promote viable and sustainable grazing and recreation programs on private and public lands."((Section 1 (b) (ll)).The Act also declares one of the purposes of the CMPA is "to promote grazing, recreation, historic, and other uses that are sustainable…." ((Section 102 (b) (2)).

In addition, the North Steens EIS tiers to, and incorporates by reference, resource descriptions, management actions and effects analyses contained within the Andrews/Steens PRMP/FEIS which analyzed 5 different levels of grazing in a planning area including the proposed North Steens Project area. The levels of grazing were reflected in an array of alternatives showing potential effects different levels of grazing management would have on other resources. Alternatives included: (1) the existing (at the time of development of the PRMP/FEIS) level of use outside the "no livestock grazing area" established by the Steens Act; (2) a no grazing on public land scenario over the whole planning area; (3) a level of use emphasizing nonconsumptive uses where livestock stocking levels would be lower than existing levels and livestock would be excluded from designated areas; (4) a level of use similar to the existing level but also including changes in management practices after analysis of monitoring data, construction of additional range improvements to open underutilized areas to grazing, and exclusion of specific areas from livestock grazing; and (5) optimizing grazing to the maximum extent possible while still meeting standards for rangeland health.

Current grazing practices in the Project Area are not considered a causal factor for juniper establishment, and cessation or modification of such activities would not reduce undesirable juniper.

The main impact of historic domestic livestock grazing was overall removal of fine fuels, the major carrier of fires in much of the area. Invasion of juniper into big sagebrush communities appears to be directly related to cessation of periodic fires (Burkhardt and Tisdale, 1976).

An excessive level of grazing was documented near the Project Area in 1902 by Dr. David Griffiths during a tour of northern Nevada and southeastern Oregon. The course of the tour led "across and somewhat below the sources of the Blitzen, Mud, Indian, and Cocoamongo (Cucamonga) creeks (Griffiths, 1902)." These creek sources are nearby or in the Project Area and, therefore, Griffiths' description should also reflect the condition of the Project Area in 1902.

Griffiths states, "The most closely pastured region visited was Steins (Steens) Mountains. On the whole trip of three days we found no good feed, except in very steep ravines, until we reached the vicinity of Teger (Kiger) Gorge…In places from Ankle Cap to Nuttersville, a sheep supply camp, there was practically no more feed than on the floor of a corral. We passed two areas at least 2 miles in extent in which even the surface of the ground was reduced to an impalpable powder."

In his summary, Griffiths states, "The public ranges of the region are in many places badly depleted and furnish at the present time not over one-third of the feed which they once did. This is directly traceable to overstocking…" Griffiths made a conservative estimate of 182,500 sheep, or over 450 animals per square mile, on Steens Mountain during the summer season. In addition, the French-Glenn estate and the Pacific Live Stock Company, along with half a dozen smaller ranches, ran their cattle in the same region as much as possible. These conditions are depicted below in Images 2.4 and 2.5.

The Taylor Grazing Act was passed in 1934. The Preamble to the Act defines it as, "An Act to stop injury to the public grazing lands by preventing overgrazing and soil deterioration; to provide for their orderly use,

Image 2.4: Sheep grazing on Steens Mountain around the turn of the century. Photo reflects historic grazing levels in the vicinity of the Project Area.

Image 2.5: Fish Lake, Steens Mountain. Photo reflects historic utilization levels in the Project Area around the turn of the century.

improvement, and development; to stabilize the livestock industry dependent upon the public range; and for other purposes." By 1936, the transient sheep outfits (those without base property to support their flocks during the winter) were forced off the (Steens) mountain (Bill Bradeen, 1972).

Other policy and land management plans adopted include, but are not limited to, the 1997 Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington (S&Gs), and the CMPA RMP/ROD, August 2005. Each document gives direction and guidance on proper multiple resource management of public lands.

The S&Gs discussed above are analyzed through a formal allotment evaluation. Based upon the level of complexities and resource concerns of the allotment, an evaluation is completed on a 5- or 10-year schedule. Through the formal evaluation process, an ID Team assesses achievement of resource objectives set for the allotment and determines whether the standards have been achieved and guidelines have been conformed to. Additional resource objectives are designed, if necessary, and recommendations for improved management of any identified resources are declared. These standards ensure grazing management provides for the ecological health of rangelands.

While grazing management on Steens Mountain has improved dramatically since 1902, encroached juniper continues to be a problem. As discussed previously, modern fire control and prevention programs are probably the most important factors currently influencing juniper expansion (Burkhardt and Tisdale, 1976).

Soule', et al. (2004), found juniper establishment rates are generally accelerated regardless of the active disturbance regime. Ongoing grazing is not a required mechanism to promote increasing woodiness on arid western rangelands (Soule' and Knapp, 1999). Burkhardt and Tisdale (1976) found little relationship

between range condition of big sagebrush-grass stands and rate of juniper invasion. Invasion of juniper into big sagebrush communities appears to be directly related to the cessation of periodic fires (Burkhardt and Tisdale, 1976). Adopting a removal of grazing management regime in the Project Area would not reduce juniper and, therefore, would not meet the objectives of the proposed project.

Adopting a removal of grazing management regime in the Project Area would also not conform to direction in, or meet objectives of, the Steens Act which states as one of its purposes: "To promote viable and sustainable grazing and recreation programs on private and public lands," (Section 1 (b) (11)). The Act also declares one of the purposes of the CMPA is "to promote grazing, recreation, historic, and other uses that are sustainable…" (Section 102 (b) (2)). A Removal of Grazing Alternative would also not be in conformance with the Steens Mountain CMPA RMP/ROD.

Implementing a Removal of Grazing Alternative could have serious implications to the social and economic values of the communities surrounding the Project Area and Harney County. Viability and sustainability of ranches that hold grazing permits in the Project Area could decline as a large part of the lands they rely on become unavailable. Heavier grazing on upper reaches of critical riparian areas within and surrounding the Project Area could occur, as much of these areas are privately owned. A Removal of Grazing Alternative does not consider effects on the total ecosystem, including both public and private land. This alternative will not be addressed further in this document.

Wildlands Juniper Management Area

The Wildlands Juniper Management Area (WJMA) was initially included in the DEIS as a project unit within the North Steens Project Area. In response to a request by the SMAC and increased interest in the WJMA by potential cooperators, BLM completed a separate decision document addressing the WJMA demonstration project. The proposed demonstration treatment units were implemented within the WJMA during 2006; once cooperator funding has been secured, public education opportunities would be pursued.

The WJMA would serve initially as a demonstration area for more common treatments proposed within this document. The aforementioned proposed treatments have been subjected to considerable scientific scrutiny. Much of the applicable research was conducted within the North Steens Project Area. The BLM has utilized these juniper management methods in past projects. The WJMA would serve as an educational tool for informing interested members of the public about more common juniper management methods.

Other juniper management techniques and philosophies have not been equally tested or may not have been developed yet. For these techniques and other unknown ones, the WJMA would serve as an experimental as well as an educational project. Opportunities for cooperator participation in the WJMA project have been investigated and are currently in an early planning stage.

Chapter 3
Affected Environment

3 Affected Environment

3.1 Project Area Profile

The North Steens Project Area encompasses private lands and public lands administered by BLM located within the Andrews RA, primarily within the CMPA. This chapter describes the current condition, amount, location, use, and demands of each resource in the Project Area potentially affected by actions described in Chapter 2. Physical characteristics such as geology and climate are incorporated into the description of the physical environment. Although such characteristics should not be affected by enactment of any alternatives, they are a part of the physical environment where the actions would be taking place.

Health and safety are required management components that would not change by alternative. Protection of the public would be provided under all alternatives and would include such measures as posting signs and issuing news releases to alert the public to hazardous elements and locations within the Project Area.

3.1.1 Physical Characteristics

The Project Area lies in the northwest portion of the Great Basin in the Basin and Range Physiographic Province. Drainage is generally internal with no outlet to the sea.

About ten million years ago, regional uplifts and movement on faults in the Basin and Range Province formed fault-block mountains and intervening broad valleys. Fault movement continues today. Steens Mountain is a fault-block mountain dipping gently westward and is characterized by its steep, east-facing, 5,500-foot high escarpment overlooking Alvord Valley.

The elevation of 9,700 feet on top of Steens Mountain allowed the formation of alpine glaciers less than one million years ago. The glaciers took the form of an icecap on top of Steens Mountain during an earlier glacial advance (the Fish Lake advance) and were confined to river valleys during a later glacial advance (the Blitzen advance). The valley glaciers carved gorges 2,000 feet deep exposing layers of Steens Basalt. Steens Basalt has a total thickness of approximately 3,000 feet.

Weather in the semiarid Project Area is the result of maritime air moving eastward from the Pacific Ocean over the Coast and Cascade Mountain ranges. As air masses rise to cross these mountains, much of the moisture in the air condenses and falls to the ground, making the air relatively dry by the time it reaches southeastern Oregon. There is an abundance of sunshine and a wide range between maximum and minimum daily temperatures. Average annual precipitation in the region is between 8 and 14 inches, with some isolated areas receiving up to 30 inches or more. Most of the precipitation occurs from November through February with about one-third falling as snow. The amount of precipitation in a particular location depends on topography; the higher the elevation, the greater the precipitation.

Thunderstorms, occasionally accompanied by hail, typically occur each year over virtually every part of the Project Area. High-intensity thunderstorms occur between April and September; storms during July and August are typically drier than those in June or September. At elevations below 6,000 feet the snowpack usually melts by April; at higher elevations it remains until mid-June/early July. Localized flooding often follows spring snowmelt.

The frost-free period (temperatures about 32 °F.) varies from 139 days at the lower elevations to 74 days at higher elevations; however, frost may occur during any month of the year.

Prevailing winds are west-southwest during summer months while winds during winter months are generated from the northwest.

Archaeological evidence indicates the Project Area has been inhabited by humans for the last 10,000 years. Prehistoric occupation has been continuous, although population density and patterns of use have varied

according to changing climatic cycles. Small, highly mobile family groups of hunters and gatherers were the norm during most of the year though larger groups gathered at winter camps in the valley bottoms.

Archaeological sites, material remains of this prehistoric presence, are a commonplace yet fragile reminder of prehistoric activity. Prehistoric sites include stone flake scatters, larger more complex campsites, tool stone quarries, rock shelters and caves, rock art and rock structures such as rock rings (wickiup supports), rock cairns, and hunting blinds. Many Paiute tribal members have continued traditional practices such as marmot hunting, root gathering, and fruit harvesting.

Fur trappers were the first Euro-Americans to visit Steens Mountain in a brief foray in 1826. The next visitors came in the 1840s and 1850s. The area was increasingly populated in the 1870s, and the most arable land with water was claimed shortly thereafter. Just after the beginning of the 20th century, a brief dry-land farming boom occurred to the west in Catlow Valley. By 1920, however, most residents were driven away from the Steens Mountain area by cold winters, summer frost, and drought. The Riddle Brothers, who ranched on Little Blitzen River, were an exception. They developed the 1,220-acre ranch in the late 1800s. It was operated continuously until 1986 when the public acquired the property and it was designated a National Register Historic District administered by the BLM.

In the early 20th century, Basque sheepherders moved onto Steens Mountain and surrounding rangeland, leaving their marks in the form of place names, cabins, carved aspen, sheep camps, and numerous rock cairns. Many eventually became ranch owners.

Historic sites in the Steens Mountain area include wagon roads, homesteads, and Basque sheep camps with carved aspen. Riddle Brothers Ranch National Register Historic District is a complex of well-preserved historic buildings, willow fences, corrals, and rock walls. The BLM has restored four of the buildings and stabilized the others. In addition to the historic component, the District contains several prehistoric sites.

Natural Range of Variability

Natural range of variability has been explored to a great extent with regard to juniper expansion on Steens Mountain and surrounding areas (see Chapters 1 and 2 of this document). The EOARC has done extensive research on various aspects of the subject. For purposes of analysis and adaptive management it is useful to describe the Project Area in terms that frame the natural range of variability of western juniper populations within North Steens Project ecosystems.

These general descriptions fall into three condition categories:

1. Past condition.
2. Present condition
3. Target future condition (see the description of the DRC in the Andrews/Steens PRMP/FEIS, pp. 2-3).

Past condition can be separated into recent past (0-140 ybp) and ancient past (140-10,000 ybp). Juniper has expanded its range dramatically over the last 140 years, but this is not completely unique to juniper as there are other plant communities that have experienced change since human population expansion into the western portions of the United States. Juniper expansion does, however, have significant statistics to consider when looking at the natural range of variability question. For example, over 90% of the 8 million acres of juniper have developed in the last 100 years. While that is significant in itself, the real issue for consideration is how does this compare to prior juniper expansion in the historic record?

Relevant scientific literature identifies several main triggers to the recent expansion of juniper woodlands. These include:

1. Climate shifts.
2. Fire suppression and changes in the Mean Fire Return Interval (MFRI).
3. Past grazing practices.

Climatic trends from 1850 to 1920 shifted to milder winters and greater annual precipitation across much of the Great Basin (Graumlich 1987). This warmer, wetter period aligns with the peak period of woodland

establishment. Holmes and others (1986) found wet, mild conditions promote vigorous juniper growth. Similar trends can also be found in the prehistoric record. During the Early Holocene (10,000 to 8,000 ybp), climate began to warm and juniper began to expand into higher elevations replacing sub-alpine forests (Betancourt 1987). Juniper populations continued to fluctuate in the mid-Holocene (8,000 to 4,000 ybp) which was a warmer, drier period. Between 5,000 and 4,000 ybp, precipitation and temperatures increased, and conditions favored grasses over woody plants (Miller and Wigand 1994).

Increases in grasses coincided with an increase in fire occurrence throughout the Great Basin. Woodlands of this time were probably very open and restricted to areas of little fuel accumulation. During the latter stages of the Holocene (2,500 to 140 ybp) climatic conditions varied greatly. Severe drought and major fires also occurred resulting in dramatic declines in juniper and perennial grasses and expansion of sagebrush and salt-desert shrub vegetation (Miller and Tausch 2001).

The ebb and flow of juniper woodlands over the last 10,000 years have occurred under different conditions. Recent woodland increases (last 140 years) have occurred during a warming trend, but large increases in fires did not accompany increasing temperatures. The magnitude and rate of woodland expansion during the last 140 years exceeds any thing that occurred in a similar length of time during the preceding 5,000 years (Miller and Wigand 1994). Additionally, recent work has examined effects of the global carbon dioxide ($CO_{2)}$ increase on woodland expansion (Knapp and Soulé 1996). Increases in juniper do not coincide with increases in global CO_2. However, more work is needed to examine effects of tree growth related to increasing CO_2 and effects on the competitive relationships between trees and understory plants.

The next two triggers are closely linked in time. Miller and Wigand (1994) identified lack of fire as one of the major differences between prehistoric and historic juniper increases. Domestic livestock were introduced during the 1860s and their numbers increased dramatically from the 1870s through the early 1900s (Miller and Tausch 2002). Domestic grazing may have influenced juniper expansion by reducing fine fuels, which also altered the fire regime (Miller and Rose 1999). Prior to these shifts in plant community dynamics, fires occurred on an average of 15 to 30 years MFRI. Western juniper expansion has drastically reduced aspen communities. The MFRIs of these wetter, more productive plant communities were 60 to 90 years (Wall, et al. 2001). Estimations by Miller and Rose (1999) concluded the MFRI for mountain big sagebrush and quaking aspen plant communities has increased to well over 200 years.

3.1.2 Past Actions

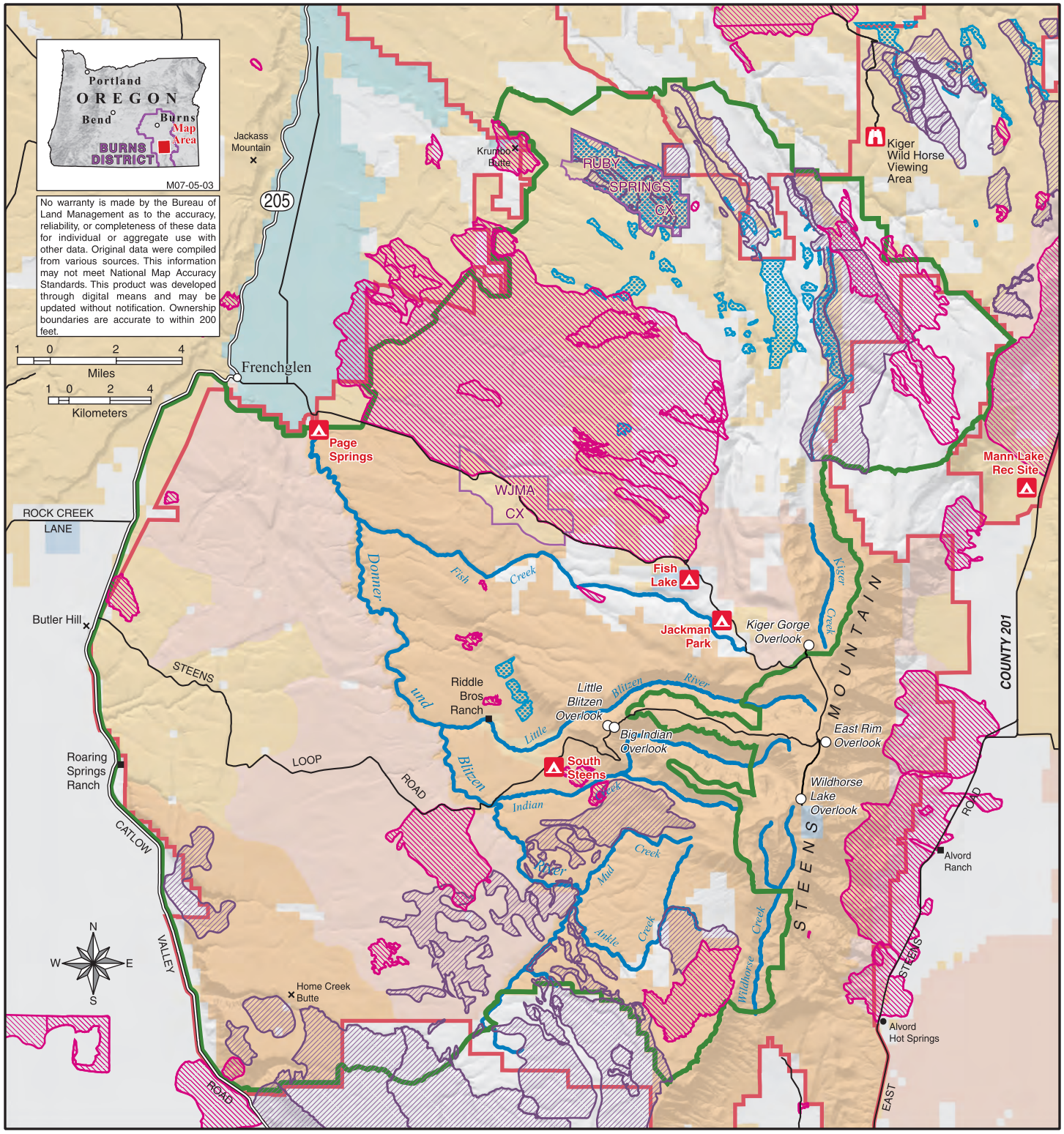
See Map 3.1: Past Actions: Juniper Cuts and Wildland Fires (Prescribed and Natural).

The discussion of past and present actions utilizes two scales. The first is defined as the proposed Project Area boundary. The second is defined as the Burns District perimeter. Acres shown are derived from the Burns District GIS database and are rounded to the nearest acre.

Project Area - cultural burning practices
Indigenous populations of the Great Basin, including those who lived within the Steens Mountain area, were actively utilizing fire at the time of American westward expansion. Extensive historic documentation details such use as a management tool for hunting, crop management, fireproofing areas, insect collection, pest management, warfare and signaling, economic extortion, clearing areas for travel, felling trees, and clearing riparian areas. Within the Great Basin, Steward (1938) documented fire use by Ash Valley and Mono Lake Paiutes as a tool to drive rabbits, antelope, and deer. Use of fire by "Snake Indians" (Paiute and Bannock) in eastern Oregon was reported in the journals of Peter Skene Ogden and in the ethnographic work of Omer Stewart.

Oral histories from Basque sheepherders and their immediate descendants detail the practice of back burning as they led their flocks of sheep off rangelands at the end of each fall season. The documented reasons for this use of fire were to "clean the land and set the grass seeds for the next year" and in one case to follow the practice learned from the Paiute people.

Historic photographic records of Basque-use and old ranch-use areas in the northern extent of the Project Area show lands covered in forage with few ancient juniper and sparsely spaced juniper seedlings.



- Overlook
- Prescribed Burn 1992 to Present
- Wildland Fire 1992 to Present
- Cut Area
- Area Analyzed under Separate Process
- Paved Road
- Non-Paved Road
- Wild and Scenic River
- North Steens Project Area Boundary
- Cooperative Management and Protection Area Boundary

Administered Land

- Bureau of Land Management
  - Wilderness
  - Wilderness Study Area
- U.S. Fish and Wildlife Service
- State
- Private

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Map 3.1: Past Actions: Juniper Cuts and Wildland Fires (Prescribed and Natural)

Early records from residents in Harney Basin indicate juniper was present in the late 1800s and early 1900s. Densities and distribution are not described in detail. However, written records indicate the need to travel some distance to obtain wood fiber for various activities. Residents cut junipers for fence posts and firewood as evidenced by old weathered stumps found across the Project Area. Reports from the Burns Times-Herald (1902) indicated most settlers in the Frenchglen area traveled to Jack Mountain west of the Project Area for juniper posts and firewood.

Burns District - cultural burning practices
According to Shinn's 1980 paper on historical range burning practices "…broadcast burning by the native peoples of the inland Pacific Northwest was widespread and persisted over an extended period primevally. It may have dominated, perhaps largely pre-empted, natural burning in shaping aboriginal environments. The entry of European culture to the region interrupted native traditions in the use of wildland fire, altered their role in nature, and distorted their prior relation to grazing phenomena, contributing to shifts in native ecosystems which continue to this day."

Suppression of fires in the early 1900s was primarily limited to forested areas of Harney County. Standing timber presented a much greater value than sagebrush. Sagebrush fires were not actively suppressed unless there was a threat to private property, primarily structures. Early ranchers and farmers understood that removal of sagebrush resulted in increased forage for livestock. However, the conversion came at the price of diminished current forage. The tradeoff was often enough to let fires burn. Following World War II there was an increase in the available workforce and large equipment and in suppression activities.

Project Area – 20th - 21st century prescribed fire practices
Prescribed fire has been used as a land management tool in the Project Area for many years on both private and public lands. Objectives of these activities and methodologies used to implement them have changed over time.

The following table (Table 3.1) displays prescribed fire acres by year within the Project Area. Some prescribed fires may have overlapped prior burn areas; this overlap acreage has not been adjusted for within the table.

Table 3.1 - Prescribed Fire Activity within the Project Area

	Prescribed fire
Year	**Acres**
1996	2,528
1997	7,736
1998	0
1999	5,665
2000	0
2001	12,239
2002	1,247
2003	0
2004	1,765
2005	0
2006	3,223
Total Acres	34,403

Average acres of prescribed fire / year = 3,128

Burns District – 20th–21st century prescribed fire practices
Concurrent with Project Area scale practices, prescribed fire has been used as a land management tool in Burns District for many years on both private and public lands (Table 3.2). Objectives of these activities and methodologies used to implement them have changed over time.

Average acres prescribed fire / year (1996-2006) = 4,761
Average acres prescribed fire / year (1980-1996) = 384

Project Area and Burns District – 20th-21st century wildfire
The following tables (Tables 3.3 & 3.4) display wildfire acres by year within the Project Area. Some wildfires may have overlapped prior burn areas; this overlap acreage has not been adjusted for within the table. Fire acreage in Burns District does not include acres within the Project Area. Prior to the 2006 fire season, the

Table 3.2 - Prescribed Fire Activity within Burns District, but outside the Project Area.

Prescribed fire	
Year	**Acres**
1980	5,749
1996	388
1997	3,135
1998	2,912
1999	13,847
2000	1,090
2001	17,077
2002	1,593
2003	3,020
2004	2,213
2005	4,607
2006	2,487
Total Acres	**58,118**

Table 3.3 - Wildfire Acres within the Project Area

Year	Acres
1981	5,442
1982	3,310
1984	3,164
1987	3,731
1996	752
1997	3,237
1998	880
1999	3,202
2001	284
2002	139
2003	0
2004	14
2005	2,721
2006	47,259
Total	**74,135**

Table 3.4 - Wildfire Acres within Burns District

Year	Acres
1980	10,567
1981	29,918
1982	10,384
1983	42,887
1984	37,461
1985	146,574
1986	7,046
1987	3,117
1988	3,278
1989	491
1990	96,876
1991	566
1992	10,864
1994	13,751
1995	3,575
1996	45,193
1997	8,283
1998	25,695
1999	13,305
2000	16,005
2001	43,552
2002	3,022
2003	0
2004	357
2005	11,746
2006	105,750
Total	**690,263**

average number of acres burned per year within the Project Area was 1,119 acres varying from 0 to 5,442 acres. At conclusion of the 2006 fire season, 47,259 acres burned within the Project Area. This value is over 15 times the 25-year average. A majority of the burned area lies lower down slope from the Project Area.

Average wildfire acres / year (1981-2006) = 2,965

Average wildfire acres / year (1980-2006) = 26,549

Project Area - 20th-21st century juniper management
Approximately 5,538 acres (Burns District GIS Data) of existing juniper cuts are located within the North Steens Project Area units. Data do not include years in which cutting occurred.

Burns District - 20th-21st century juniper management
Juniper management began in the mid to late 1980s in Burns District with a few small cutting projects primarily for habitat improvement and fuels reduction. During the 1990s juniper cutting increased in scale (primarily in Three River RA) and objectives were more often for fuels management. The focus of juniper management was in several general areas in Three Rivers RA including the Stinkingwater Mountains, the National Forest interface with BLM-managed lands, and the south central portion of Three Rivers RA north of the North Steens Project Area.

In this century, projects have combined juniper cutting and prescribed fire methods to treat vegetative communities on a landscape scale, recognizing cut juniper provides the fuel continuity required to carry a desirable fire across a landscape (Table 3.5). Goals and objectives of these projects are substantially the same

Table 3.5 - Juniper Cutting Acres within Burns District

Year	Acres
1987	43
1989	123
1994	360
1995	326
1996	166
1997	142
1998	221
1999	386
2000	873
2001	2,051
2002	4,643
2003	1,958
2004	1,853
2005	5,822
2006	1,578
Total	***20,245**

*Does not include the acres of existing cuts in the Project Area

as those proposed in this document - to restore historic plant communities by reintroducing fire into fire-dependent systems.

Average acres cut / year (1987-2006) = 1,012

3.1.3 Present Actions

Project Area - prescribed fire practices
Ongoing projects that combine juniper cutting and prescribed fire continue to be implemented on a limited scale within the Project Area. Ongoing projects include, but are not limited to Ruby Springs Fuels Reduction, Wildlands Juniper Management Area Demonstration Project, and East Ridge Prescribed Fire Project.

Burns District - prescribed fire practices
Three Rivers RA is currently utilizing prescribed fire to reduce fuels, including juniper slash, for ecosystem restoration purposes. The scale is the same as juniper management activity in Three Rivers RA during the 1990s. Ongoing projects combining juniper cutting and prescribed fire activities in Three Rivers RA include, but are not limited to SHED, Devine Ridge, Five Creeks Rangeland Restoration, and Forks of Poison Creek.

Ongoing projects combining juniper cutting and prescribed fire are being implemented on a limited scale within Andrews RA as stated in the Present Actions Project Area prescribed fire practices section above.

Project Area and Burns District - juniper management
Juniper management and prescribed fire activities have merged into single effort projects with follow-up treatments of prescribed fire and are described in the Present Actions Project Area prescribed fire practices section above.

Present condition can be seen as the result of many factors including climate events, fire suppression practices, commodity production, and human population increase. Prior to expansion of nonindigenous people into the West, juniper was limited to rocky ridgetops or shallow soil areas with sparse vegetation (West 1984). Changes in historic trends are readily apparent within the Burns District and across the CMPA. Large areas of mountain big sagebrush and quaking aspen plant communities have shifted to dominance

by juniper. Changes in these plant communities have dramatic short- and long-term implications on soil stability and fertility, wildlife habitats, forage resources, and overall site diversity. Increases in juniper have also altered fuel loading and structure of many plant communities. In mature woodlands, there are approximately 10 times the aboveground fuel loads compared to an older mountain big sagebrush stand.

Historically, virtually all plant communities in Burns District were subjected to fires. The resulting mosaic of plant communities enhanced the success and diversity of animal species and contributed to the ecological integrity of the entire region. In fire-dependent ecosystems, occasional fire is essential to the health and function of the natural system. Loss of natural disturbance events, or at least modification of those events, can severely affect specific habitats and sensitive species that live within them.

The greater sage-grouse is a sagebrush obligate species and a good example of a species that can be affected as habitat is modified by the expansion of juniper. This juniper expansion has resulted in a decrease of available sagebrush cover and associated woody and non-woody vascular and nonvascular plants. For perspective, Map 3.2 shows the potential for sagebrush (all species) in the Project Area. Map 3.3 shows the actual current distribution of sagebrush in the Project Area. Map 1.1 (Chapter 1) shows current (1980s) juniper populations in the same areas where the potential and current sagebrush coincides thereby showing the displacement of sagebrush by juniper.

Habitat in the Project Area that has been or is being affected by the same expansion includes, but is not limited to mountain big sagebrush, low sagebrush, quaking aspen stands, riparian plant communities, and Wyoming big sagebrush.

3.2 Environmental Components

This section describes site-specific affected environmental components. The discussion is divided into four sections comprising critical and noncritical elements of the human environment which are discussed and analyzed in this document.

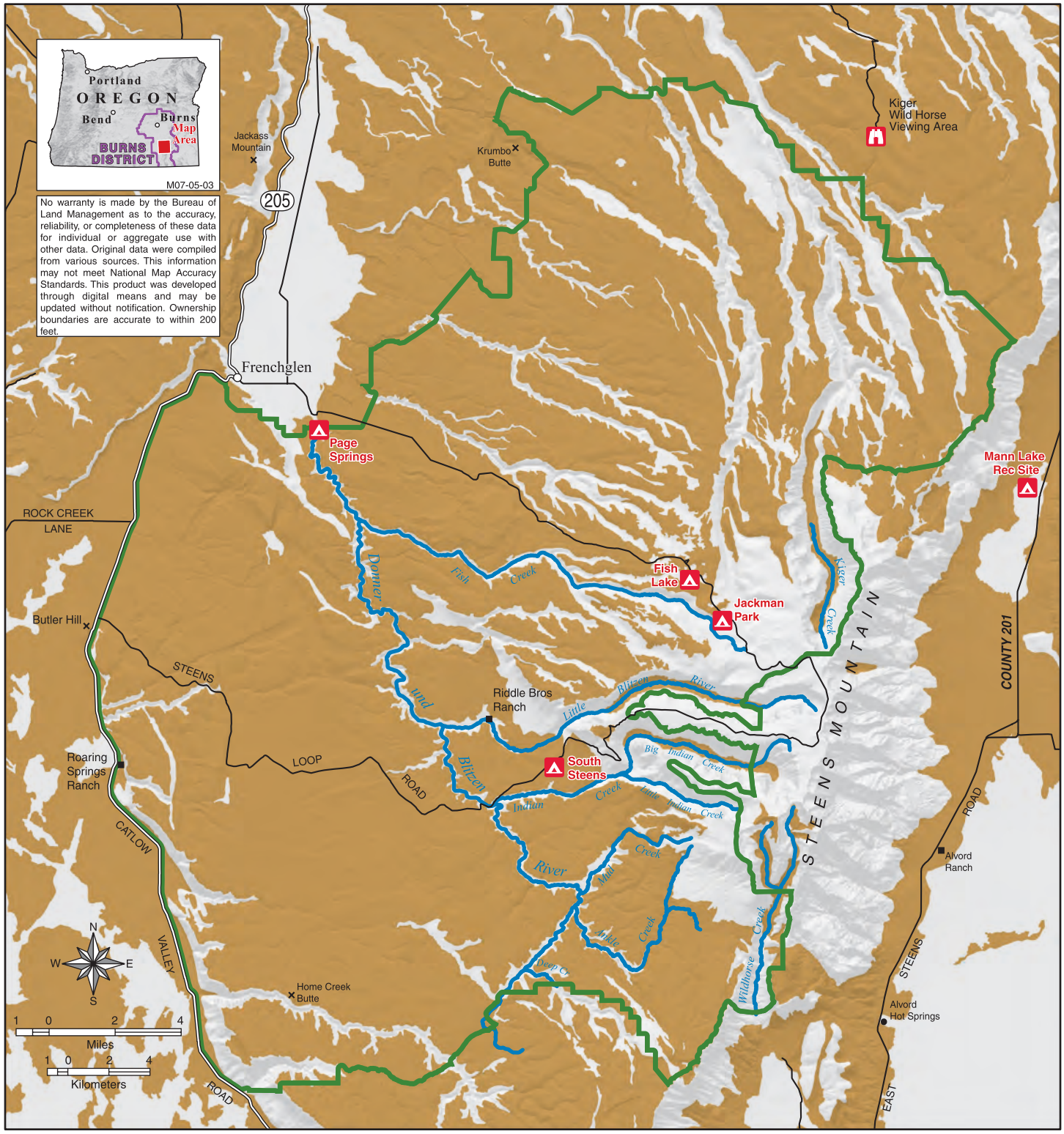
Critical Elements of the Human Environment:
Areas of Critical Environmental Concern (ACEC), Air Quality, American Indian Traditional Practices, Cultural Resources, Environmental Justice, Farmlands (prime and unique), Flood Plains, Hazardous Materials, Migratory Birds, Noxious Weeds, Paleontology, Special Status Fauna, Special Status Flora, Wetlands and Riparian Areas and Water Quality, WSRs, and Wilderness and WSAs.

Noncritical Elements of the Human Environment:
Biological Soil Crusts, Fire Management, Fisheries, Forestry/Woodlands, Grazing Management, Lands and Realty, Minerals, Recreation, OHVs, Social and Economic Values, Soils, Transportation/Roads, Vegetation, Visual Resources, and Wildlife.

The following elements of the human environment are not known to be present in the Project Area or are not potentially affected by implementation of the proposal and will not be discussed further in this document: Areas of Critical Environmental Concern, Flood Plains, OHVs, Paleontological Resources, Prime or Unique Farmlands, Minerals, Lands and Realty, and Hazardous Materials. Environmental Justice would also be unaffected by this proposal.

> Executive Order 12898 requires Federal agencies to adopt strategies to address Environmental Justice concerns within the context of agency operations. After review of the proposal the BLM has determined implementation of the proposal would not result in a disproportionately adverse effect on minority or economically disadvantaged populations as such populations do not occur in or near the Project Area. Environmental Justice will not be discussed further in this document.

American Indian Traditional Practices are known to occur within Harney County, however, exact locations have not been made available to the BLM. Consultation with the Burns Paiute Tribe concerning potential effects to American Indian traditional practices would occur prior to any implementation. A PDE has been created to address this issue. American Indian Traditional Practices will not be addressed further in this document.



North Steens Project Area Boundary

Potential Sagebrush Vegetation

Campground

Watchable Wildlife

Paved Road

Non-Paved Road

Wild and Scenic River

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BURNS DISTRICT

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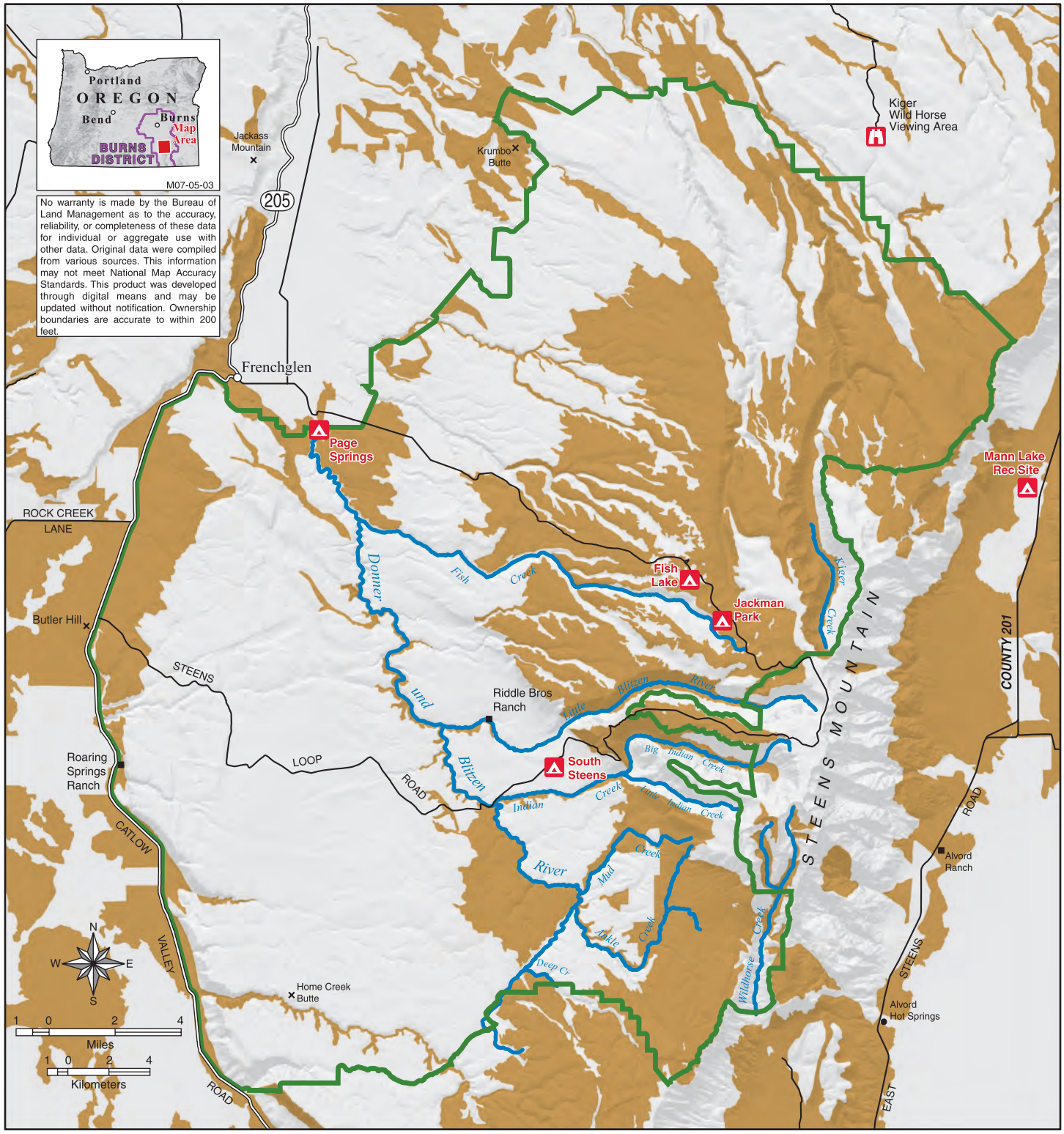
Map 3.2: Potential Sagebrush Vegetation



North Steens Project Area Boundary

Current Sagebrush Vegetation

Campground

Watchable Wildlife

Paved Road

Non-Paved Road

Wild and Scenic River

U.S. DEPARTMENT OF THE INTERIOR
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BURNS DISTRICT

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Map 3.3: Current Sagebrush Vegetation

Critical and noncritical elements of the human environment are described and combined in the following order; which to a certain degree reflects a hierarchy of dependency between the resources.

Air, Soil and Water Resources:
Air Quality, Soil, Wetlands, Riparian Areas, and Water Quality

Biological Soil Crusts and Vegetative Resources:
Biological Soil Crusts, Forestry/Woodlands, Noxious Weeds, and Vegetation. Special Status Species of Flora are described in Chapter 3 as they do occur in the Project Area. There would be no effects (positive or negative) to known Special Status plant species in the Project Area with implementation of any of the alternatives; therefore, Special Status plant species will not be discussed in Chapter 4 of this document.

Fish, Wildlife and Wild Horses and Burros Resources:
Fisheries, Migratory Birds, Wildlife, Special Status Species – Fauna, and Wild Horses and Burros.

Cultural, Visual, and Special Management Oriented Resources:
Cultural Heritage, Visual Resources, WSRs, Wilderness, WSAs, and parcels with wilderness characteristics.

Fire and Livestock Management, Recreation, Transportation/Roads, and Social and Economic Values Resources:
Fire Management, Livestock Grazing Management, Recreation, Transportation/Roads and Social and Economic Values

3.2.1 Air, Soil and Water Resources

Current discussion and analysis of potential effects on air, soil and water resources are tiered to the AMU/CMPA PRMP/Final EIS (August 2004), and relevant information contained in the following sections is incorporated into this EIS by reference: Sections 3.2, 3.3, 3.4, 3.5, 4.2, 4.3, 4.4, and 4.5.

3.2.1.1 Air Quality

Under criteria established by the Clean Air Act as amended in 1990, Steens Mountain Wilderness is designated as a Class II airshed, with good to excellent air quality. The remainder of the Project Area is also designated Class II. The nearest nonattainment area is Lakeview, Oregon, and this area is 120 miles to the west of the Project Area.

The air pollutant of most concern on BLM-administered land is Particulate Matter (PM), which may originate from fire (either natural or prescribed), road or windblown dust, and vehicle use. The major pollutant of concern in smoke from burning vegetation is fine particulate matter (Sandberg et al. 2002). Particle sizes of concern are PM10 (10µ [microns] or 3.937×10^{-4} inches) and PM 2.5 (2.5µ or 7.874×10^{-5} inches). 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).

3.2.1.2 Soil

(See Andrews/Steens RMP Map S-3, Soil Survey, on enclosed CD.)

General Soil Types
Eight soil types have been identified within the Project Area. Table 3.6 contains a description of each type by acres within the EIS Project Area. For a more detailed description of the soils in the Project Area refer to Section 3.4 of the Andrews/Steens PRMP/FEIS.

Table 3.6 - Soil Types found in the Project Area (Burns District GIS Database)

Soil Types	Description	Acres
Spangenburg-Enko-Catlow	Well or moderately well-drained, very deep soils formed in lacustrine sediments and alluvium on middle lake terraces; 0-20% slopes.	3,221
Felcher-Skedaddle	Well-drained, shallow or moderately deep soils formed in colluvium and residuum on mountains; 20-70% slopes.	781
Fury-Skunkfarm-Housefield	Somewhat poorly to very poorly drained, very deep soils formed in alluvium and lacustrine sediments on stream terraces and lake terraces; 0-2% slopes.	518
Reallis-Vergas-Lawen	Well-drained, very deep soils formed in alluvium and eolian material on high lake terraces and fan terraces; 0-8% slopes.	2,345
Baconcamp-Clamp-Rock outcrop	Well-drained, shallow or moderately deep soils formed in residuum and colluvium; 5-80% slopes.	*106,425
Raz-Brace-Anawalt	Well-drained, shallow or moderately deep soils formed in residuum and colluvium on tablelands having 8 to 12 inches of precipitation; 0-30% slopes.	23,318
Ninemile-Westbutte-Carryback	Well-drained, shallow and moderately deep soils formed in residuum and colluvium on tablelands and hills having 12 to 16 inches of precipitation; 0-70% slopes.	*192,459
Merlin-Observation-Lambring	Well-drained, shallow to very deep soils formed in residuum and colluvium on shrub and grass covered hills; 0-70% slopes	1,571
No Soils Information		99
Total Acres		**330,737**

* Soil types include acres within the boundary of the EIS project but outside treatment units (e.g., areas along Highway 205).

3.2.1.3 Wetlands/Riparian Areas and Water Quality

Characteristics of Wetlands and Riparian Areas
Wetlands and riparian areas form ecological links between terrestrial and aquatic habitats of the landscape, and serve as buffers that assist in reducing overland flow and sediment input into surface water from uplands. Wetlands are characterized by specific hydrology (presence of water on or near the soil surface), soil characteristics (saturated, flooded or ponded soils that develop oxygen-deficient conditions in the upper soil profile), and vegetation communities (plants that tolerate or require water or oxygen-deficient soils during all or part of the growing season). Riparian areas are generally linear zones associated with flowing water that undergo seasonal flooding, and include plants that tolerate or require water. However, oxygen-deficient soil conditions are not usually present, and in a technical sense, riparian areas do not function as true wetlands. In arid areas, the demarcation between upland and riparian plant communities is usually well-defined and easily identified.

Woody riparian plant communities include associations such as cottonwood-willow, alder-willow, mixed willow, willow-chokecherry, and quaking aspen. Understory herbaceous species include numerous forbs, grasses, and grass-like species such as sedges and rushes. The composition of riparian vegetation (relative amount of woody or herbaceous plants) is influenced by numerous factors including bed and bank material, duration of flows, depth of water table, localized bank disturbances, canopy opening and available sunlight, and availability of plant material within the stream system.

Many riparian areas within the Project Area have undergone varying degrees of juniper expansion. Streams with the greatest degree of juniper expansion are Krumbo, Bridge, McCoy, Fish, Fir, Little Blitzen, Big and Little Indian and Home Creeks, and the Donner und Blitzen River. Western juniper has become established and now dominates many portions of these streams, effectively competing with other woody and herbaceous vegetation for moisture and sunlight during the growing season. This increase in juniper cover and density

has resulted in a corresponding reduction in streambank cover of riparian plants, increasing the amount of bare ground, risk of soil erosion, and sediment input into streams. Riparian plant communities are fairly resilient, and may respond rapidly to management intervention. If competition from expansive juniper is reduced or eliminated while physical characteristics of streambanks are still intact (stream channels are vertically stable, erosion is not excessive, and the water table is still within reach of roots of riparian plant species), riparian plant communities may become reestablished quickly, especially if species have not been entirely eliminated.

Riparian Proper Functioning Condition Assessment
Analysis of riparian condition is based on an assessment of Proper Functioning Condition (PFC), a methodology developed by BLM and U.S. Forest Service (USFS) resource specialists to provide a consistent approach for considering hydrology, vegetation and soil erosion/deposition attributes and processes to assess conditions of riparian and wetland areas (USDI BLM Tech Ref. 1737-15, 1998). Assessments are conducted by ID teams of BLM resource specialists which may include livestock operators and specialists from cooperating agencies. Approximately 151 stream miles (representing 77 stream reaches) were assessed between 1998 and 2003. One hundred and eleven stream miles were determined to be in PFC and 28 miles were determined to be Functioning At Risk (FAR) with an upward trend. Only 9 miles, or 8% of stream miles, were determined to be FAR with no apparent trend, a downward trend, or nonfunctioning. The condition of stream reaches not in PFC was considered by the ID teams to be the result of past management practices, either individually or cumulatively, such as unsustainable livestock numbers, season and duration of use, fire suppression and subsequent juniper encroachment, and large storm events.

In 2006, some stream reaches previously determined to be FAR with no apparent trend or a downward trend were reassessed for PFC. No stream reach had become nonfunctional, or had reverted from an upward trend to a downward trend between assessments. Approximately eight stream miles had attained PFC from a previous FAR determination, mostly in stream reaches for which no trend had been determined previously. A summary of PFC determinations after 2006 reassessments is contained in Table 3.7.

Surface Water Quality Assessment
The Federal Environmental Protection Agency (EPA) delegated authority to Oregon Department of Environmental Quality (DEQ) to implement the Clean Water Act (CWA). The objective of the CWA is to restore and maintain the physical, chemical, and biological integrity of the nation's waters. To implement the CWA, the State of Oregon develops and adopts water quality standards, which include beneficial uses, narrative and numeric criteria, and antidegradation policies. Oregon's water quality standards are contained in Oregon Administrative Rules 340 Division 41. Section 303(d) of the CWA requires the state to identify those waters not meeting the water quality standards, referred to as "water quality limited" or "impaired" and to develop Total Maximum Daily Loads (TMDLs). The TMDLs describe the amount of each pollutant a water body can receive without violating water quality standards. The TMDL and Water Quality Management Plan (WQMP) for the Alvord Lake subbasin were completed by the DEQ and approved by the EPA in 2004. The DEQ plans to complete TMDLs for the remaining subbasins in Andrews RA by 2010.

Through a Memorandum of Agreement (MOA) (USDI 2003), ODEQ recognizes BLM as the Designated Management Agency responsible for implementing and enforcing natural resource management programs for the protection of water quality on public lands under its jurisdiction. This MOA recognizes nonpoint source water quality issues are best controlled through development, adoption, and implementation of sound resource management practices, referred to as Best Management Practices (BMPs). The primary cause of water quality degradation on public land is nonpoint source pollution. To further the purposes of this MOA and the CWA, the USFS and BLM are implementing a protocol for addressing CWA Section 303(d) Listed Waters (USDA/USDI 1999). In coordination with the EPA, ODEQ and other agencies, the BLM is implementing the protocol recognized as the vehicle for achieving water quality compliance.

Fourteen streams in the Project Area are included on DEQ's 303(d) list (2004-2006 report) because they exceed the water temperature standard for salmonid fish (spawning, rearing, or presence) (Table 3.8). However, at time of listing, the temperature standard used to evaluate water quality impairment required a 7-day average maximum temperature of 64 °F. The standard has since been changed to a 7-day average maximum temperature of 68° F, more reflective of natural conditions in desert areas. The temperature standard is linked in part to biological requirements of redband trout occurring in these systems, which

have evolved to persist in warmer waters. For example, redband trout in the Owyhee system have been observed feeding at water temperatures of 82.9º F (Zoellick 1999). The DEQ is scheduled to complete a TMDL for the Donner und Blitzen watershed in 2010. However, DEQ has concurred (in a formal letter to the BLM Project Lead received May 1, 2006) that action is warranted now if it "includes planning elements that serve as a precursor to the development of a total maximum daily load (TMDL) for this subbasin in 2010."

Macroinvertebrate data have been collected across the Burns District for 14 years between 1980 and 2001. Streams included in the sampling and within the Project Area include Little Blitzen River, Donner und Blitzen River at Page Springs, Donner und Blitzen River upstream of the confluence with Little Blitzen River, Deep, Fish, Home, Indian, and Threemile Creeks. Most macroinvertebrate species identified are indicative of slightly nutrient-enriched water.

Excessive sediment deposition is noted as part of the PFC assessments, though not measured. Excessive sediment deposition was noted in 2.4 of the 151 miles surveyed.

Summary of Riparian Condition and Water Quality by Hydrologic Subbasin
The project includes portions of the Malheur, Alvord, and Guano/Harney subbasins. Riparian condition was analyzed at the 6th-field hydrologic unit (HUC, or 6th level subwatershed). There are 16, 6th-level HUCs within the Project Area with streams supporting cold-water biota. (See Andrews/Steens RMP Map S-1, Hydrographic Subbasins, and Map S-2, Proper Functioning Condition Assessment, on the enclosed CD.) Current conditions are summarized by 6th level subwatersheds within the Project Area.

Ankle Creek 6th Field HUC
Approximately 11 miles of Ankle Creek (including tributaries) were assessed for PFC in 1998, all of which is within the No Livestock Grazing Area perimeter of Steens Mountain Wilderness. The ID team determined 4.4 miles of headwater reaches in two tributaries were in PFC. The remaining stream miles were determined to be FAR with an upward trend. The FAR rating was based on low numbers of woody riparian species, lack of sedges, and small headcuts. Ankle Creek is 303(d) listed due to temperature; however, the stream does not exceed the new standard (68 ºF) established by DEQ, and the listing is likely to be changed.

Bridge Creek 6th Field HUC
Approximately 2.2 miles of Bridge Creek was assessed for PFC in 1998, and the entire reach was determined to be in PFC. Assessments were also conducted on 4.2 miles of Little Bridge Creek. Two miles were determined to be in PFC, and 2.2 miles were FAR with no apparent trend, primarily due to juniper expansion and lack of woody riparian species. Bridge Creek is 303(d) listed due to levels of iron, manganese, beryllium (the source of these pollutants is apparently in parent rock material), and temperature; however, the stream does not exceed the new standard (68 ºF) established by DEQ, and the listing is likely to be changed. There are no temperature data for Little Bridge Creek.

Cucamonga Creek 6th Field HUC
The PFC assessments were conducted on three reaches on Cucamonga Creek in 2000. Most of this subwatershed is under private ownership and management. Approximately 0.6-mile was determined to be in PFC, and 0.6-mile was assessed as FAR with a downward trend. This FAR determination was due to juniper expansion into the riparian area, lack of recruitment of riparian species, and a deeply incised channel. The FAR reach was reassessed in 2006, and the ID team determined a short (0.1-mile) section had attained PFC with the remainder FAR with an upward trend.

Deep Creek 6th Field HUC
The headwaters of Deep Creek and South Fork Donner und Blitzen River are located on private land. All public land in this subwatershed is within the No Livestock Grazing Area perimeter of Steens Mountain Wilderness. The PFC assessments were conducted on approximately 2.2 miles of Deep Creek in 1998, and the reach was determined to be FAR with an upward trend. One mile of the assessed reach is now privately-owned. The FAR determination was due to effects resulting from beaver dam failures and juniper expansion into riparian areas. Deep Creek is 303(d) listed for exceeding the standard for temperature. The 7-day average maximum temperature for Deep Creek was 71.6 ºF.

Approximately 4.5 miles of South Fork Donner und Blitzen River within the subwatershed were assessed in 1998. A PFC determination was made for one mile, and the remainder was determined to be FAR with an upward trend. Juniper expansion was identified as a contributing factor to FAR, or as a potential problem in all areas assessed. Conditions on South Fork Donner und Blitzen are meeting management objectives identified in a water quality management plan completed in 1996 (Lampman,1996). The plan also identified a need for juniper to be reduced to historic fire regime levels by 2010. Data collected by BLM indicate temperatures exceed the current (68 ºF) DEQ standard.

Dry Creek 6th Field HUC

This subwatershed includes Cold Springs Creek, Squaw Creek, and the main stem of Donner und Blitzen River between Fish Creek and Little Blitzen River. These streams are entirely within the designated No Livestock Grazing Area perimeter of Steens Mountain Wilderness. Approximately 3.6 miles of Cold Springs Creek and two reaches of Squaw Creek were assessed for PFC in 1999. Approximately 9.6 miles of the lower Donner und Blitzen River (between Fish Creek the Little Blitzen River) and some tributaries to the reach are included in the subwatershed description, which was also assessed in 1999.

Cold Springs Creek is a small stream with intermittent flows. The PFC was attained for 1.9 miles, one mile was determined to be FAR with an upward trend, and 0.3-mile was FAR and no apparent trend. Two headwater wet meadow areas (0.4-mile) were determined to be nonfunctional (NF) because the main channel had become entrenched, and riparian vegetation had lost contact with the water table. Upland vegetation was present in the riparian area. No temperature data have been collected for Cold Springs Creek.

Approximately 2.5 miles of Squaw Creek were assessed for PFC in 1999. Squaw Creek is a small stream with very low flows, and the riparian area does not have a well-developed composition of riparian species. The PFC was attained for 1.5 miles, and the remainder was FAR with no apparent trend. The FAR determination was due to excessive erosion and deposition, lack of deep-rooted sedges and rushes in the understory, and juniper encroachment. No temperature data have been collected from this stream.

Donner und Blitzen River and tributaries within the subwatershed was determined to be in PFC. This section of river does not meet the current (68 ºF) DEQ standard.

Fish Creek 6th Field HUC

PFC assessments were conducted in Fish, Little Fish, and Grove Creeks in 1998 and 1999. Headwaters of Little Fish and Grove Creeks are in the No Livestock Grazing Area perimeter of Steens Mountain Wilderness. The Fish Creek assessment included 6.5 stream-miles, and was determined to be in PFC. Two unconnected segments (1.4 miles) of Grove Creek were assessed for PFC. The lower segment (0.6-mile) was determined to be in PFC. The other reach, a wet meadow which had been converted to an intermittent channel, was assessed as was NF. This condition was speculated to be the result of historic levels of livestock use occurring decades before the assessment.

Approximately 1.7 miles of Little Fish Creek were evaluated for PFC in 1999, 1.2 of which were determined to be in PFC. The uppermost 0.5-mile was determined to be FAR with a slight upward trend, with small areas that were NF due to effects from excessive livestock use (bank erosion and high levels of sediment deposition). Livestock grazing no longer occurs in the FAR and NF reaches of Little Fish and Grove Creeks.

Home Creek 6th Field HUC

Approximately 11 miles of Home Creek and tributaries were assessed for PFC in 1998 and 1999, 5.3 of which are in public ownership (within Home Creek Canyon). Approximately 2.5 miles were determined to be in PFC, with some juniper encroachment noted. Above this reach, 2.6 miles in public land and 6.9 miles in private ownership were assessed as FAR with an upward trend, primarily due to insufficient woody vegetation and need for improvement in channel morphology. Home Creek exceeds the current DEQ standard for temperature (68 ºF).

Indian Creek 6th Field HUC

The PFC assessments were conducted on 17 miles of Indian, Big Indian and Little Indian Creeks in 1999, all of which were determined to be in PFC. This entire subwatershed is within the No Livestock Grazing Area of Steens Mountain Wilderness. Big Indian Creek meets the current DEQ temperature standard. Data

collected by DEQ indicate Indian Creek exceeded the temperature standard 1 of 2 years. Data collected over a 9-year period at the mouth of Indian Creek by BLM indicate the standard for temperature was exceeded 6 of 9 years. Temperatures in Little Indian Creek were well below the current DEQ standard.

Kiger Creek 6th Field HUC

Approximately 6.8 miles of Kiger Creek were assessed for PFC in 1998, all of which were determined to be in PFC. The uppermost reach is near the headwaters of Kiger Creek within the No Livestock Grazing Area perimeter of Steens Mountain Wilderness, and was determined to be near potential (for stream morphology and vegetation). Functionality of the lower two reaches has potential to be degraded by juniper encroachment, which may have already begun to reduce health and vigor of aspen in the riparian area and curtailed cottonwood recruitment. Temperature data collected in 2005 indicate the DEQ standard was achieved.

East Ridge Prescribed Burns and Juniper Cutting Project was implemented in the Kiger Creek drainage in 2001. Fire was allowed to burn through riparian areas. In some project units, juniper growing within riparian areas was cut and burned when conditions were conducive to lower intensity burns less likely to have long-term negative effects. During a field visit on March 16, 2005, several young cottonwood trees, willow, and alder were seen throughout the treatment areas. Some juniper trees were felled into the stream to provide cover and increased habitat complexity for fish.

Krumbo Creek 6th Field HUC

The PFC assessments were conducted on 4.5 miles of Krumbo Creek in 1999. The lowest 2.1 miles include low-gradient wet meadow habitat, and was determined to be in PFC. Above this reach, the channel is much steeper and dominated by boulders, and livestock access is limited by rimrock and channel obstructions. The three upstream reaches were determined to range from PFC to FAR with a downward trend. The channel has become incised in some segments, likely due to concentrated livestock use and high flow events, and is relatively intact in other segments. Riparian vegetation in these steeper areas would normally be composed mostly or entirely of woody species. Juniper expansion has reduced vigor and recruitment, and has suppressed the capability of woody species to reestablish in scoured and incised areas. Despite localized upstream degradation to riparian condition, BLM data (1997) indicate the DEQ temperature standard was attained at the mouth of Krumbo Creek.

Little Blitzen River 6th Field HUC

Little Blitzen River is entirely within the No Livestock Grazing Area perimeter of Steens Mountain Wilderness. The PFC assessments were conducted in 1999, and the entire 14 miles were determined to be in PFC. Water temperatures in this system do not meet the (68 °F) DEQ standard.

McCoy Creek 6th Field HUC

The PFC assessments were conducted on 10.8 miles of the main stem of McCoy Creek in 1999 to 2000. Approximately 3.1 miles were determined to be in PFC, 0.16 mile was FAR with an upward trend, 5.6 miles were FAR with no apparent trend, and 1.7 miles were FAR with a downward trend. The PFC and FAR were determined throughout the stream system. Reasons for the FAR determinations included localized high width/depth ratios, sagebrush expansion, little recruitment of woody species (especially cottonwood), and excessive erosion and deposition. At least one flood event was noted to have occurred recently, before the assessments, which contributed to erosion and deposition described in the assessments. Assessment reaches that were FAR with a downward trend or no apparent trend were assessed again in 2006. The reach previously in a downward trend was determined to have progressed to an upward trend, and reaches with no apparent trend were determined to have achieved PFC. Cottonwood and willow recruitment had obviously increased, though another recent flood event had retarded vegetative recovery to some extent in local areas.

Approximately 6 miles of (mostly unnamed) minor tributaries to McCoy Creek were also assessed during this time. Four miles were determined to be in PFC, 0.8-mile was FAR with no apparent trend, and 0.9-mile was FAR with a downward trend. All assessments for downward trend were due to headcuts and hummocks resulting from (growing) season-long grazing around headwater springs and snowmelt areas.

McCoy Creek exceeds the (68 °F) DEQ standard for temperature.

Approximately 3.1 miles of Dingle Creek were assessed in 1998. Dingle Creek flows through private and BLM-managed lands. Two miles were determined to be in PFC. Approximately 0.8-mile was determined to be FAR with no apparent trend, and approximately 0.3-mile (the uppermost reach, an intermittent channel) was determined to be FAR with a downward trend. The downward trend was considered to be due to raw banks, low density of riparian species, and lack of a flood plain resulting from livestock grazing. The amount and season of livestock use changed after the first assessment was completed, and a new PFC assessment conducted in 2006 determined the reach had achieved an upward trend. The ID team reached consensus livestock grazing was no longer impeding recovery. There are no temperature data for Dingle Creek.

Mud Creek1 6th Field HUC (Upper Donner und Blitzen)
This subwatershed includes Mud Creek and South Fork Donner und Blitzen River between Little Blitzen River and Mud Creek. Mud Creek drainage is entirely within the No Livestock Grazing Area perimeter of Steens Mountain Wilderness. Approximately 5.1 miles of Mud Creek were assessed for PFC in 1998. The ID team determined 3.4 miles were in PFC, and 1.7 miles were FAR with an upward trend. The team noted potential for juniper expansion into the riparian areas, though recent prescribed and wildfire had alleviated the potential to some extent. Mud Creek exceeds the DEQ standard for water temperature.

Approximately 9 miles of South Fork Donner und Blitzen River were assessed in 1998, all miles were determined to be in PFC.

Mud Creek2 6th Field HUC (Lower Donner und Blitzen)
This subwatershed is located downstream of Page Springs Campground. Approximately 6.3 miles of Big Fir, Little Fir, and Mud Creeks were assessed for PFC in 1998 and 1999. All of Mud and Little Fire Creeks were assessed as being in PFC. Big Fir Creek (1.7 miles) was determined to be FAR with an upward trend, primarily due to bank instability, inadequate herbaceous vegetation, and excess sediment deposition. The stream was reassessed in 2006, and had attained PFC. There are no temperature data for Big Fir or Little Fir Creeks. Water temperature in Mud Creek exceeds the (68 °F) DEQ standard for temperature.

Threemile Creek 6th Field HUC
Threemile Creek flows through private lands before crossing Steens Mountain Wilderness. Approximately 3.7 miles were assessed for PFC in 1998. A PFC determination was reached for 2.8 miles upstream of where the stream exits Catlow Rim. At that time, the ID team could not reach consensus on the potential natural condition downstream from Catlow Rim (0.85-mile to Highway 205), and therefore could not reach consensus on a determination. This reach was revisited in 2003 with an expanded team, and a determination of PFC was agreed upon. Based on data from 1997 through 2004, this stream meets the DEQ temperature standard of a 7-day maximum average temperature of 68 °F.

Wildhorse Creek 6th Field HUC
Little Wildhorse and Wildhorse Creeks are included within the boundaries of the Project Area. Most of the drainage is included in the No Livestock Grazing Area. Over 7 miles of stream in two reaches were assessed for PFC; both reaches were determined to be in PFC, but do not meet the water quality standard for temperature.

Table 3.7 - PFC Assessment for Streams within the Project Area. Data Collected During 1998 – 2006

PFC Determination	Miles	Percent
PFC[1]	110.8	74
FAR[2]/Upward	28.4	19
FAR[2]/Downward	1.8	2
FAR[2]/Not apparent	6.2	5
NF[3]	1.2	<1
Totals	139.3	100

[1]Properly functioning condition [2]Functioning at risk [3]Nonfunctioning

Table 3.8 - Streams within the Project Area on DEQ's 303(d) list

Stream Name	Pollutant
Ankle Creek	**Temperature (old Standard 64 ºF – does not exceed new standard of 68 ºF)**
Bridge Creek	**Iron, Manganese, Beryllium and Temperature (old Standard 64 ºF – does not exceed new standard of 68 ºF)**
Deep Creek	**Temperature**
Donner und Blitzen	**Temperature**
Donner und Blitzen (South Fork)	**Temperature**
Fish Creek	**Temperature**
Home Creek	**Temperature**
Indian Creek	**Temperature**
Little Blitzen River	**Beryllium, Temperature**
Little Wildhorse Creek	**Temperature**
McCoy Creek	**Temperature**
Mud Creek (Upstream of Indian Creek)	**Temperature**
Mud Creek (Downstream of Page Springs)	**Temperature**
Wildhorse Creek	**Temperature**

3.2.2 Biological Soil Crust and Vegetative Resources

Current discussion and analysis of potential effects on biological soil crust and vegetative resources are tiered to the AMU/CMPA PRMP/Final EIS (August 2004), and relevant information contained in the following sections is incorporated into this EIS by reference: Sections 3.4, 3.5, 4.4, and 4.5.

3.2.2.1 Biological Soil Crusts

Identification of biological soil crusts at the species level is often not practical for fieldwork. Use of some basic morphological groups simplifies the situation. Morphological groups are useful as they are representative of the ecological function of organisms (Page 6, Technical Reference [TR] -1730-2).

Using a classification scheme proposed in 1994, microbiota such as biological soil crusts can be divided into three groups based on their physical location in relation to the soil: hypermorphic (aboveground), perimorphic (at ground) and cryptomorphic (below ground). Preliminary field observations in 2004 indicate the Project Area contains primarily perimorphic and secondarily hypermorphic biological soil crusts. Hypermorphic biological soil crusts may have better representation in the Project Area as compared to lower elevations in Burns District.

The morphological groups are:

1. Cyanobacteria - Perimorphic/cryptomorphic.
2. Algae - Perimorphic/cryptomorphic.
3. Micro-fungi - Cryptomorphic/perimorphic.
4. Short moss (under 10mm) - Hypermorphic.
5. Tall moss (over 10mm) - Hypermorphic.
6. Liverwort - Hypermorphic

7. Crustose lichen - Perimorphic.
8. Gelatinous lichen - Perimorphic.
9. Squamulose lichen – Perimorphic.
10. Foliose lichen - Perimorphic.
11. Fruticose lichen - Perimorphic.

Morphological groups 1, 4, 5, 7, 8, and 9 would likely be the dominant groups represented in the Project Area. Groups 10 and 11 may also be represented in the Project Area as site-specific conditions required for their growth may exist in sufficient quantity.

Biological soil crust data specific to the northern Great Basin has been lacking in the past. Research conducted by Ponzetti and McCune in 2001 provides insight concerning biological soil crust communities in the Andrews RA. New monitoring studies are currently in their first year of baseline data collection. Information from these studies could be utilized to inform future management actions.

Factors influencing distribution of biological soil crusts (TR-1730-2) include, but are not limited to the following:

Elevation - Biological soil crust cover is usually greatest at inland elevations under 3,100 feet. Lichen and moss components generally increase with elevation until vascular plant cover dominates the site. The Project Area is generally in the range of 4,500 to 6,500 feet in elevation. Soil crust cover is not expected to be high due to elevation, but may have higher potential where slope and soil chemistry promote biological soil crust community formation.

Soils and Topography - Shallow soils support greater total biological soil crust cover than deep, more productive soils. As coarse soil texture increases, total biological soil crust cover decreases. In more unstable soil types representation of morphological groups such as short and tall moss may be exclusively under vascular plant cover (TR-1730-2).

Percent rock cover influences total biological soil crust cover as well; embedded rocks provide armor for microbiota contained within soil interspaces. Preliminary field observations in 2002 and 2003 indicate some of the most developed biological soil crust communities in the RA occur in these highly rocky unproductive systems. North and east slopes generally favor crust development due to moisture and temperature requirements for optimal physiological activity. Calcareous and gypsiferous soils can support higher species richness. The soil chemistry gradient has been shown to be the "…strongest explanatory factor for the compositional difference among research sites."(Page 223. Ponzetti and McCune 2001).

Calcareous and gypsiferous soils occur in the Project Area and site-specific soil chemistry varies throughout. Potential for biological soil crusts is site-specific.

Disturbance - Intensity of disturbance and the time since disturbance can influence the community composition and total cover of biological soil crust communities. Type of disturbance is a fundamental consideration as well; compressional stress from vehicles, wild horses, livestock, and human footprints can modify biological soil crust communities. As stated by Ponzetti and McCune on Page 223 of their 2001 publication, "...the compositional effects of grazing were overwhelmed by the stronger soil chemistry and climate gradients. However, grazing-related differences were clearly discernable with statistical methods that accounted for the blocked design of the study." Biological soil crusts may serve as an early warning system as they appear to be more sensitive to livestock-related effects than vascular plants.

Grazing as well as other disturbances such as wild horses, recreationists, short return interval fires, and juniper expansion have occurred in the Project Area. Their specific contribution to current biological soil crust condition and cover is not discernable from other historic disturbance. The paper cited in the prior paragraph is likely the most relevant.

Timing of precipitation - Moisture regimes can play a large role in crust community composition. Presence or absence of fog in a desert system can influence the abundance of mosses and other microbiota under shrubs due to collection of moisture by the shrub. Fog seems to play some role in the Project Area, the

extent to which is not known, but field observations correlate with the expected occurrence of well-developed crust communities under shrubs receiving some increase in moisture interception.

Juniper expansion has increased the interception of moisture and light over large portions of the Project Area. Biological soil crust communities still may occur in the understory under these conditions. As stated before, site-specific soil chemistry is the strongest factor in determining presence or absence of biological soil crusts.

Biological soil crusts play a role in a functioning ecosystem. On Page 29 of TR-1730-2 it states in "... a given ecoregion, ecological roles of biological soil crusts can vary widely in their importance and will depend on crust composition and biomass, as well as characteristics of the specific ecosystem being considered."

Carbon fixation, nitrogen fixation, and increased soil oxygen content (during active photosynthesis) are beneficial contributions to the ecosystem resulting from biological soil crusts. The effect of crust communities on soil water relations is highly site dependent (TR-1730-2). Soil surface microtopography and aggregate stability are important contributions from biological soil crusts as they increase the residence time of moisture and reduce erosional processes. Influence of biological soil crusts on infiltration rates and hydraulic conductivity varies greatly; generally speaking infiltration rates increase in pinnacled crusts and decrease in flat crust microtopographies. The northern Great Basin has rolling biological soil crust microtopography and infiltration rates are probably intermediate compared to flat or pinnacled crust systems.

Information specific to the Andrews RA is currently being gathered via new monitoring efforts. The BMPs would be developed and implemented as determined necessary by the Field Manager.

Common biological soil crusts found in the Project Area are *Bryum, Cladonia, Collema, Didymodon, Lecanora, Megaspora, Peltigera, Psora,* and *Tortula.* This is not an all inclusive list of potential genera.

For a continued discussion of biological soil crusts, see the Andrews/Steens PRMP/FEIS.

3.2.2.2 Forestry/Woodlands

Western juniper is the dominant woodland type across the Project Area and occurs in an elevation band between 4,500 and 7,000 feet. Below 4,500 feet, available soil moisture limits juniper growth to wet areas and stream courses. Within this woodland band on Steens Mountain, western juniper has expanded into more productive mountain big sagebrush, quaking aspen, riparian hardwoods, and low sagebrush plant communities. Miller and Rose (1995) studied western juniper population structure across Steens Mountain and found over 90.0% of the current juniper trees established after 1870.

The remaining 10.0% is comprised of older trees inhabiting rocky ridgetops or shallow soil areas where fires rarely burned. Tree age may reach 700-800 years in these stands. Growth form of old trees is often characterized by a generally asymmetrical, rounded, spreading canopy. These canopies may be quite sparse with large areas of dead branches. The trunk is often irregularly shaped with a severe taper. The trunk is deeply furrowed and covered by fibrous bark. The lower portions of the tree may contain several heavy branches and bright yellow/green, arboreal, fruticose lichen (Waichler et al. 2001). Woodlands with these characteristics occupy less than 1.0% of the Project Area. However, these communities are often embedded within other plant communities and in close proximity to younger woodlands.

Associated understory plant species in younger woodlands are the same as species found in mountain big sagebrush, quaking aspen, and riparian plant communities. Understory of old-growth woodlands is sparse with large amounts of bare ground and rock. Understory plant composition of old-growth communities is the same as low sagebrush plant communities.

Plant response to disturbance in younger western juniper woodlands has been documented by Bates and others (2002). Understory herbaceous and shrubby vegetation responds rapidly to cutting of the tree overstory. In general, plant community response to disturbance in old-growth stands is the same as in

younger stands; however, plant community response in the former is slower than in the latter because of shallow soils, rocky soils typically found on old-growth sites.

3.2.2.3 Noxious Weeds

(See Andrews/Steens RMP Map S-5, Noxious Weed Infestation, on the enclosed CD.)

The Burns District Office operates under weed protocols set forth in the following documents: Vegetation Treatment on BLM Lands in Thirteen Western States FEIS and ROD (USDI 1991), Supplement to the Northwest Area Noxious Weed Control Program FEIS and ROD (USDI 1987), and Burns District Noxious Weed Management Program EA #OR-020-98-05 (USDI 1998).

Burns District GIS database currently identifies 235 sites of noxious weeds totaling 462 acres in the proposed North Steens Project Area. Please see the following table (Table 3.9). The weed database has not been updated since 2003; however, no significant weed sites have been discovered since that time in the Project Area. The majority of weed sites occurs along roads and reservoirs and has been actively treated on a regular basis. Treatments utilized include chemical, mechanical, and biological control methods.

3.2.2.4 Vegetation

(See Andrews/Steens RMP Map S-4, General Vegetation, on the enclosed CD.)

The North Steens Project Area contains 12 general vegetation types as listed in the Burns District GIS database. Vegetation types are characterized by dominant plant species. Table 3.10 lists vegetation types and acreage within the Project Area.

Big Sagebrush Shrublands

Big sagebrush shrublands (including areas where juniper has encroached big sagebrush) are the most common plant community in the Project Area. These areas are often a mosaic of different shrubby and herbaceous plant species with a dominant or co-dominant big sagebrush overstory. Wyoming big sagebrush, mountain big sagebrush, and basin big sagebrush are three subspecies of big sagebrush commonly found in the Project Area.

Table 3.9 - Noxious Weed Site Information (Burns District GIS Database)

Noxious Weed Species	Number of Sites	Number of Acres
Bull Thistle	63	27.94
Canada Thistle	69	98.41
Dalmatian Toadflax	5	0.09
Diffuse Knapweed	12	1.95
Field Bindweed	1	0.08
Mediterranean Sage	4	156.51
Medusahead Rye	3	1.32
Perennial Pepperweed	5	0.25
Russian Knapweed	4	0.02
Scotch Thistle	34	168.57
Spotted Knapweed	12	5.26
St. Johns Wort	2	0.01
Tansy Ragwort	2	0.01
Whitetop	16	1.97
Yellow Starthistle	2	0.001
Yellow Toadflax	1	0.001
Total	**235**	**462.39**

Table 3.10 - Vegetation Types found in the Project Area, Data from Ecological Site Inventories conducted in the mid-1980s (Burns District GIS Database)

General Vegetation	Acres	% Of Total*
Big Sagebrush Shrublands	51,993	16.1%
Mountain Big Sagebrush/ Grassland	40,685	12.6%
Mountain Shrub/Grassland	4,878	1.5%
Low Sagebrush/Grassland	102,905	31.9%
Native Perennial Grassland	4,944	1.5%
Juniper/Big Sagebrush	43,391	13.4%
Juniper/Low Sagebrush	47,421	14.7%
Quaking Aspen	19,397	6.0%
Big Sagebrush/Annual Grassland	3,353	1.0%
Crested Wheatgrass	1,219	0.4%
Annual Grassland	1,115	0.3%
Rabbitbrush/Grassland	231	0.1%
Silver Sagebrush/Grassland	291	0.1%
Total	**321,823**	

*Percentages were rounded to the nearest tenth.

Wyoming big sagebrush occupies shallower soils than basin big sagebrush, and soils may have elevated calcium content. Green rabbitbrush, gray rabbitbrush, and gray horsebrush are other shrubs commonly found in association with Wyoming big sagebrush, and Thurber's needlegrass, bluebunch wheatgrass, and Idaho fescue are common grasses found in the understory. Other grasses include Sandberg's bluegrass, junegrass, Indian ricegrass, and western wheatgrass, while numerous forbs can be found. Several species of Lupine, milkvetch, Delphinium, hawksbeard, biscuitroot, and false dandelion occur across the Project Area. Introduced plants have invaded this plant community to a greater degree than other communities. Cheatgrass is the most commonly listed invader, but there are also many other annual and perennial plants actively spreading through this plant community. Response to disturbance is often slow, but is often positive if there is an adequate mixture of natives present prior to disturbance. Most plants in this community exhibit some adaptation to fire; large taproot, protected growing points, or early growth form. Fire played a role in the plant community's development, but at a much longer interval than the more productive basin and mountain big sagebrush plant communities.

Basin big sagebrush occupies deeper soil areas than Wyoming big sagebrush and has many of the same plant species. Basins wildrye is a notable exception. Seed stalks from this grass may achieve heights greater than 6 feet. Basin big sagebrush plant community occupies areas between 4,200 and 5,500 feet in the Project Area. At lower elevations, greasewood increases and mixes with sagebrush plants. Bare ground also increases as elevation decreases. The line between Wyoming big sagebrush and mountain big sagebrush plant communities is much harder to distinguish. There are some suggestions Wyoming big sagebrush and mountain big sagebrush hybridize to some degree in the ecotone between the two plant communities (Winward 1980). Mountain big sagebrush responds to disturbance more successfully and is much less susceptible to invasion by noxious weeds.

This big sagebrush plant community occupies areas between 4,200 and 5,500 feet in the Project Area. At lower elevations, greasewood increases and mixes with sagebrush plants. Bare ground also increases as elevation decreases. The line between Wyoming big sagebrush and mountain big sagebrush plant communities is much harder to distinguish. There are some suggestions Wyoming big sagebrush and mountain big sagebrush hybridize to some degree in the ecotone between the two plant communities (Winward 1980). Mountain big sagebrush responds to disturbance more successfully and is much less susceptible to invasion by noxious weeds.

Mountain big sagebrush plant community occupies areas between 4,500 and 8,000 feet on Steens Mountain. Productivity of these sites is greater than lower elevation Wyoming big sagebrush and low sagebrush plant communities. Mountain big sagebrush plant community occurs on a variety of soils, but most are deep, well-drained. Numerous woody and herbaceous species occur in this community. Associated shrubs include antelope bitterbrush, wax current, green rabbitbrush, gray rabbitbrush, and snowberry. Large, deep-rooted perennial grasses found include bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, western needlegrass, and Thurber's needlegrass. Mountain big sagebrush communities contain a very diverse forb component. Common genera include hawksbeard, false dandelion, Lupine, milkvetch, Phlox, Penstemon, buckwheat, and biscuitroot. There are also a number of native annual forbs common to mountain big sagebrush communities. Microsteris, willowherb and Microseris species are the most common and are important forage for sage-grouse, especially early in the life of chicks. Encroachment of western juniper has primarily occurred in this plant community on the Steens Mountain.

Response of native, perennial plants is usually strong following disturbance. A brief phase dominated by annual plants may occur, but annuals are quickly replaced by perennial plants. Return of shrub cover is also quicker than in drier big sagebrush or low sagebrush plant communities.

Low Sagebrush

Low sagebrush plant community is found intermixed with Wyoming, basin, and mountain big sagebrush plant communities. Low sagebrush is low-growing (< 24 inches tall) sagebrush found on shallow soils or soils with a restrictive layer within 18 inches of the soil surface. Bedrock or a heavy clay layer may restrict rooting on these sites. Many of these sites are flooded or experience very high soil moisture conditions in the spring. Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass, Nevada bluegrass, and Sandberg's bluegrass are common perennial grasses. Cheatgrass can be found, but is usually restricted to disturbed areas, such as rodent mounds or road shoulders. A larger percentage of forbs on these areas are mat-forming. Genera include numerous species from Buckwheat and Phlox. Low sagebrush plant community also contains a strong population of biscuitroot species. These plants were an important food plant to early inhabitants of the area. The fleshy taproot or corm provided American Indians with a source of starch and protein. Areas where rooting is restricted by bedrock have a large percentage of rocks on the soil surface. Response to disturbance is slow for shrubs, but rapid for forbs and grasses. Areas where rooting is restricted by a clay layer may respond quicker than areas where bedrock limits root growth.

Juniper occupancy of these low-productivity sites occurs in two main ways. Old-growth juniper is often associated with these sites in the Project Area. There is a high likelihood of rocky outcroppings in many low sagebrush sites. These outcropping provide the type of protection from fire allowing western juniper to establish and grow with little threat of burning. Actual acreage of old-growth, western juniper within the Project Area is unknown. Miller and Rose (1995) estimated over 95% of the current western juniper woodlands established after 1870. Younger juniper has less of an impact in low sagebrush sites as a function of site-specific, low productivity. The short growing season and relatively low productivity of these sites limits influence of western juniper on associated vegetation.

Mountain Shrub

Mountain shrub plant community occurs primarily on north slopes above 7,000 feet and below alpine plant communities on Steens Mountain. This plant community covers 1.50% of the Project Area and is a minor component. However, it provides diversity to the total landscape. Mountain big sagebrush is a major component in most communities, but is usually only co-dominant at best to other shrub species for example antelope bitterbrush, snowberry, wax current, ocean spray, chokecherry, bitter cherry, and buckbrush. Understory vegetation is the same as the mountain big sagebrush plant community. Response to disturbance is also the same as the mountain big sagebrush plant community. Most woody vegetation, with the exception of mountain big sagebrush, sprouts following removal of aboveground portions of the plant.

Quaking Aspen

Quaking aspen is a conspicuous plant community across higher elevations of Steens Mountain. This tree species is often found on north slopes or areas where snow accumulates and persists into the spring. Quaking aspen is found on 6.0% of the Project Area but are very important to the diversity of the area. Maser and others (1984) identified 84 wildlife species that utilize quaking aspen stands for breeding and 117 species that utilize these areas for forage. Productivity of these plant communities is greater than adjacent

sagebrush plant communities. Vegetation occurs in multilayered mixtures of shrubs, forbs, and grasses. Over 300 plant species have been identified growing in quaking aspen stands across the Great Basin. Common grass and grass-like genera found include wheatgrass, bromes, wildrye, bluegrass, and sedges. Forbs include meadowrue, sweet cicely, geranium, aster, peavine, yarrow, and bedstraw. Numerous shrub species may be found in the understory and are the same as those found in the mountain shrub plant community.

Western juniper has encroached into quaking aspen stands between 5,000 and 6,500 feet elevation across Steens Mountain. Expansion has occurred during the same timeframe as in other plant communities. However, the number of juniper and aerial cover of juniper are much higher than adjacent plant communities because of high site productivity. Some stands have become totally dominated by juniper and understory vegetation has been reduced to one or two species per acre. Wall (1999) found three-quarters of quaking aspen stands below 6,500 feet were being encroached by juniper. This is coupled with a regional decline in all quaking aspen stands (Bartos and Campbell 1998). Many factors have attributed to the decline, but fire exclusion, large herbivore browsing, and climate shifts have been major factors identified (Wall 1999).

Bartos and Campbell (1998) point out fire historically played an important part in the ecology of quaking aspen stands. Reduction in fine fuels from domestic livestock, wild horses, mule deer, and Rocky Mountain elk coupled with fire suppression has essentially removed fire from these communities. Fires burned in these stands approximately once every 60 years. This would be adequate to keep quaking aspen clones vigorous. However, currently stands are dominated by old trees in various stages of fungal infections and canopy senescence.

Riparian Areas

Riparian areas are water-dependent ecosystems bordering streams, springs, and lakes. Because of this community's dependence upon water, a detailed description can be found under Section 3.2.1.3 Wetlands/ Riparian Areas and Water Quality.

Old-Growth Western Juniper Woodlands

A small percentage of the total Project Area and Steens Mountain would be classified as old-growth western juniper woodlands. Miller and Rose (1995) determined less than 5% of all western juniper trees on Steens established prior to 1870. These stands would have been small acreages on ridgetops and shallow soil areas. Old-growth woodlands on Steens Mountain would have been historically small inclusions within low sagebrush and mountain big sagebrush plant communities.

Other Plant Communities

Less than 2.0% of the Project Area would be classified as occurring within modified plant communities. Crested wheatgrass plantings constitute 1,219 acres within the Project Area. Most of this area is at lower elevations. Seedings were planted primarily in the early to mid 1970s and have varying degrees of big sagebrush. Crested wheatgrass seedings are not targeted for juniper fuels reduction treatments.

Annual grasslands, rabbitbrush/annual grasslands and big sagebrush/annual grasslands constitute 4,700 acres within the Project Area. These areas are also concentrated at lower elevations and are not targeted for juniper fuels reduction treatments.

3.2.2.5 Special Status Species - Flora

(See Andrews/Steens RMP Map S-6, Special Status Species Plants, on the enclosed CD.)

Portions of the Project Area have been surveyed by BLM for presence or absence of Special Status plant species (shown in Table 3.11). A significant population (~10,000 individual plants) of playa Phacelia was discovered in the Project Area during 2004 surveys and was documented on an Oregon Natural Heritage Program (ONHP) site form. Playa Phacelia is an ONHP list 1 species, a Bureau Sensitive species and a Federal Species of Concern. The habitat for this species is naturally low in fuels and normally has little or no juniper or sagebrush component and would not be treated as part of the project design. Playa Phacelia had not previously been documented on Steens Mountain.

Table 3.11 - Known Special Status Plant Species in the Project Area (Burns District GIS Database)

Scientific Name	Common Name	Federal Status	BLM Status	ONHP List
Agastache cusickii	Cusick's hyssop	-	A	2
Botrychium crenulatum	crenulate grapefern	SOC	S	1
Botrychium lunaria	Moonwort	-	A	2
Botrychium minganense	gray moonwort	-	T	4
Botrychium pinnatum	pinnate grapefern	-	T	4
Castilleja pilosa v. steenensis	Steens mountain paintbrush	-	S	-
Castilleja viscidula	sticky paintbrush	-	T	3
Claytonia nevadensis	Sierra spring beauty	-	T	4
Cymopterus nivalis	snowline cymopterus	-	A	2
Eriogonum ochrocephalum	ochre-flowered buckwheat	-	T	4
Gentianella tenella s. tenella	slender gentian	-	A	2
Melica stricta	nodding melic	-	A	2
Penstemon davidsonii v. praeteritus	Davidson's penstemon	-	T	4
Phacelia inundata	Playa Phacelia	SOC	S	1
Potamogeton diversifolius	Rafinesque's pondweed	-	A	2
Saxifraga adscendens s. oregonensis	wedge-leaf saxifrage	-	A	2
Sedum debile	weak-stemmed stonecrop	-	T	4

Federal Status:
SOC – Species of Concern

BLM Status:
S = Sensitive – species that could easily become endangered or extinct in a State, are restricted in range and have natural or human-caused threats to survival.
A = Assessment – species not currently eligible for official Federal or State status, but are still of concern and need protection or mitigation.
T = Tracking – species that may become of concern in the future, but more information is needed to determine status for management purposes.

ONHP Status:
L1 – taxa threatened with extinction or presumed to be extinct throughout their range.
L2 – taxa threatened with extirpation or presumed to be extirpated from the State of Oregon.
L3 – taxa of conservation concern that need more information to determine status.
L4 – taxa which are of concern because they are rare and stable or common and declining.

Large portions of the Project Area have been surveyed for Special Status plant populations. Additional surveys would be conducted in the appropriate season prior to each phase of project implementation.

Known populations of Special Status plant species represent 17 species. Status definitions are located at the end of this section.

This list could change depending on what species botanical specialists locate during the remaining botanical surveys. The Andrews/Steens PRMP/FEIS contains an expanded list of Special Status plant species at 3-23 to 3-25; not all species from this expanded list are represented in the CMPA.

3.2.3 Fish, Wildlife, and Wild Horses and Burros Resources

Current discussion and analysis of potential effects on fish and wildlife resources are tiered to the AMU/CMPA PRMP/Final EIS (August 2004), and relevant information contained in the following sections is incorporated into this EIS by reference: Sections 3.6, 3.7, 3.14, 4.6, 4.7, and 4.14.

3.2.3.1 Fisheries

Fish have been documented in approximately 201 miles of streams within the Project Area, most native to Steens Mountain. Fish distribution and management status are summarized by species for the Project Area.

Bridgelip Sucker
Little is known about distribution of this sucker species. It has been documented only in Kiger and Bridge Creeks. Preferred habitat for bridgelip sucker is small, fast-flowing cold water streams with gravelly, rocky bottoms, although it may also inhabit rivers where current is moderate and substrate composed of sand and silt. There is no Special Status for this species.

Brook Trout
At one time, brook trout were stocked by ODFW into Fish Lake, and a self-sustaining population still persists. These trout have not expanded within the system, and are still found only in Fish Lake (probably a result of limited outflow). There is no Special Status for this species.

Lahontan Cutthroat Trout
Lahontan cutthroat trout is listed as threatened by the USFWS. A detailed description of this species can be found under Section 3.2.3.4 Special Status Species – Fauna.

Great Basin Redband Trout
The Great Basin redband trout is a BLM tracking species and considered sensitive by the USFWS. A detailed description of this species can be found under Section 3.2.3.4 Special Status Species – Fauna.

Longnose Dace
Longnose dace is widespread across the United States, and is distributed throughout a large portion of the Project Area. Data indicate the species has been documented in lower reaches of McCoy and Kiger Creeks, and throughout Donner und Blitzen River. There is no Special Status for this species.

Malheur Mottled Sculpin
Malheur mottled sculpin is a BLM sensitive species. A detailed description of this species can be found under Section 3.2.3.4 Special Status Species – Fauna.

Mountain Whitefish
Mountain whitefish is a native species documented in Kiger Creek, and in the Donner und Blitzen River system above Page Springs. It likely exists throughout the Donner und Blitzen River system. There is no Special Status for this species.

Redside Shiner
Redside shiner has been documented in South Fork Donner und Blitzen River and Bridge Creek, and likely occurs throughout the river system and in tributaries satisfying habitat requirements. Redside shiners can occupy a wide variety of habitats including lakes, streams, ponds, and irrigation ditches. There is no Special Status for this species.

3.2.3.2 Migratory Birds

Approximately 70 species of migratory birds are known to inhabit different parts of the Project Area. Some of these species such as Northern goshawk and Swainson's hawk are considered Special Status Species and are discussed in Section 3.2.3.4 Special Status Species – Fauna.

Neotropical migratory birds utilize all habitats in the Project Area; some are habitat specific while others use a variety of habitats. Grassland species include vesper sparrow and horned lark. These species usually are ground nesters in open areas. Sagebrush species include Brewer's sparrow, white-crowned sparrow, green-tailed towhee, sage thrasher, and sage sparrow. Most of these species nest in sagebrush canopy but may also nest at the base of a shrub. Woodland species include gray flycatcher, dusky flycatcher, dark-eyed junco, bushtit, Cassin's finch, pine siskin, western wood-peewee, and chipping sparrow. Species that may be found in two or more habitats include American robin, brown-headed cowbird, Lincoln's sparrow, lark sparrow, and western meadowlark. These species nest in many different habitats and nest sites are found from the ground to trees and willows. The current transition of sagebrush into juniper woodlands is favoring the woodland species and reducing habitat for sagebrush-dependent species, some generalist species, and some grassland species.

3.2.3.3 Wildlife

Wildlife other than migratory birds and Special Status Species include mule deer, elk, pronghorn antelope, badger, black-tailed jackrabbit, cottontails, magpies, ground squirrels, pocket gophers, deer mouse, cougar, bobcat, coyote, ducks, geese, swans, chukar, California quail, yellow-bellied marmot, wood rats, voles, reptiles, and amphibians. More information on big game species can be found in Chapter 3 of the Andrews/ Steens PRMP/FEIS.

Pronghorn can be found at all elevations of the Project Area at different times of the year. They prefer more open habitats such as grasslands, low sagebrush, and generally open rolling terrain but use other habitats such as big sagebrush occasionally.

Mule deer use the Project Area yearlong. Lower elevations below about 5,600 feet are considered winter range but this varies with snowpack each year. Deer are dependent on sagebrush for the main part of their winter diet. Sagebrush and juniper are also used for thermal cover during winter months to help reduce heat loss during cold winter nights. As snow melts, deer usually move to higher elevations. Fawning habitat was described by Sheehy in the 1970s as mountain big sagebrush areas near aspen stands. The majority of documented fawning occurred within 100 yards of these stands. Bitterbrush and mountain mahogany are important browse species for deer in the fall and early winter months.

Approximately 400 head of elk use the Project Area yearlong. Winter range is usually the lower elevations such as along the Donner und Blitzen River corridor and lower juniper areas to the north. Kiger Gorge, Riddle Creek, Coyote Creek, upper elevations of the Donner und Blitzen drainage, and other higher areas on private land make up elk summer range..

3.2.3.4 Special Status Species – Fauna

(See Andrews/Steens RMP Map S-7, Wildlife Habitat, on the enclosed CD.)

Special Status Species occurring within this Project Area include bald eagle, Columbia spotted frog, greater sage-grouse, Northern goshawk, Swainson's hawk, Preble's shrew, wolverine, California bighorn sheep, several species of bats, long-billed curlew, western burrowing owl, and sage sparrow. Sage sparrows are discussed above in the Migratory Bird Section. Other Special Status Species listed on Pages 3-26 to 3-28 of the Andrews/Steens PRMP/FEIS do not occur in this Project Area or would not be affected by the project.

Bald eagles (Federally listed, Threatened, winter resident only) winter in the Project Area, but there are no known roost sites. There is a potential for one in the Donner und Blitzen River drainage upstream from Page Springs Campground. Bald eagles have been documented flying out of Donner und Blitzen River Canyon for years, but winter roosts have never been documented. During March 2005, bald eagles were observed on two of four survey visits.

Columbia spotted frogs (Federal Candidate for listing as Threatened or Endangered) are known to inhabit several stream systems within the Project Area. They have been documented on public lands in the upper part of McCoy Creek from the private land upstream (south), Fish Lake, Little Fish and Grove Creeks, Page Springs Campground, and the lower part of Mud Creek near Malheur NWR boundary. Habitat for Columbia spotted frogs in the Project Area includes slow moving or still water around springs, ponds behind beaver dams or other ponds, and shallower vegetated areas in lakes. Faster flowing water courses such as McCoy Creek may be used as travel corridors between breeding and wintering habitat. Spotted frogs bury themselves in soft mud substrates during late summer through winter months and emerge in late winter-early spring for breeding. Some research suggests after breeding, frogs disperse to habitats near their wintering areas, dig into soft substrate and remain there until next breeding season.

There are 14 known greater sage-grouse leks within the boundary of the North Steens Project Area (see Andrews/Steens RMP Map S-7, Wildlife Habitat, on the enclosed CD). Sage-grouse leks usually occur in low sagebrush sites or areas with very little vegetation but with escape cover such as low or big sagebrush nearby. Of these leks, three are known to be inactive. One is considered historic (has not been active since disturbance occurred many years ago); one has not been active since a wildfire burned the area in the

mid 1980s; and sage-grouse have not been seen for about 15 years at the third lek site, possibly due to the proximity to South Loop Road.

The entire Project Area has been identified as yearlong sage-grouse habitat except for steep slopes such as the gorges and the east face of Steens Mountain. Nesting habitat extends from lower elevations up to about 7,000 feet on the west side of the mountain. Brood rearing, which occurs from May through October, takes place at all elevations, with most sage-grouse being found above 6,500 feet, until late fall to early winter snows move them into lower country. Movement to higher elevations is due most likely to drying up of vegetation in lower elevations and availability of greener vegetation and water at higher elevations. Some hens and broods stay at lower elevations if food and water are available such as in areas with springs and areas along East Canal of Malheur NWR. While nesting may occur anywhere suitable nest sites are found, research from other areas has documented most (>50%) hens nest within 4 miles of a lek (Hanf et al. 1994) . Nest site selection seems to be independent of the lek at which the hen was radio collared but may be based more on vegetation characteristics. Research conducted on sage-grouse at Steens Mountain from 1997-2000 (Crawford, et al.) shows hens nested an average of 7 miles from the lek where they were captured (range = 0.60 to 17.60 miles), although no analysis was conducted to determine distance to the nearest lek location. Most research has also shown about two-thirds of hens nest in big sagebrush while one-third nest in low sagebrush or other mixed sagebrush communities. In comparison, of the 29 nests located during the Steens Mountain study, 13 were in mountain big sagebrush vegetation type, 12 were in a low sagebrush/big sagebrush mix, and 4 were in Wyoming big sagebrush. Hens also show affinity to nest sites. While they may not return to the exact nest site each year, they return within a few meters of the nest site used previously. If a nest site is destroyed because of fire, research has shown hens returning to that site may move many miles to suitable habitat to nest.

Currently, juniper expansion is affecting sage-grouse nesting habitat as well as migratory routes between lower elevation nesting to early brood-rearing habitats and upper elevation late brood-rearing habitats. Nesting habitat has been reduced because of juniper expansion into both big and low sagebrush vegetation types. This has probably reduced overall productivity of sage-grouse. This expansion of juniper into nesting habitat has also affected productivity of nesting hens by providing more perches for predators such as raptors and ravens. Ravens are effective nest predators and use perch trees to spot and raid nests. Juniper expansion may also be affecting some lek sites by providing raptor perches close to strutting males which could disrupt breeding occurrence and also reduce numbers of sage-grouse through predation.

Wolverines are known to exist on Steens Mountain. One individual was trapped in the 1970s and wolverines have been observed several times in the 1990s and in 2000. Their habitat is mostly unknown as they have not been studied on Steens Mountain, but likely includes talus slopes and canyons on the east side of the mountain as well as some upper elevation flat areas adjacent to the canyons. A critical component of their habitat seems to be absence of human activity or development.

Northern goshawks are known to utilize Steens Mountain, but documented occurrences are few. Reynolds, et al. (1982) describe a goshawk nest in an aspen stand at 5,700 feet on the mountain's west slope. They are usually a forest species but use dense, large groves of aspen with considerable canopy closure. Many lower elevation aspen stands have been invaded by junipers, and the amount of nest sites has probably been reduced in the last half century. Some stands, such as along Big Fir Creek, have had junipers cut in the last 15 to 20 years but density of mature aspen may not be high enough for nesting goshawks. Any aspen stands in an area to be treated would need to be surveyed at least one year prior to treatment for presence of nest sites.

Swainson's hawks may be found in the Project Area but documentation of nest trees or sightings have not been obtained. These raptors use juniper woodlands and are known to nest in small trees such as junipers, willow, and possibly in sagebrush. They have been in decline for many years. Some factors affecting Swainson's hawk numbers are caused by offsite issues, but some decline is possibly due to change of shrublands to juniper woodlands. They may forage and nest near open grasslands and wet meadows which would include areas near seedings and Malheur NWR. Sighting location data would be collected and analyzed to determine if and where hawks occur in relation to proposed cuts and burns.

Bighorn sheep habitat occurs mostly on the periphery of the Project Area and includes steep slopes on the East Rim of Steens Mountain and along Catlow Rim. Most habitat is not differentiated into seasonal use, but animals move up and down in elevation along these rims depending on weather conditions.

Long-billed curlews are mainly a grassland species nesting in many of the crested wheatgrass seedings and native grassland or meadow vegetation types in the area. They also use flooded native hay meadow areas for feeding. They are quite common in the crested wheatgrass seedings near the Project Area.

Preble's shrew has been found on Steens Mountain in a variety of habitats and is found mainly near streams, wet meadows, and aspen habitats but also in sagebrush-bunchgrass vegetation types near these wet areas. Verts and Carraway (1998) suggest the rarity of specimens of this species may be an artifact of sampling effort.

Eight species of Special Status Species bats are known to inhabit areas in and around the Project Area. These include the long-eared myotis, long-legged myotis, pallid bat, silver-haired bat, spotted bat, Townsend's big-eared bat, western small-footed myotis, and Yuma myotis. These bats use a variety of habitats for roosting and foraging. Roosting habitats include crevices in rock cliffs and rimrock, abandoned mines, abandoned structures, and trees with loose bark such as older cottonwood and old-growth juniper. Foraging habitats include open grasslands, shrub-steppe, and in and around trees. Most species fly some distance from their day roosts to forage for bugs and drink water then roost for a couple of hours around midnight. They return to foraging then return to their day roosts. We have very little site-specific information on bats and their foraging or roosting areas within the Project Area.

Western burrowing owls are found in grassland and shrub-steppe habitats. Burrowing owls in Oregon tend to use burrows for nesting which were previously excavated by badgers. Badgers are a major predator of burrowing owl eggs and young. No burrowing owls have been observed in the Project Area recently, but nest sites do exist in some of the nearby crested wheatgrass seedings.

Lahontan cutthroat trout is listed by the USFWS as threatened. The species was introduced to streams on Steens Mountain and could be considered reintroductions back into historic range. They are not representative of the original Alvord Basin strain of the species (USFWS 1995). An introduced hatchery-bred population of Lahontan cutthroat trout exists in Wildhorse Lake and Wildhorse Creek. The population is self-sustaining and streams are no longer stocked. The genetics of the trout have not been determined and may not be pure-strain Lahontan cutthroat trout.

Great Basin redband trout is a BLM Tracking Species, and is considered sensitive by the USFWS. The species represents a unique natural history, reflecting the Pleistocene connection between lake basins of eastern Oregon and Snake and Columbia Rivers. Redband trout are able to survive warmer water than most other salmonids and thus are better adapted to a desert environment. It is widespread throughout the Donner und Blitzen drainage, and there are also populations in the Catlow Valley. Populations in all basins, including Donner und Blitzen, are viable and self-sustaining (USFWS 2000).

The species was assessed in a 2005 report by ODFW that describes the current conservation status of native fishes in Oregon based on interim criteria defined in Oregon's Native Fish Conservation Policy [OAR 635-007-0507]. The policy calls for fish to be managed at the Species Management Unit, or SMU, level. The SMUs are groups of populations from a common geographic area that share similar life history, genetic, and ecological characteristics. The Project Area is part of the Malheur Lakes SMU, and includes distinct unconnected populations in Riddle Creek, McCoy Creek and the Donner und Blitzen River and tributaries, including Mud and Bridge Creeks.

Six pass/fail risk criteria were used to evaluate each population (existence/extinction, distribution, abundance, productivity, independence, and hybridization). Donner und Blitzen River and tributaries passed all six criteria. Riddle and McCoy Creeks passed all but productivity, and this score was based on uncertain intrinsic potential productivity; these populations are inferred to fail the criterion until productivity can be adequately assessed. Large migratory fish are only captured regularly from the Donner und Blitzen population where they have periodic access to Malheur Lake and regular connection to the lower river (USFWS, Malheur National Wildlife Refuge, unpublished data). Since the SMU meets five of

the six interim criteria, it has been classified by ODFW as "potentially at risk". The ODFW is currently developing a conservation plan for this SMU.

The Steens Act designated Donner und Blitzen River as a redband trout reserve upstream of the confluence with Fish Creek. The purpose of the reserve is to conserve, protect, and enhance the Donner und Blitzen River population of redband trout and the unique ecosystem of plants, fish, and wildlife of a river ecosystem; and to provide opportunities for scientific research, environmental education, and fish and wildlife-oriented recreation and access (Steens Act 2000).

Malheur mottled sculpin is a BLM Sensitive Species. Distribution data indicate Malheur mottled sculpin is widespread throughout the Donner und Blitzen watershed, including populations in McCoy, Kiger, and Riddle Creeks. The preferred habitat of mottled sculpin is clear, cool mountain streams of rapid to moderate current (Sigler and Sigler 1987).

3.2.3.5 Wild Horses and Burros

(See Andrews/Steens RMP Map 7, Herd Areas and Herd Management Areas, on the enclosed CD.)

There is one Herd Management Area (HMAs) within the Project Area. The South Steens HMA is 127,838 acres and is located in the southwest part of the Project Area.

The HMA is managed according to a Herd Management Plan identifying population of horses to be managed and objectives for managing herds including physical characteristics. The horse population is controlled by periodic gathers and adoptions conducted by the BLM.

3.2.4 Cultural, Visual and Special Management Area Resources

Current discussion and analysis of potential effects on cultural heritage, visual resources, and special management area resources are tiered to the AMU/CMPA PRMP/Final EIS (August 2004), and relevant information contained in the following sections is incorporated into this EIS by reference: Sections 3.9, 3.11, 3.22, 3.23, 3.24, 4.9, 4.11, 4.22, 4.23, and 4.24.

3.2.4.1 Cultural Heritage

(See Andrews/Steens RMP Map S-8, Completed Cultural Resource Inventory, on the enclosed CD.)

Section 3.1.2 of the Andrews/Steens PRMP/FEIS (Page 3-2) defines a rich and extensive human history within the Project Area and its surrounds. This history details human occupation beginning at least 11,500 years ago and encompassing the cultures of American Indian Tribes, European and American fur traders, Euro-American pioneers and settlers, and Basque sheepherders. Remnants of these peoples' historic occupations exist as archaeological sites located throughout the Project Area.

Section 3.9 of the Andrews/Steens PRMP/FEIS (Page 3-36) states both the legal and regulatory compliance issues surrounding the protection of cultural resources properties. These compliance issues are further emphasized within the Steens Act [Section 111(a)(1)] whereby, within Steens Mountain Wilderness, the BLM would act in a manner that:

> "…ensures the conservation, protection, and improved management of ecological, social and economic environment of the Cooperative Management, and Protection Area, including…North American Indian tribal and cultural and archaeological resource sites, and additional cultural and historic sites…."

Evaluation of the Project Area affected environment is problematic based on the current database of located and documented archaeological sites. Of the acres within the Project Area only approximately 7.0% has been assessed for the location of archaeological remains.

Despite this lack of information, realistic generalizations can be made based upon known data, oral and written histories and extrapolations from data gathered in areas immediately adjacent to the Project Area. One hundred-sixty (160) cultural resource sites have been located within the planned Project Area. Of these sites, approximately 90.0% are pre-contact era, 10.0% are post-contact era, and fewer than 3.0% contain both pre- and post-contact era elements. Dates of use attributed to the pre-contact sites ranges from 8,000 ybp to modern times, the post-contact sites from 1880 to present. Many of the sites within the Project Area have not been evaluated for eligibility to the National Register of Historic Places. The sites would require evaluation for eligibility before management priorities and actions can be determined.

Combining this data with environmental features of known site locations, a probability sample for location of nondocumented sites can be extrapolated. These indicative features include soils types conducive to economic root and berry crops, gently sloping and rolling terrain, and year-round water sources. Based on these environmental features and known pre-contact and post-contact use of the area, approximately 60.0 to 80.0% of the planned project acreage is considered "high probability" for the occurrence of cultural resource properties.

Riddle Brothers Ranch Historic District
Riddle Brothers Ranch Historic District is eligible for the National Register of Historic Places under all four evaluation criteria (see Riddle Brothers Ranch Historic District Cultural RMP). The site contains both historic and American Indian archaeological site components.

Historic wooden structures and features are extremely susceptible to damage from fire, either planned or unplanned. Planned activities such as mechanical treatments, fencing, reseeding, and prescribed fire could create a potential for adverse affect to site constituents.

The District Archaeologist or designee would assess treatment modification in or around Riddle Brothers Ranch Historic District during the treatment planning phase and be present as advisor during any treatment.

3.2.4.2 Visual Resources

(See Andrews/Steens RMP Map 3, Visual Resource Management Classes, on the enclosed CD.)

Bridge Creek, Blitzen River, South Fork Donner und Blitzen, Home Creek, High Steens, and Lower Stonehouse WSAs, Steens Mountain Wilderness, and the Donner und Blitzen Wild River corridor are VRM Class I areas. The VRM Class I objective is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change created by human actions to the characteristic landscape should be very low and must not attract attention.

The VRM Class II areas are generally located north of Steens Loop Road and in the western portion of South Steens Project Unit. The VRM Class II objective is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Existing seedings, Steens Loop Road corridor through the WJMA, and several small areas along the west central Project Area boundary are VRM Class III areas. The VRM Class III areas are also found in the western portions of South Steens Project Unit. The VRM Class III objective is to partially retain the existing character of the landscape. Level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the landscape.

There are no VRM Class IV areas in the Project Area.

The VRM Classes for each Project Unit are shown in the following table:

Table 3.12 - VRM Class by Project Unit

UNIT	VRM CLASS			
	I	II	III	IV
Ankle Creek	X			
Bird Reservoir #3		X		
Bridge Creek #3	X	X		
Brown	X	X		
Chimney #3		X		
Cold Spring	X			
Cucamonga Creek	X	X		
Dingle	X			
Doe Camp		X		
Drake	X	X		
Elliot Field #9		X		
Fish Creek	X			
Gorges	X			
Hardie		X		
Home Creek	X			
Horton		X		
Kiger Creek	X			
Krumbo Mountain #2	X	X		
Krumbo Ridge #1	X	X		
Kundert	X			
Lower Field #1	X	X	X	
McCoy Creek #1 East		X		
McCoy Creek #1 West		X		
Moon Hill #6		X		
North Mud Creek	X	X		
Oliver Springs #4		X		
P. Hill	X	X		
Ranch	X	X		
Road #2	X			
Ruby Spring #4		X		
Sagehen		X	X	
Scharff	X	X		
Solomon	X			
South Mud Creek	X			
South Steens	X	X	X	
Upper Field #2	X		X	
West Lower River #6	X			
West Slope		X		
West Upper River #5	X			
Wildhorse	X			

3.2.4.3 Wild and Scenic Rivers

(See Steens Mountain Wilderness and WSRs Plan Map W3, Wild and Scenic Rivers Management Plan, on the enclosed CD.)

Outstandingly Remarkable Values (ORV):

Donner und Blitzen WSR was designated as "Wild" in 1984. Segments of the WSR include Fish Creek, Little Blitzen River, Big Indian Creek, Little Indian Creek, South Fork Donner und Blitzen, and Donner und Blitzen. The ORVs associated with this WSR are scenic, geologic, recreational, fisheries habitat, wildlife, vegetation, cultural, and historic.

In 2000, Congress added Mud Creek, Ankle Creek, and South Fork Ankle Creek to Donner und Blitzen WSR through the Steens Act. Kiger Creek WSR and Wildhorse Creek WSR, including Little Wildhorse Creek, were also designated as "Wild" rivers. The ORVs for these systems include scenic, recreational, wildlife, botanical, and fish. The ORVs for all three WSR systems in the Project Area are described in detail in Steens Mountain Wilderness and WSRs Management Plan under "Outstandingly Remarkable Values."

The majority (25,465 acres) of WSR corridor acres is within Steens Mountain Wilderness; however, 1,182 acres are outside wilderness including the Riddle Brothers Ranch Historic District. Of these 1,182 acres, 322 acres are outside Riddle Brothers Ranch and wilderness. See Table 3.13 below. Acreages outside Steens Mountain Wilderness and Riddle Brothers Ranch are located within the CMPA, Page Springs Campground or WSAs.

3.2.4.4 Wilderness

(See Steens Mountain Wilderness and WSRs Plan Map W2, Wilderness Management Plan, on the enclosed CD.)

The following project units are completely or partially within Steens Mountain Wilderness or WSR corridors:

Table 3.13

Project Unit	Acres in Unit	BLM Administered Acres	Steens Mountain Wilderness Acres	WSR Acres in Wilderness	WSR Acres Outside of Wilderness
Ankle Creek	16,329	14,339	14,336	2,543	0
Cold Spring	29,770	29,031	28,835	4,363	93
Dry Creek	5,712	5,712	5,712	0	0
Fish Creek	6,782	6,768	6,741	0	0
Gorges	10,456	10,456	10,353	8,156	12
Home Creek	9,274	8,881	8,881	0	0
Huffman	8,022	6,064	11	54	40
Kiger Creek	5,037	5,036	5,021	1,420	0
Ranch	1,171	1,171	0	0	860
Road #2	3,434	3,434	2,007	0	0
Scharff	9,111	2,875	0	0	138
South Mud Creek	15,048	14,842	14,756	7,965	39
3 Mile	7,739	5,092	5,092	0	0
Wildhorse	2,420	2,420	2,420	1,003	0
Total	**130,305**	**116,121**	**104,165**	**25,465**	**1,182**

Total acres in the Project Area in Steens Mountain Wilderness and WSRs are 105,347.

Wilderness Values:

Naturalness - Naturalness refers to an area which "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" as stated in BLM Manual 8560 - Management of Designated Wilderness. Steens Mountain Wilderness is generally considered to be in a natural condition except for areas containing certain human-made elements. These features are generally not noticeable except when viewed from higher terrain or the immediate vicinity.

Portions of the 170,155-acre Steens Mountain Wilderness affected by the proposed project are generally in a natural condition. Of the proposed Project Area 105,184 acres lie within nine project units in wilderness. The affected portion of wilderness lies within Frazier Field (Fish Creek and Road #2 Project Units) and South Steens (Home Creek Project Unit) livestock grazing allotments and the designated No Livestock Grazing Area. The area involved includes certain unnatural features scattered throughout. These features include, but are not limited to, fences, troughs, reservoirs, and other facilities associated with livestock grazing. A number of older buildings and structures also exist which may be of some historic significance.

Native vegetation within the wilderness area has been affected by juniper expansion due principally to past fire exclusion. Juniper woodlands totaling 45,000 acres presently exist within Steens Mountain Wilderness. Approximately 10% of those woodlands include large-dimension, old-growth junipers scattered throughout the area with the remaining 90% having increased in area of occupancy since 1870.

Numerous juniper treatments, consisting of cuts and prescribed fires, exist within Steens Mountain Wilderness. These vegetative treatments occurred in the area from the mid-1990s through 2001. Proposed project units within wilderness which were affected include: 1) Cold Spring Project Unit with three large juniper cuts dating from the mid-1990s; 2) South Mud Creek Project Unit with prescribed fires in 1997 and juniper cuts in 1999; 3) Ankle Creek Project Unit with prescribed fires in 1999 and 2001 (an unanticipated fire effect from a burn initiated in Skull Creek drainage); and 4) Home Creek Project Unit with prescribed fires in 1997 and 2001 (an unanticipated fire effect from a burn initiated in the V Lake area).

Solitude - Outstanding opportunities for solitude are enhanced by the varied and rugged topography. Vegetative screening in some areas, especially the creek and canyon bottoms, supplements the topographic screening. In wilderness there is an expectation encounters with other users would be infrequent. Refer to the Steens Mountain Wilderness and WSRs Plan.

Primitive and Unconfined Recreation - Primitive and unconfined recreation is defined in 43 CFR 6301.5 as nonmotorized types of outdoor recreation activities that do not require developed facilities or mechanical transport.

There are outstanding opportunities throughout Steens Mountain Wilderness for primitive and unconfined recreation including hiking, backpacking, camping, horseback riding, hunting, fishing, photography, and sightseeing.

Numerous nonmotorized recreation trails exist within the wilderness. Some of the well known trails include High Desert National Recreation Trail, Wildhorse Lake, Steens Summit, Nye, Little Blitzen, Big Indian, Mud/Ankle Creek, and Blitzen River Trails. Other historically-used trails exist. Hikers and equestrians are not restricted to trails, but may travel cross-country as well.

Supplemental Values - Supplemental values are listed in the Wilderness Act as "ecological, geological, or other features of scientific, educational, scenic, or historical value." Supplemental values of wilderness are geology, scenery, vegetation, and wildlife. Historical values, including the remains of old homesteads, can be found throughout the wilderness.

The Debate about Wilderness Fire Management:

"I must confess that it seems to me academic to talk about maintaining the balance of nature. The balance of nature in any strict sense has been upset long ago, and there is no such thing to maintain. The only option we have is to create a new balance objectively determined upon for each area in accordance with the intended use of that area." (Leopold 1927)

Given the fact that no wilderness area is or could be utterly "pure," administrators are presented with challenges concerning possible active steps to restore what some perceive to be more "natural" ecosystem function. My own view is that east or west, great hesitation is needed in decisions to actively manipulate a wilderness environment in the name of restoring what we might perceive as more natural ecosystem function. A fundamental underpinning of wilderness philosophy and the Wilderness Act is that in these areas we meet nature on its terms, with humility – including the humble awareness that ecological "certainties" we perceive today may prove wrong with greater knowledge in the future. As Howard Zahniser put it, in wilderness we should be "guardians, not gardeners." (Scott 2005)

For many years it has been widely determined and accepted wildland fire use in fire-adapted ecosystems is not only beneficial, but necessary for healthy, functioning natural systems. The debate now focuses on use and application of fire in designated wilderness areas. The debate centers, not on the issue of the benefits of fire, but how to allow fire to come back into areas where fire suppression efforts of the 20th century have altered the natural cycle of fire and associated habitats.

Should fire in wilderness only be allowed through natural (lightning-caused) ignitions to bring the system back to stability? Or should fire be brought back by management-ignited (agency personnel) prescribed fire in areas where natural systems are seriously out-of-balance due to decades of fire suppression? The question also remains as to whether or not some type of physical manipulation, such as creating ladder fuels, would be needed in areas where unnatural fuel systems have also been created.

The 1964 Wilderness Act gives no clear or concise direction on this issue and the subject is open to interpretation. BLM policy allows for use of both natural and management-ignited fires. The BLM Manual 8560 allows for use of prescribed fire for the following purposes: 1.) It is needed to maintain the natural condition of a fire-dependent ecosystem or to reintroduce fire where past strict wildfire control measures have interfered with natural ecological processes; 2) A primary value of a given wilderness would be sustained as a result of the burning; and 3) It would promote the perpetuation of a threatened or endangered species.

David Parson, Peter Landres and Carol Miller of the Aldo Leopold Wilderness Research Institute deal directly with this issue in their 2003 paper, *The Dilemma of Managing and Restoring Natural Fire and Fuels in United States Wilderness.* Under the paper's section entitled "The Dilemma of Natural Fire in Wilderness" they have spoken to heart of this ongoing debate:

"The management and restoration of natural fire and fuels in wilderness pose a dilemma – a situation requiring a choice between equally undesirable alternatives. The dilemma stems from the need, in some situations, to choose between two different core values of wilderness – wildness and naturalness – where this choice of one value will likely lead to the reduction or loss of the other value. This choice between wildness and naturalness … parallels the well-documented debate about whether forest and fire restoration in national parks should be guided by process- or structure-driven philosophies …. The outcomes will differ depending on the choices made."

"Whether or not, values and philosophical views ultimately drive the choices made in managing or restoring natural fire and fuels in wilderness. The 1964 Wilderness Act protects both ecological and social values in wilderness. Ecological values include the natural conditions native to an area – the mixture of young and old forests, animals, plants, soil microbes and fungi – as well as ecological processes such as fire, disease, wind storms, and landslides; and the evolutionary processes. In short, "naturalness" is a core value of wilderness representing conditions that are relatively unaffected by modern people …. Social values include the aesthetic, recreational, spiritual, and therapeutic benefits of solitude in undeveloped natural areas. One of

the most important and enduring social values of wilderness is its being "untrammeled" and unmanipulated by people and their desires – its 'wildness.'"

"Although wilderness is managed for the twin values of naturalness and wildness, in some cases managing for one may compromise the other …. When the Wilderness Act was written, these core values were undoubtedly meant to reinforce on another. Recent recognition of the large-scale effects of acid deposition, exotic species, and fire suppression has lead to a call for restoring native ecological conditions in wilderness…. In some cases restoration plans include intensive actions, such as the mechanical reduction of fuels accumulated over the decades of fire suppression …. This manipulation, even for the purpose of restoring native ecological conditions, is viewed by some as a control of wilderness that abrogates the untrammeled and wild legislative intent of the Wilderness Act (Nickas 1998). The decision of whether wilderness ecosystems should be manipulated toward naturalness or left wild may be one of the major wilderness management dilemmas of the 21st century…."

"How we weigh the values of naturalness and wildness strongly impacts how we manage fire and fuels in wilderness. For example, if we choose to emphasize the maintenance or restoration of naturalness we would likely favor active management of fire and fuels through prescribed burning and mechanical fuel reduction to maintain species compositions, spatial and temporal patterns of fuels and forest structure and ecological processes native to the area. Although the sheer magnitude of the effort to overcome the effects of fire suppression makes it difficult to attain the goal of natural conditions in many areas, naturalness, to the extent it can be satisfactorily quantified, can provide a useful target for management."

"If we choose favor wildness as the primary wilderness value we would strive to allow all natural ignitions to burn without human intervention, control, or manipulation; prescribed fire and other manipulative tools to create desirable conditions would not be used. The goal of wildness is rarely attained in today's world because risks to non-wilderness values, such as the threat of fire crossing into non-wilderness lands, result in the suppression of many, if not most, natural fires. Although wildness remains an important social value and management goal in wilderness, managing for wildness may compromise naturalness by allowing un-naturally large and intense fires to burn following decades of fuel accumulation from active fire suppression. The goal of wilderness management should be to optimize both naturalness and wildness. This two-fold goal may be most easily accomplished in those areas where fire suppression has had minimal effect. For example, at higher elevations, natural ignitions may often be allowed to burn because the current fire return interval and fuel conditions are within the historic range of variability. Examples of where such programs have experienced some success include the Selway-Bitterroot Wilderness in Montana, and Yosemite and Sequoia-Kings Canyon wildernesses in California…."

"In other places, where fire return intervals and fuels are clearly well beyond the historic range of historic variability, we must often confront the dilemma of whether to manage primarily for naturalness or wildness. In these situations there are several challenges to crafting an effective FMP that explicitly acknowledges and optimizes both the naturalness and wildness values of wilderness."

In Natural Resources 3495, an internet-based wilderness management class offered by the University of Montana, under the "Prescribed Fire in Wilderness" segment, author Laurie Yung also addresses the issue of trammeling with regards to prescribed fire use in wilderness as follows:

"While restoration of naturalness or natural conditions is often the stated goal of manager-ignited fires, the Wilderness Act also requires that wilderness be untrammeled. According to Worf [President and Founder of Wilderness Watch] untrammeled means that 'you don't control it, you don't net it. You let nature's processes go wherever you can.' There is clear agreement that past fire suppression represents trammeling of the wilderness. According to Arno [Research Forester, Intermountain Fire Sciences Lab, Missoula, MT] a mixed-severity fire region is 'absolutely incredible for biodiversity,' and taking it away is trammeling, 'a much greater trammeling than most other things you can do in wilderness.' Morton [Wilderness Coordinator, Northern Region, U.S. Forest Service] also agrees that suppression of fire has been a form of trammeling."

"Nickas [George, Executive Director, Wilderness Watch] and Morton agree that manager-ignited fire also constitutes a trammeling. Morton claims that they are trammeling to restore naturalness. Eckert [District Ranger, Spotted Bear Ranger District, Flathead National Forest] calls this the 'double trammel' and considers

it the crux of the issue. Do we trammel wilderness again to reduce the effects of previous trammeling? For Morton 'natural and untrammeled are 180 degrees apart,' meaning they are in conflict with one another regarding the issue of fire. Another trammel is required, in Morton's view, to make wilderness natural again."

A final word on the issue of prescribed fire use in wilderness from Carol Eckert, "the issue is more philosophical than scientific because we are dealing with a wilderness area. No amount of data is going to change how people feel about wilderness and whether they think that more aggressive management is right." (Yung, L.)

It is also important to consider this debate within the context of specific provisions provided by the Steens Act. The Steens Act requires Steens Mountain Wilderness be managed in accordance with the Wilderness Act and WSAs be managed under Section 603(c) of FLPMA. However, it should be recognized the Steens Act specifically identified conserving, protecting and managing the long-term ecological integrity of Steens Mountain as the purpose of the Steen Mountain CMPA. Section 113(c) of the Steens Act also emphasized the restoration of the historic fire regime in the CMPA and the resulting native vegetation communities through active management of western juniper on a landscape level, including management measures such as natural and prescribed burning. Steens Mountain Wilderness and WSAs make up 59% (290,305 acres) of the BLM-administered lands in the CMPA and contain some of its most ecologically diverse and unique areas.

3.2.4.5 Wilderness Study Areas

(See Andrews/Steens RMP Map S-18, Special Areas, on the enclosed CD.)

All or portions of Bridge Creek, Blitzen River, South Fork Donner und Blitzen River, Home Creek, High Steens, and Lower Stonehouse WSAs totaling 79,607 acres are within the Project Area. The following table details the WSA acreages for those project units with WSAs:

Table 3.14 - Wilderness Study Area Acres within Project Units (Burns District GIS Database)

	Wilderness Study Area					
Unit	Bridge Creek	Blitzen River	S. Fork D&B*	Home Creek	High Steens	Lower Stonehouse
Bridge Creek #3	23					
Braden		4,118				
Brown					1,113	
Burnt Car		6,660				
Cold Spring		33				
Cucamonga Creek					614	
Dingle					2,342	
Dipping Vat		5,768				
Drake					107	139
Huffman			5,388	1,165		
Kiger Creek					10	
Krumbo Mountain #2	1,980					
Krumbo Ridge #1	1,271					
Kundert		2,870				
Long Dam			8,578			
Lower Field #1	2,857					
North Mud Creek	1,117					
P. Hill		2,986				
Road #2	1,352					
Scharff					1,565	
Solomon		3,325				
Tabor Cabin			4,596			
3 Springs			9,402			
Upper Field #2	4,152					
West Lower River #6		1,996				
West Upper River #5		3,019				
WSA Total	12,752	30,772	27,964	1,165	5,751	139

*D&B = Donner und Blitzen

Wilderness characteristics include naturalness, outstanding opportunities for solitude or primitive and unconfined recreation, and the presence of special features.

Wilderness characteristics of Bridge Creek WSA (14,325 acres) are summarized from the Oregon BLM Wilderness Study Report, Volume I (1991).

Naturalness: Bridge Creek WSA is in a relatively natural condition. The topography creates magnificent areas of naturalness. The steep canyons, rolling hills, and vegetative screening enhance the sense of naturalness. The WSA provides habitats for wildlife species, including mule deer, pronghorn antelope, elk, a variety of raptors and songbirds, and small mammals. Riparian habitat along 12.80 miles of Mud and Bridge Creeks varies in condition from good to fair to poor. The WSA contains 32 unnatural features: 21 reservoirs, 4 fences totaling 6.00 miles, 6 ways totaling 7.00 miles, and one crested wheatgrass seeding of about 1,200 acres. The reservoirs are scattered, generally small, located in drainages, or are surrounded by vegetation. The visual influence of the ways is slight because they are located in sagebrush-covered, relatively flat areas or are screened by juniper trees. Most of these fences are screened by junipers and are not a visual influence on any portion of the WSA. The Steens Mountain Loop Road is the primary outside influence on the WSA. The road receives heavy motor vehicle use during the summer and its size and level of improvement make it visible from a large portion of the WSA.

Solitude: Opportunities for solitude in Bridge Creek WSA are outstanding. Topographic and vegetative screening, as well as the size of the study area, provides areas where visitors can find a secluded spot. Bridge Creek and Mud Creek canyons and their tributaries provide topographic screening both within the canyons and from the remainder of the WSA. Moderate to dense juniper stands in the eastern half of the WSA enhance solitude. Riparian vegetation along the major drainages further enhances solitude. The western portion of the WSA, with only occasional junipers, offers little screening.

Primitive and Unconfined Recreation: Bridge Creek WSA provides outstanding opportunities for primitive recreation, including day hiking, camping, backpacking, horseback riding, hunting, and fishing. Opportunities for day hiking, fishing, backpacking, camping, and horseback riding are mainly associated with Bridge and Mud Creeks. Opportunities for big game and upland game bird hunting are good where there is adequate habitat and cover. Fishing opportunities are good in the creeks.

Special Features: Special features of Bridge Creek WSA include wildlife, cultural resources, and scenic features. The WSA contains crucial mule deer winter range, high-quality raptor nesting habitat, redband trout (a native fish with limited range), and a greater sage-grouse strutting ground. Greater sage-grouse is a BLM Special Status Species. Scenery is good because of the deep, winding, and narrow canyons, a variety of colors (reds, brown, tans, and greens), rugged rock outcroppings, and clear streams in the canyon bottoms accented by green riparian vegetation. Significant cultural resources have been also found in the WSA.

Blitzen River WSA was reduced to 31,902 acres from 55,880 acres with designation of Steens Mountain Wilderness. Wilderness characteristics of Blitzen River WSA are summarized from the Oregon BLM Wilderness Study Report, Volume I (1991).

Naturalness: Blitzen River WSA is in a relatively natural condition. The WSA contains a variety of wildlife habitats with a diversity of animals. There are currently 48 unnatural features: 16 reservoirs, 1 developed spring, 14 fences totaling 24.50 miles, and 17 ways totaling 27.00 miles. (The number of unnatural features has been adjusted to reflect new structures in the WSA and changes resulting from designation of wilderness.) Many of the developments and ways are visible from the higher elevations around them. Fences are generally screened by topography or vegetation. Outside influences include several small reservoirs along the west boundary, Page Springs Campground, and a power line along the northwest boundary.

Solitude: Blitzen River WSA has outstanding opportunities for solitude. The area contains a substantial amount of topographic and vegetative screening. There are small portions of the WSA,

mostly near the western border, where finding seclusion would be difficult because of the area's lack of topographic or vegetative screening.

Primitive and Unconfined Recreation: Blitzen River WSA provides outstanding opportunities for primitive recreation including day hiking, backpacking, camping, horseback riding, hunting, wildlife viewing, sightseeing, and photography. Game species include mule deer, pronghorn antelope, elk, and chukar.

Special Features: Special features of Blitzen River WSA are scenic quality and wildlife. The topography of the WSA offers spectacular scenery of ridges covered by juniper and sagebrush, intermixed with outcroppings of dark basalt rock. Special wildlife features include a greater sage-grouse strutting ground and mule deer winter range. Greater sage-grouse is a BLM Special Status Species.

South Fork Donner und Blitzen River WSA was reduced to 27,969 acres from 37,555 acres with designation of Steens Mountain Wilderness. Wilderness characteristics of South Fork Donner und Blitzen River WSA are summarized from Volume I of the Oregon BLM Wilderness Study Report (1991).

Naturalness: South Fork Donner und Blitzen River WSA is in a relatively natural condition. Juniper and low sagebrush are the dominant vegetation. The WSA provides habitat for a variety of big game, upland game birds, and other wildlife species. The WSA contains 33 unnatural features: 17 reservoirs, 11 ways totaling 28.00 miles, 4 fences totaling approximately 9.00 miles, and an old abandoned habitation. (The number of unnatural features has been adjusted to reflect new structures in the WSA and changes resulting from the designation of wilderness.)

Solitude: Opportunities for solitude in South Fork Donner und Blitzen River WSA are outstanding. The WSA's size, numerous shallow drainages, deeper river tributaries, and juniper trees enhance the opportunities for a visitor to find seclusion.

Primitive and Unconfined Recreation: South Fork Donner und Blitzen River WSA has outstanding opportunities for primitive recreation. Day hiking, backpacking, camping, and horseback riding opportunities are available. Water and camping spots are available throughout the WSA. Game species in the WSA include mule deer, pronghorn antelope, elk, and upland game birds.

Special Features: A greater sage-grouse strutting area is located in South Fork Donner und Blitzen River WSA. Greater sage-grouse is a BLM Special Status Species.

Home Creek WSA was reduced to 1,165 acres from 26,590 acres with designation of Steens Mountain Wilderness. Wilderness characteristics of Home Creek WSA are summarized from Volume I of the Oregon BLM Wilderness Study Report (1991).

Naturalness: Home Creek WSA is in a natural condition. The WSA has good populations of pronghorn antelope and provides habitat for a variety of nongame species. There are five reservoirs and one,
1.00-mile long segment of creek in the 1,165-acre WSA.

Solitude: Opportunities for solitude in Home Creek WSA are outstanding and are enhanced by vegetative screening and remoteness.

Primitive and Unconfined Recreation: Home Creek WSA offers outstanding opportunities for hunting, wildlife viewing, camping, and horseback riding. Game species include mule deer, pronghorn antelope, and chukar.

Special Features: The identified special features of wildlife, geology, and scenery for Home Creek WSA are now in Steens Mountain Wilderness.

High Steens WSA was reduced to 13,965 acres from 69,740 acres with designation of Steens Mountain Wilderness. Segments of the WSA are located north of Steens Loop Road and along the lower east face of Steens Mountain. Wilderness characteristics of High Steens WSA are summarized from Volume I of the Oregon BLM Wilderness Study Report (1991).

Naturalness: High Steens WSA appears to be in outstanding natural condition. This WSA contains a variety of physical features which are the result of volcanism, faulting, and erosional processes. High Steens WSA has as good variety of wildlife habitat and diverse fauna. Talus slopes, ponds, and trees and high elevation fescue grasslands are special wildlife habitats. The WSA contains summer and crucial mule deer habitat, summer and yearlong pronghorn antelope range, and elk summer habitat. Riparian areas support beaver, a variety of songbirds, reptiles, and amphibians. The WSA supports habitat for upland game birds, summering raptors, and small mammals. None of the unnatural features are very noticeable. There are 3 ways totaling 5.3 miles, 8 fences totaling 6.9 miles, 2 fire rehabilitation seedings totaling 177 acres, and several locations of mining activity which include three cabins. (The number of unnatural features has been adjusted to reflect new features in the WSA and changes resulting from designation of wilderness.) Rough topography reduces the influence of these developments on the area's naturalness. Outside sights and sounds are not imposing and emanate from the boundary roads and the light traffic on them.

Solitude: High Steens WSA offers outstanding opportunities for solitude, which are enhanced by the varied and rugged topography. The extreme difference in elevations is the major screening factor. The drainages provide excellent opportunities for isolation. The eastern portions are completely screened from the northern segments. Vegetative screening also provides opportunities for solitude. Aspens, willows, and other riparian species in the drainages provide screening. However, the WSA as a whole does not contain enough vegetation to significantly enhance opportunities for solitude.

Primitive and Unconfined Recreation: Opportunities for primitive and unconfined recreation in High Steens WSA are outstanding and include day hiking, backpacking, camping, horseback riding, hunting, fishing, sightseeing, and photography. Game species which can be hunted in the WSA include mule deer, pronghorn antelope, bighorn sheep, elk, and upland game birds.

Fishing opportunities are outstanding, especially in McCoy Creek and its tributaries. Sightseeing and photographic opportunities abound with vistas of Beaty Butte and Hart Mountain to the west, Pueblo Mountains to the south, and Alvord Basin, Sheepshead Mountains, and Trout Creek Mountains to the east. Rugged and sheer rock escarpments create fascinating views.

Special Features: The special features of High Steens WSA contribute substantially to wilderness values. Geology, vegetation, wildlife, and scenic qualities are special features. The geology of Steens Mountain is the dominant special feature. Steens Mountain is a fault-block mountain dipping gently westward and reaches a maximum elevation of 9,700 feet, with a 5,500 fault scarp on the east. Scenic quality is a special feature of the WSA. Most of High Steens WSA contains outstanding scenery. Five plant species of special interest are known to occur in High Steens WSA. Bighorn sheep, greater sage-grouse, Whitehorse cutthroat trout, redband trout, pika, and northern water shrew contribute to making wildlife a special feature. Additionally, Steens Mountain is an important raptor foraging area.

Wilderness characteristics of Lower Stonehouse WSA (7,449 acres) are summarized from Volume I of the Oregon BLM Wilderness Study Report (1991).

Naturalness: Lower Stonehouse WSA is in a relatively natural condition. The eastern escarpment and the high plateau on the western side of the WSA provide an area with a high degree of naturalness. This east-facing escarpment is highly scenic and combines a variety of landforms, color, and vegetation. Habitat for a variety of big game, upland game birds, and other wildlife species occurs in the WSA. The WSA contains 7 unnatural features: 3 reservoirs, a fence 1.25 miles long, 2 ways totaling 1.75 miles and an old 780-acre crested wheatgrass seeding.

Solitude: Opportunities for solitude in Lower Stonehouse WSA are outstanding. Both topography and vegetation provide screening, but the area would support only a limited number of users. Areas with

the greatest potential for solitude are in drainages of the east-facing escarpment and a few places on the ridgetop where shallow drainages and small hills provide some screening. Other portions of the WSA provide insufficient topographic screening to enhance solitude. Juniper stands and a few aspen groves offer some vegetative screening and enhance solitude.

Primitive and Unconfined Recreation: Lower Stonehouse WSA has outstanding opportunities for primitive recreation, but they are limited by size and topography of the WSA. Hunting, day hiking, backpacking, camping, and sightseeing opportunities are available. Day hiking, backpacking, and camping are limited. Game species in the WSA include mule deer, antelope, elk, and chukar. The east rim of Steens Mountain provides spectacular views of the surrounding area including Alvord Basin and Sheepshead Mountains. The most attractive WSA feature is the impressive east-facing escarpment.

Special Features: Scenic quality and botanical and wildlife values add to Lower Stonehouse WSA's wilderness values. The east-facing escarpment is highly scenic and combines a variety of landforms, colors, and vegetation. Biddle's lupine, a BLM Special Status Species, occurs at the lower elevations. Greater sage-grouse are found at the upper elevations. Crucial mule deer winter range is found on lower east-side slopes.

3.2.4.6 Parcels with Wilderness Characteristics

As part of the Steens Mountain CMPA ROD/RMP (August 2005), two parcels within the Project Area were identified as having wilderness characteristics. The Bridge Creek parcel is approximately 1,526 acres and is located adjacent to the eastern boundary of Bridge Creek WSA. A wildfire in the summer of 2006, burned the entire Bridge Creek parcel, so some juniper and vegetation mortality occurred. The High Steens parcel is approximately 629 acres and is located to the north of the North Steens Loop Road and adjacent to the western boundary of the High Steens WSA. The primary recreational activities for both parcels include day hiking, camping, backpacking, horseback riding, hunting, fishing, sightseeing and photography.

Parcels with documented wilderness characteristics will be managed to protect those characteristics but are not provided additional special management status. Parcels will be managed according to the RMP direction for surrounding non-WSA lands. The protections afforded by the CMPA (e.g. the mineral withdrawal, prohibition on cross-country motorized/mechanized vehicle use, ROW avoidance/exclusion areas, and VRM classifications) are considered to provide sufficient protection to meet the goal/objective. No special monitoring will be conducted for parcels with wilderness characteristics. No restrictions to chainsaws or other uses are required.

3.2.5 Fire and Livestock Management, Recreation, Transportation/ Roads, and Social and Economic Values

Current discussion and analysis of potential effects on cultural heritage, visual resources, and special management area resources are tiered to the AMU/CMPA PRMP/Final EIS (August 2004), and relevant information contained in the following sections is incorporated into this EIS by reference: Sections 3.12, 3.15, 3.16, 3.20, 4.12, 4.15, 4.16 and 4.20.

3.2.5.1 Fire Management

Fire Regime Condition Class (FRCC)
The FRCC is a classification process by which land management agencies evaluate the current role vs. past role of fire. The process determines degree of departure, or how much of a change has occurred. 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. Five historical fire regimes have been identified (Table 3.15) based on average number of years between fire events (fire frequency) and fire severity (Hann and Bunnell 2001; Schmidt et al. 2002).

Table 3.15 - General Fire Regime Classification and Description

Fire Regime	Frequency (years)	Description
I	0-35	Frequent, low to mixed severity fires. Less than 75.0% of the dominant overstory vegetation replaced by burning. Surface fires are common.
II*	0-35	Frequent, high severity fires. Greater than 75.0% of the dominant overstory replaced by burning. Stand replacing fires common.
III*	35-100+	Fire return is frequent to long term and has mixed severity. Less than 75.0% of the dominant overstory is replaced by burning.
IV*	35-100+	Fire return is frequent to long term and has mixed severity. Less than 75.0% of the dominant overstory is replaced by burning.
V*	>200	Fires are infrequent and high severity; these can be stand replacing fires.

*Fire regimes present in the Project Area.

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 (prior to 1900). Reduction in number of fires has allowed western 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 or fuel. The increase in aboveground fuel changes the character and effects of wildfires. Fire intensity is increased due to greater fuel levels. More heat is transferred to the ground for a longer period of time with the increase of western juniper compared to a shrub dominated plant community. Condition Class (CC) indicates degree of departure from historical conditions (Table 3.16). The CC considers a number of biologic, fire behavior and fire effects factors. Many situations can cause a shift in CC; vegetation characteristics, fuel composition, fire frequency, fire severity, fire pattern. Introduction of cheatgrass would increase frequency of fires by filling spaces between native perennial plants. Fires would now travel between plants under a wider set of conditions.

Table 3.16 - Condition Class Description and Potential Risks based on Fire Behavior, Post-fire Vegetation Conditions, Suppression Efforts, and Risks of Losing Native Species Following Burning

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 form 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 of key ecosystem components are high.

An assessment was done for the North Steens Project Area. The assessment identified 5 Potential Natural Vegetation Groups (PNVG) for the Project Area. The PNVG are general landscape classifications for determining the Fire Regime and the CC of an area. Classification is done based on a single attribute, or a group of attributes. Factors that may be considered are vegetation, soils, geomorphology, or some other ecologic site factor. The PNVG were selected from the national database or developed from local data. The national database gives historical conditions developed through modeling efforts of LANDFIRE. The GIS data were used to determine the percentage composition of the Project Area. Table 3.17 lists the PNVG for the project area, percent composition, fire regime, CC, and departure from historical conditions. The project area is dominated by Mountain Big Sagebrush and Low Sagebrush PNVG. Dry Wyoming Big Sagebrush and Western Juniper PNVG were common and Riparian PNVG was rare. The western juniper PNVG is a combination of stands that have established following 1870 and old-growth stands. As restoration of the site progresses the percentage of western juniper woodlands would decrease and the percentage of mountain big sagebrush and low sagebrush would increase. The Riparian PNVG includes quaking aspen plant community in the uplands. Analysis indicates all PNVG were outside historical fire regimes. Mountain Big Sagebrush and Western Juniper (old-growth stands) PNVG were assigned CC 3. The other PNVG was assigned CC 2. This indicates Mountain Big Sagebrush and Western Juniper PNVG were significantly different from historical conditions.

The FRCC analysis also combines all PNVG to develop a landscape assessment. The Project Area was classified as CC 2. Conditions across the whole Project Area are moderately altered from historical conditions. The analysis also indicates restoration of vegetation composition, vegetation and fuels structure would be required to move toward historical conditions.

Fire has played an important role in development of most plant communities in the Project Area. The wildfire regime can be defined as the role fire would play across a landscape in the absence of human mechanical intervention, but under the influence of aboriginal burning (Agee 1993). Fire regimes vary across the Project Area with change in vegetation. Fire ignited by lightning, or early inhabitants, occurred at varying intervals and intensities across the Project Area. Fires functioned to reduce accumulation of old plant material, reduce dominance of a single or small number of plant species, release nutrients back into the system, provide seedbed for some plant species and reinvigorate some plant species. Fires also exposed mineral soil to forces of wind and water, allowing movement of soil across the landscape. However, the role of fire in ecosystem structure, function, and processes has changed since 1870. Prior to 1870, fires reduced the dominance of big sagebrush and killed any western juniper present. The plant community was shifted toward herbaceous plant dominance. Fires burned with much lower intensity because of lower fuel loading.

Mountain big sagebrush plant community had the shortest historic fire return interval (average number of years between fire events) at 15 to 25 years. Fire burned through this plant community and consumed a majority of the aboveground plant material. Fires generally burned during summer and early fall, but

Table 3.17 - FRCC Analysis of the North Steens Project Area

Potential Natural Vegetation Group	Fire Regime	Strata Comp.	Departure	Condition Class
Mountain Big Sagebrush	II	35%	70%	3
Low Sagebrush	V	23%	40%	2
Dry Wyo. Big Sagebrush	IV	18%	55%	2
Western Juniper	II	16%	83%	3
Riparian (including Quaking Aspen)	III	8%	61%	2
Project Area	**III**	**100%**	**62%**	**2**

fires did occur outside that time period. A majority of plant species found in mountain big sagebrush plant community is adapted to fire. Shrubs, with the exception of mountain big sagebrush, have the ability to sprout from buds on the root collar or along roots. Mountain big sagebrush must establish from seed. Most grasses and deep-rooted forbs also have buds below the soil surface protected from burning and these sprout following top removal. Other species may avoid fire by completing their growth cycle prior to peak of fire season. Biscuitroot, buttercups, wild onions, and some native annual forbs are examples of plants that complete their annual lifecycle prior to the peak of fire season. Unless soil heating is extreme, these types of plants are not likely be affected by fire. Most of the mountain big sagebrush plant community across the Project Area would be classified as Fire Regime II, 0-35 year return interval with high severity (stand replacing) fire effects (greater than 75% of the dominant overstory replaced). (Refer to Table 3.15 above for a description of Fire Regimes.)

Low sagebrush plant community often forms a complex mosaic with other sagebrush species. Size of patches varies from less than an acre to over 1,000 acres. Fire was historically, and still is, a relatively rare event in the low sagebrush plant community. Shallow soils and low site productivity reduce the chance for fuels to accumulate. However, fires burn across this plant community, but at a very low frequency. Fire return intervals of this plant community are greater than 150-200 years. Fires may burn small areas within this plant community, consuming plants in more productive areas or areas of slightly deeper soils where productivity of fine fuels (grasses and forbs) is great enough to carry fire. Fires may also burn across entire plant communities during years of above average precipitation. Some plants found in other big sagebrush plant communities are found in these areas. However, there is a greater occurrence of mat-forming forbs in low sagebrush compared to big sagebrush plant communities. Growing points of most mat-forming forbs are elevated above the soil surface and vulnerable to damage from fire. Work done on Sheldon and Hart Mountain NWRs found frequency and cover of these forbs were reduced following burning (Miller and Rose 1999). Low sagebrush, same as other sagebrushes, does not sprout following burning. Plants must establish from seed. Recovery of this plant community is slow following disturbance. Low sagebrush plant community is classified as Fire Regime V (Table 3.17), fire return interval greater than 200 years and fires are stand replacing when they occur.

Western juniper historically occupied rocky ridgetops and shallow soil slopes across Steens Mountain. Thin bark and a high volatile oil component make trees susceptible to fire. Juniper does not sprout from basal buds and needs to reestablish from seeds. Rocky and/or shallow soils limit fire spread and have permitted juniper to establish in these areas. The Fire Regime is similar to the low sagebrush plant community. However, it is difficult to assign a Fire Regime and CC to this community because it is small and embedded in other plant communities. The juniper plant community on rocky ridgetops and shallow soil areas make up a small percentage of the total Project Area, and therefore were not mapped during vegetation surveys in the early 1980s. However, juniper has expanded into deeper, more productive plant communities. Miller and Rose (1995) estimated over 90.0% of current juniper woodlands on Steens Mountain established after 1870. Expansion of juniper into sagebrush plant communities has altered the CC of sagebrush plant communities. The CC of low sagebrush and mountain big sagebrush plant communities has shifted to 2 and 3, respectively. (Refer to Table 3.16 for a description of CCs.)

The quaking aspen plant community is maintained by fire (Bartos and Campbell 1998). Quaking aspen vigorously suckers following top removal. Historically fire burned in this community once every 60 years. Wall and others (2001) found the average age of quaking aspen stands was 100 to 120 years indicating at least one fire cycle has been missed in these stands. Quaking aspen stands would be classified as Fire Regime III (35-100 years, mixed severity fires) and the missed fire would place this community in CC 2. The lengthening of the fire return interval has allowed expansion of juniper into these stands. In some areas juniper has totally replaced quaking aspen, and in other areas juniper is in various stages of replacing quaking aspen. Western juniper changes the fuels structure of quaking aspen stands. Aerial fuels are more continuous following juniper expansion into quaking aspen; fires burn at a greater intensity with more severe fire effects.

Riparian plant community comprises a small percentage of the total Project Area, but is ecologically important to the area. Fire history has not been documented in these areas, but it is assumed to be the same as the adjacent plant communities. Fire return intervals were probably the same as the quaking aspen plant community. Because of proximity to water, these areas are not dry enough in most years to burn, but during

dry years the probability of fire increases. Riparian areas would be classified as Fire Regime III (35-100 years, mixed severity). Fires would burn the understory vegetation and smaller woody shrubs. Large cottonwood trees, willows, and alders may not burn in some fires, but periodically a stand-replacing fire would pass through the riparian. High intensity fires in adjacent uplands may have a greater probability of moving into riparian areas. Most woody plants in riparian areas sprout following death of aboveground plant material.

The lower elevation plant community in the Project Area has experienced some invasion by cheatgrass. Past land and fire management practices have created conditions favoring cheatgrass establishment and survival. Once cheatgrass has become established, it provides a continuous fuel bed. Pre-invasion communities had less continuous understory vegetation and thus fuel bed. With the more continuous fuel bed, the potential for fire spread increases. Fire return interval in these areas has decreased to once every 3 to 5 years. Fire adapted plants in this community cannot tolerate fires at that high frequency. Repeated fires help to eliminate many native perennial plants. The Fire Regime of this plant community was classified as Fire Regime IV (35-100 years, stand replacing). The CC is 3, more than two fire cycles outside the historic regime. In some areas native perennial vegetation has been lost from the community. Restoration in these areas would require seeding of perennial vegetation.

Fire management of the Project Area would follow guidance outlined in the Andrews/Steens RMP and the Burns Interagency Fire Zone (BIFZ) FMP and subsequent fire management planning. Fire management strategy focuses on fire suppression, prescribed fire, mechanical treatments, and wildfire use for resource benefit. Prescribed fire would be used to meet resource and fire management objectives. Wildfires ignited by lightning would be evaluated for fire use, by the process outlined in the BIFZ FMP and the Fire Use Implementation Procedures Reference Guide (April 2005) and subsequent FMPs.

3.2.5.2 Livestock Grazing Management

(See Andrews/Steens RMP Map 8, Grazing Allotment Boundaries; S-15, Range Condition; and S-16, Range Improvements, on the enclosed CD.)

The Project Area has a long history of domestic livestock grazing. A series of land disposal legislation in the mid- to late 1800s encouraged development of the western livestock industry. The Homestead Act (1862), Enlarged Homestead Act (1909), and Stock-raising Homestead Act (1916) granted people land theoretically large enough to support a family; the last act granted a person 640 acres, enough to support 50 head of cattle. However, acre allocations were based on productivity of Midwestern farms and not the arid and semi-arid western United States. These land disposal acts set the stage for grazing management in the 20th and 21st centuries.

The Steens Mountain area was traditionally used as spring and summer range for bands of sheep and cattle in the late 19th and early 20th centuries. Domestic livestock grazing occurred unrestricted until passage of the Taylor Grazing Act in 1934. This act was passed to help reduce the degradation caused by unrestricted livestock grazing. Griffiths (1902) reported evidence of heavy sheep grazing on Steens Mountain in the spring and summer of 1901.

Griffiths reports little to no available forage in areas close to water sources. The Taylor Grazing Act established a system for allotment of grazing privileges to livestock operators based on grazing capacity and priority of use. The Taylor Grazing Act also established allotment boundaries, standards for rangeland improvement and implementation of grazing fees. Later legislation, FLPMA (1976), Public Rangelands Improvement Act (1978), and the Steens Act, also provide authority for management of livestock grazing on public lands.

Grazing Authorization

Livestock grazing is administered on nine allotments in the Project Area. Nine permittees are authorized to graze 17,936 Animal Unit Months (AUMs) on 176,423 acres in the Project Area. The AUMs allocated to large wild herbivores is 1,924 in the nine allotments.

All nine allotments have developed and implemented grazing systems primarily through Allotment Management Plans (AMPs) and agreements with permittees. See Table 3.18.

Rangeland Health and Guidelines for Grazing Management
Allotments are evaluated for rangeland health utilizing five standards outlined in the Andrew/Steens RMP. Field indicators have been developed for each of the five standards. The qualitative thresholds for these indicators vary according to soils, climate, and landform. An ID team with participation from permittees conducts assessments to evaluate standards according to field indicators.

The Authorizing Official develops appropriate grazing management actions based on the five standards. This action must occur as soon as practicable, or prior to the beginning of the next grazing season.

Grazing Exclusion
The Steens Act included 94,959 acres of Congressionally-designated No Livestock Grazing Area in Steens Mountain Wilderness. An additional 2,270 acres were also excluded adjacent to Steens Mountain Wilderness by the legislation. Land exchanges described in the Steens Act realigned some allotment boundaries creating revisions to some permitted use.

Frazier Field
Frazier Field Allotment includes 20,506 acres divided into six pastures. There are 1,906 permitted AUMs with 326 AUMs allocated to wildlife and 72 AUMs allocated to wild horses. The domestic livestock period of use is spring and summer under a deferred, rest-rotation system. Management objectives are to improve or maintain ecologic condition for upland and riparian vegetation communities. An AMP was implemented in 1991.

South Steens
South Steens Allotment contains 89,508 public acres and is divided into four pastures. There are 9,577 permitted AUMs with 582 AUMs allocated to wildlife and 3,540 AUMs for wild horses. The domestic livestock period of use is spring, summer, and fall. The grazing system is a rotational system. Management objectives are to improve or maintain ecologic condition for upland and riparian vegetation communities. An AMP was implemented in 1995.

Mud Creek
Mud Creek Allotment includes 8,245 public acres and is divided into two pastures. There are 590 permitted AUMs with 100 AUMs allocated to wildlife. The domestic livestock period of use is spring and summer. The grazing system is a deferred-rotation system. Management objectives are to improve or maintain ecologic condition for upland and riparian vegetation communities. An AMP does not exist for this allotment; however, a 1990 grazing agreement is in place.

East Ridge
East Ridge Allotment contains 5,066 public acres and 5,440 private acres. East Ridge Allotment is divided into seven pastures. There are 431 permitted AUMs with 161 AUMs allocated to wildlife. The domestic livestock period of use is spring and summer. The grazing system is a modified rotational system. Management objectives are to improve or maintain ecologic condition for upland and riparian vegetation communities. An AMP was written in 1990 as part of the Otley Brothers Allotment.

Hardie Summer
Hardie Summer Allotment contains 6,008 public acres and 3,775 private acres. The allotment is divided into four pastures. There are 408 permitted AUMs with 383 AUMs allocated to wildlife. The domestic livestock period of use is summer and fall. The grazing system is a deferred system. Management objectives are to improve and maintain ecological condition of uplands and riparian vegetation. The AMP was implemented in 1991.

Krumbo Mountain
Krumbo Mountain Allotment includes 17,353 public acres and 6 private acres. The allotment is divided into two pastures. There are 1,059 permitted AUMs and 77 AUMs allocated to wildlife. The domestic livestock period of use is summer and fall. The grazing system is a deferred rotation system. Management objectives are to improve and maintain ecological condition of uplands and riparian vegetation. The AMP was implemented in 1991.

Table 3.18 - Allotment Information (Burns District GIS Database)

Allotment Number	Allotment Name	M, I, C	Public Acres	Private acres	Total acres	Livestock AUMs	Wildlife AUMs	Wild Horse AUMs
6002	South Steens	I	89,508	1,392	90,900	9,577	582	3540
6005	Mud Creek	I	8,245		8,245	590	100	0
6006	Frazier Field	I	20,506	94	20,600	1,906	326	72
6010	East Ridge	I	5,066	5,440	10,506	431	161	161
6025	Hardie Summer	M	6,008	3,775	9,783	408	43	0
6032	Krumbo Mountain	I	17,533	6	17,539	1,059	77	0
6033	Chimney	I	14,769	10,125	24,894	2,015	193	0
6031	LaVoy Tables	I	38,257	1,708	39,965	1,653	143	36
6007	Ruby Springs	I	14,788	613	15,439	1,950	102	0

M=Maintain, I=Improve, C=Custodial

Chimney
Chimney Allotment includes 14,769 public acres and 10,125 private acres. The allotment is divided into 11 pastures. There are 2,015 permitted AUMs and 193 AUMs allocated to wildlife. The domestic livestock period of use is spring, summer, and fall. There is a seasonal grazing system implemented. Management objectives are to improve and maintain ecological condition of uplands and riparian vegetation. An AMP was written in 1990 as part of the Otley Brothers Allotment.

Ruby Springs
Ruby Springs Allotment includes 14,788 public land acres divided into 11 pastures. There are 1,950 active AUMs with 102 AUMs allocated to wildlife. The domestic livestock period of use is April 1 to September 30. Management objectives are to maintain livestock forage and improve the ecological conditions of bitterbrush, upland vegetation, and riparian vegetation. An AMP was implemented in 1991.

LaVoy Tables
LaVoy Tables Allotment includes 38,257 public acres divided into four pastures. There are 1,653 permitted AUMs with 36 AUMs allocated to wild horses. The domestic livestock period of use is April 1 to October 31. Management objectives are to improve or maintain ecological status of the allotment and to maintain wilderness characteristics within Blitzen River WSA. An AMP was implemented in 1991.

3.2.5.3 Recreation

Primary recreation uses of the area include sightseeing, camping, driving for pleasure, wildlife viewing, hunting, fishing, hiking, bird watching, and photography. Other activities include picnicking, bicycling, nature study, rock hounding, snowmobiling, cross-country skiing, and Off-Highway Vehicle (OHV) use. Except for limited winter recreation, season of use is generally from July to November, with highest use on holiday weekends and during fall hunting seasons. The Page Springs area receives heavy use during April, May, and June when higher elevations are not accessible.

Steens Mountain Back Country Byway (Steens Loop Road) traverses many project units and other project units are visible from it. This is the main route into the CMPA and is traveled by over 25,000 people each year. Steens Loop Road is closed to the public during winter and spring because of snow and wet, muddy roads. When conditions allow, winter recreationists are issued permits to drive to the snowline on North Steens Loop Road. Steens Loop Road was recently named as a Tour Route in conjunction with the High Desert Discovery State Scenic Byway.

Primitive camping occurs throughout the area, especially during fall hunting seasons. Page Springs Campground is located 4 miles east of Frenchglen on North Steens Loop Road, adjacent to Donner

und Blitzen River. This is a developed campground with water, vault toilets, designated campsites, and volunteer hosts. The campground receives heavy use during spring, summer, and fall. Additional developed campgrounds on North Steens Loop Road are Fish Lake and Jackman Park. These higher-elevation campgrounds are heavily used during summer and fall. South Steens Campground is located on South Steens Loop Road and includes equestrian facilities. Camping fees are charged at all four campgrounds. These campgrounds are destinations or are used as staging areas for dispersed uses such as hunting, hiking, and nature study.

Mule deer, pronghorn antelope, and elk are hunted with rifle, muzzleloader, and bow in the Project Area and surrounding area. Upland bird hunting, primarily for chukar and quail, is a popular late fall and winter activity. Fishing is also popular, particularly for redband trout. There are several lakes, reservoirs, streams, and rivers in the general area, which provide fishing as well as sightseeing, camping, hiking, and wildlife viewing opportunities.

High Desert Trail, a component of the National Recreation Trails System, passes through West Upper River #6 and West Lower River #5 Project Units outside of Steens Mountain Wilderness. The trail north of North Steens Loop Road skirts the Project Area to the west. Other trails in the Project Area are in Steens Mountain Wilderness and are discussed in Section 3.2.4.8.

3.2.5.5 Transportation/Roads

Routes within the project vary from the primitive 2-track roads to the higher standard Steens Loop Road. The more heavily used roads in the area include Moon Hill Road and Kiger Ridge Road. These collector roads serve as primary travel routes in the north Steens Mountain Area and are generally maintained at a higher standard than the more primitive "local" routes. Routes in the area are primarily used for recreation, livestock administration, and to access private property. Travel routes in the area are shown on Maps 11 and 13 of the Andrews/Steens RMPs (see CD included).

3.2.5.6 Social and Economic Values

Livestock raising and associated feed production industries are major contributors to the economy of Harney County. The highest individual agricultural sales revenue in the county is derived from cattle production, which is inextricably linked to the commodity value of public rangelands. The cattle industry provides an average of $28,000,000 per year to the economy of the county (www.harneycounty.com 2003). Nearly half the county taxes are derived from the ranching community. Hunting and other types of dispersed outdoor recreation contribute strongly to the local economy on a seasonal basis. The undeveloped, open spaces in the county are themselves a tourist attraction and contribute revenue for local businesses. The Steens Mountain area is central to Harney County tourism.

Chapter 4 Environmental Consequences

4 Environmental Consequences

This chapter describes all expected effects including direct, indirect and cumulative on resources from enacting the proposed alternatives. A distinction between direct and indirect effects is not made in this chapter and in many cases cumulative effects are only described as effects. All effects are considered direct and cumulative; therefore, use of these words may not appear.

This document is tiered to the Andrews/Steens PRMP/FEIS. (Copies of the Andrews/Steens PRMP/FEIS may be obtained from, or inspected at, the Burns District BLM Office in Hines, Oregon.) The environmental consequences and cumulative effects sections in the Andrews/Steens PRMP/FEIS describe potential environmental consequences to the greater environment of the North Steens Project Area and are incorporated into this document by reference in accordance with the CEQ regulation § 43 CFR 1502.2. Additional project-specific descriptions of potential environmental consequences are provided in the text below.

The proposed Project Area has been divided into specific project units, which are primarily defined by pasture fencelines and natural features; proposed wilderness and WSA project units are also organized by these features where possible.

Project unit names are sometimes utilized in the descriptions of potential environmental consequences. See the Project Unit Map (Map 2.1).

Reasonably Foreseeable Future Actions (RFFAs)

See Chapter 3 of this document for a discussion of past and present actions in the Project Area and Burns District.

The discussion of potential effects on resources from enacting the alternatives utilizes two scales. The first is defined as the proposed Project Area boundary, the second as the Burns District perimeter. Potential effects analysis contained in this document utilizes these scales and effects boundaries unless otherwise noted in individual resource sections.

Actions that could take place in the foreseeable future within or adjacent to the Project Area include the following (see Map 4.1: Reasonably Foreseeable Future Actions):

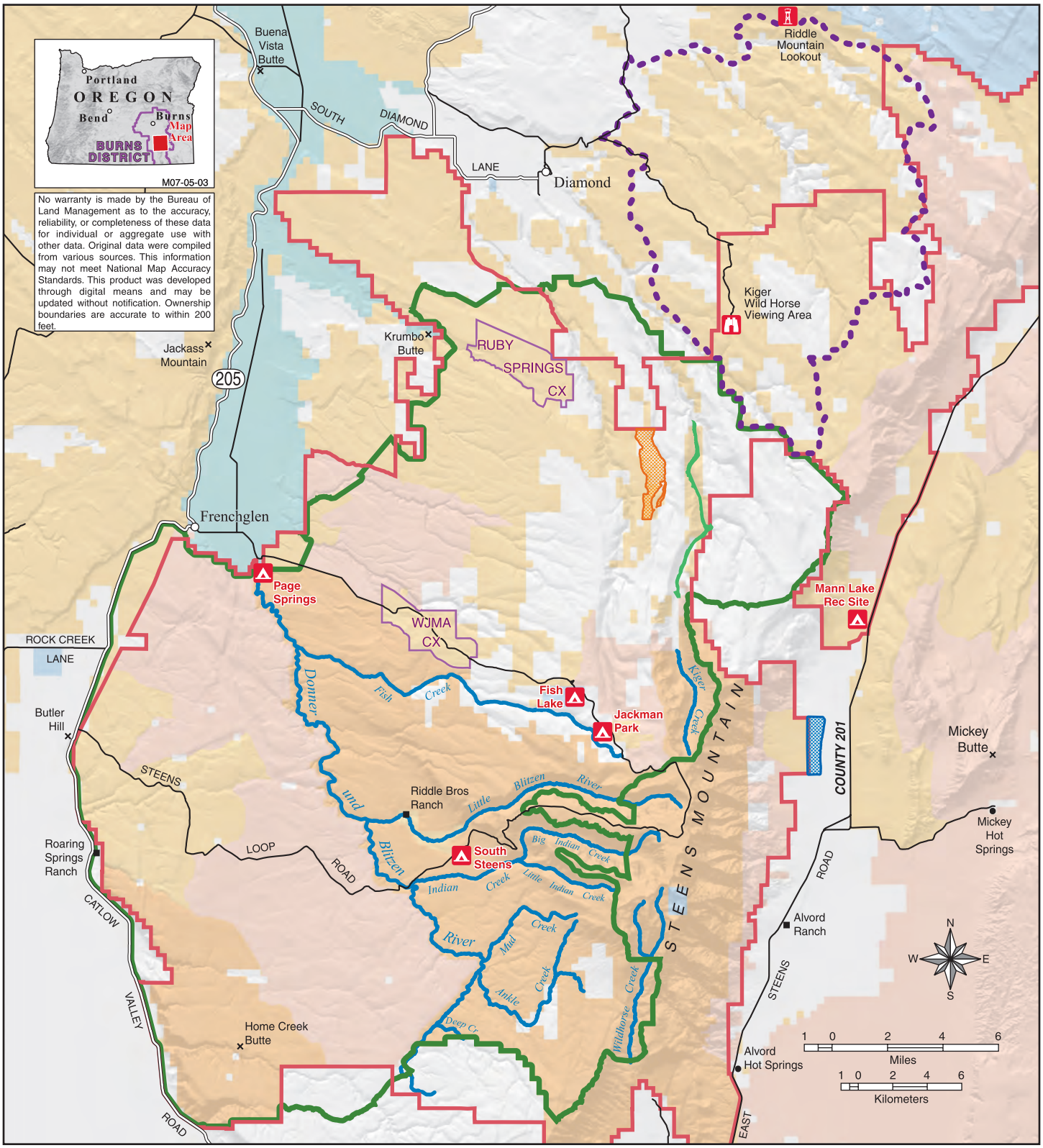
Juniper treatments within the WJMA – These would be small-scale experimental or other educational treatments of 1-100 acres. These actions could continue for many years as the site is developed for public education.

Hazardous Fuels Categorical Exclusions – These documents cover limited hazardous fuels treatments in the CMPA under authority of the Healthy Forest Initiative. Known projects are described below:

- Ruby Springs Project – Smaller, follow-up treatments may occur in this project under Categorical Exclusion authority (Healthy Forest Initiative). Treatments have been combinations of cutting and burning.
- Kiger / East Ridge Project – Limited, follow-up prescribed fire activities may continue under a previous environmental document. These treatments would be in the range of 100-1,000 acres.
- Oliver Springs Project – Completion of project actions including tree cutting and prescribed burning.

Five Creeks Rangeland Restoration Project (Five Creeks Project) – The recent 2006 decision in Three Rivers RA to implement the action alternative in the Five Creeks Project EA will result in multiple years of juniper cutting and prescribed fire adjacent to portions of the northern perimeter of the North Steens Project. The rate and scale of treatments could affect tens of thousands of rangeland acres.

East Steens Project – Small-scale treatments of cheatgrass converted rangelands (currently 500 acres on private land) would be implemented and continued in the next few seasons. The intent is to interrupt the fire cycle which has been modified by multiple fire events and vegetation shifts. Native and desirable nonnative species may be used or planted.



- Five Creeks Planning Area
- Kiger Juniper Completed Cut Unit
- Oliver Springs Completed Cut Unit
- East Steens Project Boundary
- Area Analyzed under Separate Process
- Paved Road
- Non-Paved Road
- Wild and Scenic River
- North Steens Project Area Boundary
- Cooperative Management and Protection Area Boundary

Administered Land

- Bureau of Land Management
  - Wilderness
  - Wilderness Study Area
- U.S. Fish and Wildlife Service
- State
- Private

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

BURNS DISTRICT

North Steens Project
Final Environmental Impact Statement
2007

Map 4.1: Reasonably Foreseeable Future Actions

4.1 Assumptions

There are three basic scenarios portions of the Project Area could be managed under this EIS:

1. Areas could be untreated now and in the future (No Treatment Alternative).
2. Areas could be treated, but only under future proposals and related analysis (Continuation of Current Management Alternative).
3. Areas could be treated under this EIS as a result of selecting the Partial, Limited or Full Treatment Alternatives (future proposals would also occur under this scenario).

4.1.1 No Treatment Areas

Under the No Treatment Alternative, management of the land would be different from the current Land Use Plan (LUP) direction and past actions. Areas managed under this scenario would not have treatment performed even under future proposals and related analysis.

Assumptions common to all resources:
Juniper expansion into native habitats and associated changes in fuel arrangements would continue unabated (a sagebrush community transitions to juniper woodlands). Additionally, an increased potential for large-scale, high-intensity fires due to more continuous juniper canopy (fuel) would occur. The following descriptions of the environmental consequences include both assumptions.

Within the aforementioned areas, juniper could continue to increase in density and cover at the expense of understory vegetation. Increasing juniper cover and density could also modify plant community fuel arrangements (e.g., closed juniper woodlands could replace sagebrush) across the Project Area with an associated increased risk of large, natural wildfires in juniper stands. These wildfires could burn with greater intensity and for a longer duration due to an increase in continuous woody fuels in the juniper canopy. Intact, unmodified plant communities have an increased ability to recover from fire events. In late-successional juniper woodland sites, understory generally is greatly reduced or eliminated. Lack of a healthy understory minimizes potential positive responses to fire events (such as a mosaic of seral stages in a healthy sagebrush community or a regenerated aspen stand) and maximizes potential negative effects (such as soil loss or sterilization from intense fires). As plant communities continue to transition to closed juniper woodlands, post-fire rehabilitation and operational costs would likely increase.

4.1.2 Treatment Areas

Under this scenario, treatment and management of the land conforms to the current LUP direction and exceeds the constraints of related past actions. Areas managed under this scenario would also be able to have treatment performed under future proposals and related analysis.

No Class 1 airsheds or nonattainment areas would be influenced by prescribed fire actions. The communities of Frenchglen, Diamond, Fields, and Andrews would be notified of burning activities and potential for temporary changes in air quality.

Assumptions common to all resources:
Juniper expansion into native habitats and associated changes in fuel arrangements would be reduced. Additionally, a decreased potential for large-scale, high-intensity fires due to more continuous juniper canopy (fuel) would occur. The following descriptions of environmental consequences include both assumptions.

Within the aforementioned areas, juniper would decrease in density and cover in the Project Area to the benefit of understory vegetation. Decreasing juniper cover and density would also modify plant community fuel arrangements (e.g., sagebrush could replace closed juniper woodlands) across the Project Area with an associated decreased risk of large, natural wildfires in juniper stands. These wildfires could burn with decreased intensity and for shorter duration due to a decline in continuous woody fuels (a reduced juniper canopy). Intact, unmodified plant communities have an increased ability to recover from fire events. A

healthy understory maximizes potential positive responses to fire events (such as a mosaic of seral stages in a healthy sagebrush community or a regenerated aspen stand) and minimizes potential negative effects (such as soil loss or sterilization from intense fires). As plant communities continue to transition to sagebrush, aspen, and grasslands, post-fire rehabilitation and operational costs would likely decrease.

4.1.3 Continuation of Current Management Areas

Under the Continuation of Current Management Alternative, management of the land conforms to the current LUP direction and remains within the constraints of related past actions. Areas managed under this scenario would only have treatment performed under future proposals and related analysis (NEPA).

Assumptions common to all resources:
Juniper expansion into native habitats and associated changes in fuel arrangements would continue, but could be reduced by future proposals. Additionally, an increased potential for large-scale, high-intensity fires due to more continuous juniper canopy (fuel) would occur, but may be limited by future proposals and actions that reduce fuels. The following descriptions of environmental consequences include both assumptions.

Within the aforementioned areas, juniper could continue to increase in density and cover at the expense of understory vegetation. Increasing juniper cover and density could also modify plant community fuel arrangements (e.g., closed juniper woodlands could replace sagebrush) across the Project Area with an associated increased risk of large wildfires in juniper stands. Wildfires could burn with greater intensity and for longer duration due to the increase in larger woody fuels. Sagebrush communities without expansion juniper have an increased ability to recover from fire events due to their intact plant community. In a late-transitional juniper woodland site, sagebrush understory has been greatly reduced or eliminated altogether. This lack of a healthy understory minimizes potential positive responses to fire events (such as a mosaic of seral stages in a healthy sagebrush community) and maximizes potential negative effects (such as soil loss or sterilization from intense fires). As juniper continues to transition to closed woodlands over much of the landscape, post-fire rehabilitation and operational costs would likely increase.

In untreated areas (the majority of the landscape), effects of continuation of current management are considered the same as effects of the No Treatment Alternative. In small treated areas (under other NEPA documents), effects of continuation of current management would be the same as those seen in treatment areas.

4.2 Potentially Affected Resources

4.2.1 Air, Soil and Water Resources

4.2.1.1 Air Quality

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative, juniper could continue to increase density and cover at the expense of understory vegetation. Increasing cover and density would also increase fuel continuity across the Project Area with associated increase in risk of large wildfires. Fires could burn with greater intensity and for longer duration due to increase in larger woody fuels. Increase in fuels and fire intensity would amplify total emissions and duration of fire event emissions. Smoldering combustion of woody fuels would 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 should stipulate optimal conditions for effective smoke dispersion. During wildfires, however, conditions may not be conducive to dispersion. Size is an issue with natural and prescribed events. 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 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.

The accumulation of 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 Project Area. Wildfires would burn for longer periods and produce more smoke than average historic levels.

There would be no cumulative effects to air quality under the No Treatment Alternative. Adjacent projects, such as the Five Creeks Project, would continue to treat vegetation mechanically and with prescribed fire. Emissions from that project would be on the scale of days. The treated areas in the Five Creeks Project would reduce potential for large-scale, high-intensity wildfires and risk of deleterious effects to air quality. In 2006, a 46,000-acre wildfire burned portions of the Project Area. This wildfire reduced the total amount of woody vegetation, primarily sagebrush, within the fire perimeter. This has reduced the threat of wildfire adjacent to the Project Area 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.

Partial Treatment Alternative

Air quality would be minimally affected by the Partial Treatment Alternative. The concentration of particles greater than 2.5 μg (micrograms) observed at populations centers within communities down wind from management actions would be less than the threshold set as unhealthy by the Oregon Department of Environmental Quality, 34.4 $\mu g/m^3$. Mechanical treatments in this alternative would have minimal effects on air quality. Treatment with mechanized equipment would occur during the time of year when dust production would be minimal. Mechanical work with chainsaws would occur during the spring, summer, and fall months, but production of dust from that activity would be negligible.

Prescribed fire would occur during spring, late summer, early fall (broadcast burning), and winter (jackpot, individual tree burning). Smoke production would be limited to the period of time from ignition to approximately 48 hours following the end of ignition. Smoke drift would primarily move east and southeast of the Project Area. No Class 1 airsheds or nonattainment areas would be affected by the prescribed fire actions. The communities of Frenchglen, Diamond, Fields, and Andrews would be notified of burning activities and the potential for temporary changes in air quality.

A lack of active management treatment within WSAs or Steens Mountain Wilderness would allow juniper cover and density to increase, changing fuel loading and continuity. Juniper would increase fuel loading and form a continuous fuel layer across what were formally mountain big sagebrush plant communities. Fires burning in these areas would burn at a greater intensity and cause more severe wildfire effects than pre-expansion conditions. Additional fuel loading would also increase the level and duration of emission from fires. Wildfires would also ignite regardless of immediate and future weather patterns. Smoke could be forced into local communities or production could be great enough, and over a period of 1-3 weeks, to affect distant communities. Large wildfires that have burned over 40,000 acres on Steens Mountain produced smoke for 3 weeks and had an identifiable smoke plume that reached over 300 miles. Prescribed fires would be ignited considering immediate and future weather patterns, reducing potential for negative effects from smoke. Previous prescribed fires on Steens Mountain produced visible smoke for 3-5 days and had no identifiable smoke plume past the day of ignition.

Actions from the Partial Treatment Alternative would help reduce smoke emissions from fires by reducing fuel loading and continuity. Reestablishment of mountain big sagebrush, quaking aspen and riparian plant communities would help restore historic fire regimes.

In the Partial Treatment Alternative reduction of even part of the juniper woodland would reduce the risk of large-scale, high-intensity wildfires and level of smoke produced. Prescribed burning would be conducted in late summer and fall. Smoke produced from wildfires in those post-treatment stands would be less than that produced from fires in fully-developed woodlands. Risk of fires in wilderness and WSAs would continue to grow, and summer smoke emissions would continue to be high during and after events.

Actions on the adjacent Five Creeks Project would be coordinated with management of the North Steens Project. Prescribed burning would be done to minimize effects to air quality. Prescribed fires may be conducted over the same timeframes to minimize length of smoke production or done on different days to minimize effects on each day. Treatment of vegetation on the North Steens and Five Creeks Projects would help to reduce the threat of large-scale, high-intensity fires and associated threats to air quality over the short term (3-5 years) and long term (greater than 5 years).

Limited Treatment Alternative
Short-term effects (3-5 years) on air quality from the Limited Treatment Alternative would be slightly greater than the Partial Treatment Alternative initially, but would be less in the long term (greater than 5 years) because of the reduction in risk of large-scale fires. In the long term, conversion of juniper stands to sagebrush would reduce smoke emissions from wildfire or prescribed fires. However, initially wildland fire use in juniper stands would produce smoke for a longer period of time than fires in sagebrush or lighter fuels. The post-fire plant community would produce some windborne dust until the soil surface becomes wet.

Prescribed burning would occur during spring, late summer, early fall (broadcast burning), and winter (jackpot, individual tree burning). Smoke production would be limited to the time from ignition to approximately 48 hours following the end of ignition. Smoke drift would primarily move east and southeast.

Production of dust from use of chain saws would be negligible. Heavy machinery would be used during late fall, winter, and early spring when soils are frozen. Dust production at that time would be minimal.

In the Limited Treatment Alternative the reduction of even part of the juniper woodland would reduce the risk of large-scale, high-intensity fires and the level of smoke produced from those events. Reliance of wildland fire use in wilderness during the early phases of the project may still increase the risk of large volumes of smoke affecting summertime air quality downwind. However, as fires become more common in the Project Area, duration of emissions would decrease as the fuels structure is shifted from trees to shrubs and herbaceous plants.

Cumulative effects would be the same as the Partial Treatment Alternative.

Full Treatment Alternative
Short-term (3-5 years) effects on air quality from the Full Treatment Alternative would be slightly greater than the other alternatives, 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 and wildland fire use. There would also be less of an emphasis on wildland fire use initially. Treatments would be applied across the landscape.

Production of dust would be greatest in this alternative. However, dust production from use of chainsaws would still 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 Full Treatment Alternative reduction of juniper would reduce risk of large-scale, high-intensity fires and level of smoke produced from those events. Reliance of fire use in wilderness during early phases of the project may still increase risk of large volumes of smoke affecting summertime air quality downwind. However, as fires become more common in the Project Area, duration of emissions would decrease as the fuels structure is shifted from trees to shrubs and herbaceous plants.

Prescribed burning would be conducted in late summer and fall. Smoke produced by wildfire would be at the same volume as during the free burning stage of prescribed fire, 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. Smoke production can last for 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.

Cumulative effects would be the same as the Partial Treatment Alternative

Continuation of Current Management Alternative
Effects to air quality are the same as discussed in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
Potential effects of the Preferred Alternative on air quality are the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on air quality within wilderness are the same as described in the Continuation of Current Management.

4.2.1.2 Soils

Potential Effects

No Treatment Alternative
Bare ground areas would enlarge with increasing juniper cover and density. Risk of soil erosion would, therefore, increase as understory vegetation is reduced. Effects would be greatest on southeastern to western slopes where soils are slightly shallower and loss of understory vegetation could be greatest. Risk of soil movement would be from water running across the surface as a result of high-intensity, convective storms or during winter months when soils are frozen. Frozen conditions limit infiltration and force water to run across the surface. An effect to soils could happen as a result of future fuels buildup in some areas. High concentrations of fuels could lead to large-scale, high-intensity fires leaving large areas devoid of vegetation. Even after rehabilitation efforts those bare areas would be very susceptible to wind or water erosion.

Cumulative effects under this alternative on soils could be significant if accumulation of juniper creates a situation where large-scale, high-intensity wildfire destroys a large percentage of the native vegetation. Many areas could continually experience wind and water erosion depending on soil type. Increase in juniper would also add to the amount of bare ground beneath the woodland canopy, and erosion would increase. Soil would erode into streams and move into meadows in valley bottoms. Productivity of lower elevation areas may be enhanced by increasing soil but would occur at the expense of uplands.

Partial Treatment Alternative
Prescribed burning in the form of broadcast, jackpot or individual tree burning would make the soil more fertile in many areas by adding ash to the soil surface. Areas containing the heaviest fuel concentrations may be burned at a higher intensity and the top layer of soil could be scorched, which could kill vegetation and leave the surface bare. By removing vegetation through burning, some areas, especially areas with the primary shrub component consisting of Wyoming or mountain big sagebrush, could experience soil erosion from wind or water. Soils would have more stability in areas dominated by perennial grasses, rabbitbrush, or snowberry because those sites would revegetate more quickly.

Fencing would not have an effect to soils unless the structure concentrated wildlife or livestock in small areas causing compaction or erosion from establishment of new trails.

Reseeding or planting of native or desirable nonnative vegetation would benefit soils by providing more perennial plants to hold soil and reduce erosion.

Use of large tracked or wheeled machines to either grind or cut and pile brush and trees would cause localized compaction to the soil. Small vehicles, such as pickups, used in implementation of the North Steens Project or for subsequent firewood gathering would also cause small areas of soil compaction.

By reducing buildup of fuels, especially juniper, chances of a large-scale, high-intensity fire and erosion would be reduced.

There would be beneficial cumulative effects to soils under this alternative. Treatment of juniper would reduce the amount of soil being moved offsite by erosion. This would also reduce the amount of sediment in streams and ultimately in the meadow system at lower elevations outside the Project Area. Cumulative effects to untreated areas would be the same as those described under the No Treatment Alternative.

Limited Treatment Alternative
The Limited Treatment Alternative would reduce juniper expansion in larger portions of the Project Area than the Partial Treatment Alternative. Effects from this alternative in treated areas would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.

By reducing the buildup of fuels, especially juniper, chances of a large-scale, high-intensity fire in the North Steens area would be reduced and potential for erosion would also drop.

There would be beneficial cumulative effects to soils under this alternative. Treatment of juniper would reduce the amount of soil being moved offsite by erosion. This would also reduce the amount of sediment in streams and ultimately in the meadow system at lower elevations outside the Project Area.

Full Treatment Alternative
The Full Treatment Alternative would reduce the continued modification of vegetative communities by juniper expansion in larger portions of the Project Area than the Partial and Limited Treatment Alternatives. Effects from this alternative in treated areas would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.

There would be beneficial cumulative effects to soils under this alternative. Treatment of juniper would reduce the amount of soil being moved offsite by erosion. This would also reduce the amount of sediment in streams and ultimately in the meadow system at lower elevations outside the Project Area.

Continuation of Current Management Alternative
By continuing to treat from 2,000 to 4,500 acres of juniper yearly, some sites would show improvement in soil stability while most would not. Effects of treatments would be the same as those described under the Partial Treatment Alternative but on a much smaller scale. Effects to non-treated areas would be the same as under the No Treatment Alternative.

There would be beneficial cumulative effects to soils in areas where junipers are treated. Treatments would reduce the amount of soil being moved offsite by erosion and would also reduce the amount of sediment in streams. Eventually most of the worst sites for juniper encroachment would be treated and those sites would show improved soil stability.

Effects including cumulative effects to this resource are the same as those discussed in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
Effects of this alternative would be the same as the Full Treatment Alternative except beneficial effects to soils from fuels reduction would not be realized in wilderness. Fuel loading would continue on some sites in wilderness creating potential for effects described in the Continuation of Current Management.

Cumulative impacts to soils under this alternative would be reduced in nonwilderness sites due to projects that reduce fuel accumulation from juniper expansion. Some sites within wilderness could have future impacts on soil stability if juniper expansion is allowed to continue unabated. Effects of future large-scale, high-intensity fire events could produce soil erosion in some areas. Treatment of a wide variety of juniper stands throughout the entire Steens Mountain Area would eventually culminate in a healthier ecosystem and improved soil stability.

4.2.1.3 Wetlands, Riparian Areas and Water Quality

Potential Effects

No Treatment Alternative
If no treatment occurs, juniper would continue to expand within affected watersheds, and would likely expand into previously unaffected watersheds. As juniper occupies a greater proportion of canopy and root zones of both uplands and riparian areas, the species is likely to assume control of ecological site processes. This results in a positive feedback cycle in which hydrologic processes of affected watersheds can be severely disrupted. As juniper crowns mature and reach maximum spread, foliage intercepts precipitation that would otherwise reach the ground and become available to shrubs and herbaceous vegetation. At the same time juniper roots spread outward beyond the crown and downward into cracks in bedrock as trees mature capturing and rapidly transpiring through foliage the limited moisture that does reach the ground. The roots of as few as nine mature juniper trees have the capability to occupy 100% of the root zone of an acre of ground (Gedney et al.1999).

As competing plants lose vigor, and recruitment of new plants is suppressed, bare ground in spaces between trees increases. Without live plants and plant litter to protect soil surfaces from rain and create channels into the soil through which moisture can infiltrate, detached soil particles form crusts further impeding infiltration. This further decreases the capability for plants to sustain growth, provide soil aeration, assist in capturing and storing moisture, and maintain on-site nutrient cycling. Uplands may achieve a state beyond which self-restoration is no longer possible, and the community may consist almost solely of mature western juniper.

One result of stands composed of pure juniper is that bare ground and interconnectedness between bare-ground patches increases. As a consequence, surface runoff increases and moves toward stream channels. A study completed on Steens Mountain (Miller et al. 2005) clearly demonstrates sediment yield and erosion are higher in juniper-dominated plant communities than in communities in which juniper remains absent or is a minor component. These effects are essentially the same in riparian areas, and may compromise riparian function such that no buffer of riparian vegetation survives to capture overland flows from uplands and sediment that is carried along. Although juniper trees have deep, extensive root systems, roots are not as densely matted as with riparian species (such as willows, dogwoods, alders, sedges and rushes) and lack the capability to maintain bank stability during peak flows. Increased overland flow during storm events results in increased peak flows in streams. Without the stabilizing presence of roots from riparian plants, streams may become downcut, and riparian plant communities may eventually lose contact with water tables sustaining them. Channels may continue to cut downward until harder material is reached. By then, streams are no longer in balance with sediment being supplied by the watershed, and are unable to dissipate energy from peak flows.

Image 4.1. Juniper growing on terrace upstream of Page Springs.

At this stage, riparian areas may become nonfunctional, and no longer capable of naturally restoring the previous riparian plant community or PFC. Riparian communities in which juniper has assumed control of biotic and abiotic processes may include only a few upland plant species, have essentially ephemeral flows, little or no bank stability during peak flows, and may continue to degrade indefinitely.

Potential Effects Common to All Action Alternatives
All action alternatives propose to employ the same management actions (or "tools") to achieve project objectives for riparian habitat. Alternatives differ only in degree to which these tools would be applied to different land management categories. Potential environmental effects from using these tools are the same regardless of land management category, and would vary only in the likelihood that each would achieve measurable project objectives at the landscape level. Therefore, an analysis of potential effects begins with a general discussion of anticipated effects of employing tools individually. This would support a summary of effects of using these tools in concert to achieve project objectives.

All proposed tools would contribute to achieving the four riparian project objectives (Section 2.4, Objectives Common to all Action Alternatives (except the No Treatment Alternative), Objectives 7, 8, 10, and 12) which would improve watershed function, riparian condition and stability, water quality, and fish habitat. The RMP assumes "accomplishment of site/reach-specific objectives would be dependent upon existing condition (ecological status), and subsequent environmental factors such as drought and flood cycles", and the BMPs would be applied where appropriate (PRMP/FEIS p. 4-30). Benefits to riparian functioning condition would occur as a result of juniper reduction in uplands as well as riparian areas. Any method that removes juniper canopy and kills juniper root systems in uplands or riparian habitat would immediately make additional light and moisture available to competing vegetation. This would immediately begin to improve watershed stability and function by reducing overland surface flow, increasing water infiltration, and maintaining or restoring groundwater storage. Restored riparian function would contribute to overall improvements in water quality, aquatic habitat, and stabilizing stream banks. Severely degraded stream systems may require use of additional management tools in order to "kick-start" the recovery process, although the intent of using these tools would be to initiate self-sustaining recovery processes as soon as possible. Where healthy riparian vegetation is present, some streams may simply require time to achieve PFC.

Treatment Methods
Severity of effects resulting from prescribed fire can be controlled by limiting treatment areas or managing burn intensity relative to weather and physical, chemical, and biological characteristics of individual sites (Gresswell 1999). Use of prescribed fire (primarily broadcast burning) on a unit-by-unit basis coupled with cutting juniper in advance (when necessary) offers the ability to influence factors that determine severity of fire effects and predict likelihood of meeting project objectives. Prescribed fire would be timed to reduce risk of high-burn intensity that affects vegetation mortality and impacts to soils. Cutting juniper after burning (Project Design Element #23) would protect riparian soils and any existing riparian vegetation from effects of excessive heat that would result from localized presence of heavy fuels. Given characteristics of most streams in the Project Area (steep canyons with little flood plain) it is unlikely jackpot-burning or pile burning would be prescribed in riparian areas.

In "fireproof" stands in which juniper has assumed control of site processes, juniper would not likely be killed by wildfire. In stands with high fuel loads with capacity to burn with great intensity and severity, all existing vegetation would be killed. Wildland fire use would not be desirable in these areas without some prior treatment, and would not meet project objectives. Within this range of conditions, wildfire has a greater capacity to create conditions under which project objectives for riparian function can be achieved, and riparian areas can function without need for additional management intervention.

Temporary fencing is primarily an adaptive management tool used in conjunction with other methods. Fencing eliminates livestock grazing, resulting in accelerated growth of riparian vegetation, and accelerated progress toward PFC. Fences would be beneficial in areas where progress toward PFC is slow or nonexistent, and presence of grazing or browsing animals is impeding progress. Fencing is most likely to be prescribed where willows are expected to be a component of the potential community, establishment or reestablishment of willows is unlikely due to stocking levels or season of livestock grazing, or bank soil compaction or hoof-chiseling is expected to retard progress toward PFC. The decision to prescribe temporary fencing may be

made before or after treatment, depending on actual effects from the treatment method. Fences are least likely to be prescribed for riparian areas in which a healthy sedge and rush community has persisted, soil compaction and bank chiseling (from heavy hoofed animals) is unlikely to suppress this community, willows are not expected to be part of the potential community (or have reached adequate stature to escape browsing and were not affected by treatment), or where topography would restrict or eliminate livestock access no matter what condition results from treatment.

Effects to riparian vegetation and riparian functioning condition from juniper removal are described earlier in this section. Effects of leaving burned or unburned fallen trees (and deteriorating foliage) on-site include protecting (sometimes bare) soils from rain, interrupting overland flow patterns, creating shade for recruitment of riparian plant seedlings, increasing channel roughness and bank complexity to dissipate energy from peak flows, creating drift fences to interrupt movement of livestock along riparian areas, and protecting young woody vegetation from excessive browsing by both livestock and wild herbivores. These benefits can be offset when densities of fallen trees have potential for excessive fuel loadings after trees cure. It is expected juniper cutting would be used in conjunction with prescribed burning when necessary and where conditions are appropriate for achieving site-specific objectives.

Where it is not considered advantageous to leave fallen trees to deteriorate naturally on-site, burning of dead juniper would be prescribed only where existing riparian vegetation would not be killed by excessive heat from concentrated fuels, preserving the capacity of the site to recover as quickly as possible from sources of plant material. Since access for cutters would be almost entirely by foot, effects to riparian soil compaction from the cutting process would not be measurable.

As with temporary fencing, planting of shrubs such as willow whips or seeding with native or nonnative grasses is primarily an adaptive management tool used in conjunction with other tools. The decision to prescribe seeding may be made before or after treatment, depending on actual effects from the prescribed treatment method, or after the first growing season reveals the likely speed of vegetative recovery. Planting or seeding would be beneficial in areas where progress toward PFC is slow or nonexistent, and presence of grazing or browsing animals is impeding progress. Seeding or planting shrub stock would accelerate growth of riparian vegetation, and accelerate progress toward PFC. Due to topography and stream bank characteristics throughout most of the Project Area, seeding or planting would likely be accomplished by hand without use of mechanized equipment, which would have no measurable compacting effect to soil or increased soil erosion. Whatever appropriate method is prescribed, BMPs would ensure existing riparian vegetation is protected, and sediment input to streams does not have any measurable effect to water quality.

Effects to Riparian Vegetation

Riparian plant species are adapted to fluvial disturbance, which also facilitates survival and reestablishment following fires (Dwire and Kauffman 2003). Riparian plants have evolved with a variety of adaptations to facilitate recovery from effects of fire. Reeves et al. (1995) stated fire can be important for maintenance of such complex and productive habitats. Several grasses and forbs increase reproductive output in the first few years after fire (Kauffman 1990). Common riparian shrubs such as willow, alder, birch, currant and rose sprout from stumps, root crowns and below-ground stems following fire. Willows, cottonwoods and various herbaceous species also have potential to become established in high densities from windborne seeds.

Severity of effects to vegetation from fire and speed of recovery is dependent upon a variety of site-specific conditions such as season of occurrence, topographic position, fuel loading and weather. After light to moderate fire effects, riparian vegetation can regain a foothold on sites quickly, facilitating maintenance or restoration of channel function. In sites where restoration of grasses, sedges and rushes is the objective, depth of the water table can influence success of fire restoration efforts. Sites with shallow water tables (less incised channels for instance) are more likely to be restored without seeding. Sites with deeper water tables (where channels have become incised) may require seeding to achieve restoration (Blank, Chambers, and Zamudio 2003). The Kiger/East Ridge Project is a scaled-down and limited version of the proposed North Steens Project. Results from this project have demonstrated vegetation along Kiger Creek has responded with new growth of cottonwood, willow, and alder. Prior to introduction of fire into Kiger Gorge, there were few young cottonwoods. The same response is likely throughout the streams in the North Steens Project Area.

Effects to Riparian Physical Process
Effects to physical processes are also influenced by scale and severity of fire events. Sediment may enter the riparian area from adjacent uplands through overland flow, debris flow, mudslides, or earth flows. The last three events are unlikely to originate in steep rimrock with stable material. Large amounts of material may relocate or bury riparian vegetation, although vegetation that survives burning may also capture finer sediments and build flood plain soils. Sediment inputs from uplands and riparian areas may increase during the first rainy season after treatment if riparian vegetation has been severely reduced or eliminated by fire or juniper expansion. However, in riparian areas in which sedges, rushes and stump-sprouting shrubs have survived to green-up in the first growing season, no additional sediment input is likely.

Where natural recovery is slow, elevated sediment input is likely to return to pre-treatment levels after one to five growing seasons (based on experience with projects in Andrews RA.). In riparian areas where natural recovery of vegetation is not progressing rapidly enough to protect bare soil and bank stability is threatened, planting or seedings would be prescribed in conjunction with temporary fencing if necessary. Long-term (beyond 3 years) benefits to riparian functions that maintain channel structure, store groundwater, and reduce sediment input should result.

In uplands, killing juniper would eliminate interception of precipitation by juniper canopies, absorption of moisture through juniper roots, and transpiration of moisture through juniper foliage. This would increase the amount of moisture reaching the soil, which would invigorate shrub-steppe plant communities, increase soil infiltration, and improve availability of groundwater recharge to augment late-season stream flows. As demonstrated in a study completed in southeastern Oregon, cutting juniper results in an increase of shrub and herbaceous cover (Bates et al. 2000), which is better suited to protecting soil surfaces from rain, and better able to provide for discontinuous flow patterns from uplands to riparian areas.

Effects to Water Quality
Water quality would improve with improved watershed function where erosion and sediment inputs are minimized, channel bank stability is reinforced, infiltration rates increase, and groundwater recharge is restored. Adequate intervals between treatments would offset potential for effects to downstream areas within the same (6th field) subwatershed. Monitoring and adaptive management are important features of all action alternatives. Recognizing the importance of learning from results of management actions, and adjusting management as necessary is critical to effective management (Walters 1986) and ultimately recovery of riparian function.

Action alternatives are intended to cause beneficial cumulative effects to riparian functioning condition within the Project Area for years to decades after implementation, which would subsequently benefit water quality and fisheries habitat. Potential for short-term (1-3 years), adverse cumulative effects to water quality would take the form of increased sediment from unprotected soil reaching streams (especially during the first rainy season after treatment) from multiple treatment areas in the same condition simultaneously. For instance, an adverse effect could occur if multiple stream reaches within the same 6th field HUC are treated and bare soil is left exposed, or treatments occur in an adjacent 6th field HUC which is a tributary to a common, larger-order stream. Adverse effects could accumulate as a result of implementing the Preferred Alternative only or from the Preferred Alternative and other projects implemented in the same 1-3-year period. Potential for adverse, short-term (1-3 years) cumulative effects would be addressed in the implementation schedule for individual project units.

Other projects with potential to contribute to short-term**,** adverse effects during the implementation period include projects within North Steens Project Area (juniper treatments within the WJMA, Ruby Springs, and Kiger / East Ridge), projects adjacent to North Steens (Five Creeks Project, Kiger/East Ridge, and East Steens), and projects that may occur throughout the AMU (hazardous fuels reductions conducted under categorical exclusions).

Partial Treatment Alternative
Watersheds representing approximately 70-75% of the total Project Area would not be available for treatment by active management other than use of wildfire. Since timing, frequency and specific location of wildfire events cannot be predicted, the likelihood of achieving measurable and nonmeasurable project

objectives within these areas is not known. Since prescribed burning methods and juniper cutting would not be considered for the majority of the Project Area, any plan to achieve the landscape-level objective for treatment of at least 10 miles of riparian habitat over 5 years would concentrate effects in the 25-30% of the Project Area outside Steens Mountain Wilderness and WSAs. After timing and arrangement of treatment units have been evaluated for effects to water quality, it is likely more than 5 years would be required to achieve this objective. Conversely, wildfire could achieve the numerical objective in one or more seasons within the 5-year period, although achievement of site-specific objectives cannot be predicted.

Without wildfire, juniper stands would continue to expand and develop in riparian areas and associated uplands in all 6th field HUCs of the Donner und Blitzen River system (4th field HUC) upstream from Page Springs, and in all or parts of the following 6th field HUCs outside the Donner und Blitzen system: Mud (Lower Donner und Blitzen), Bridge, Home, Kiger, McCoy, Threemile, and Wildhorse Creeks. Where juniper has already been identified as contributing to at-risk riparian functioning condition (7.9 miles in Bridge Creek, Deep Creek, and South Fork Donner und Blitzen River), it is likely at-risk functioning conditions would persist. In streams where PFC has been achieved, but juniper was identified as a potential risk (5.9 miles in Home Creek and Mud Creek-upper Donner und Blitzen River), continued development of juniper stands could imperil functioning condition. In watersheds, where juniper is present but not yet established in riparian areas, the likelihood is great juniper would become established.

The objective for reducing expansion juniper in riparian areas by 75-85% within the Project Area would not be possible without occurrence of one or more wildfire events effective in killing mature juniper. Although the 2006 wildfires burned a large area, juniper mortality was low for large portions of the burn area, and it is likely this would occur again.

Although the Partial Treatment Alternative would apply prescriptive treatments to a small portion of the Project Area, project units would still be spread between drainages based on site-specific evaluation to reduce potential of any adverse cumulative effects to riparian areas, water quality, and fish.

Limited Treatment Alternative

Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire in riparian areas. However, juniper cutting would not occur in wilderness and WSAs corridors. Since timing, frequency, and specific location of treatments can be planned and executed under prescribed conditions, the likelihood of achieving measurable and nonmeasurable project objectives within these areas is greater than under the Partial Treatment Alternative. However, without juniper cutting, it is possible or even likely burning alone would not achieve site-specific objectives, especially in stands in riparian areas in which little or no understory has survived, and fire cannot travel across juniper crowns. Still, any plan to achieve the landscape-level objective for treatment of at least 10 miles of riparian habitat over 5 years is more likely to succeed than under the Partial Treatment Alternative. After timing and arrangement of treatment units have been evaluated for effects to water quality, it is possible the landscape-level objective could be achieved in 5 years. As with all action alternatives, wildfire could achieve the numerical objective in one or more seasons within the 5-year period, although achievement of site-specific objectives would be less predictable.

Expansion and development of juniper stands could be arrested in riparian areas and associated uplands in all 6th field HUCs of the Project Area. In streams where PFC has been achieved, but juniper was identified as a potential risk (5.9 miles in Home Creek and Mud Creek-upper Donner und Blitzen River), juniper treatment may succeed in preventing loss of functioning condition in the future, if stands are not fireproof. In watersheds where juniper is present but not yet established in riparian areas, prescribed fire in uplands could ensure juniper does not become established at some future time.

The objective for reducing expansion juniper in riparian areas by 75-85% within the Project Area would be possible without occurrence of one or more wildfire events effective in killing mature juniper. The likelihood of achieving this objective would be better assessed as riparian areas are evaluated on a site-specific basis and prioritized for treatment. Although the Limited Treatment Alternative would apply prescriptive treatments throughout the Project Area, project units would still be spread between drainages based on site-specific evaluation to reduce potential of any adverse effects to riparian areas, water quality, and fish.

Full Treatment Alternative
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire and juniper cutting by nonmechanized methods in riparian areas (wilderness and WSAs would also be treated). Juniper cutting could be applied wherever it is determined to be a suitable method. It is likely site-specific project objectives would be achieved in all riparian treatment areas, including stands in riparian areas in which little or no understory has survived. Since timing, frequency, and specific location of treatments can be planned and executed under prescribed conditions with all available tools, the likelihood of achieving measurable and nonmeasurable project objectives within these areas is greater than under other action alternatives. Any plan to achieve the landscape-level objective for treatment of at least 10 miles of riparian habitat over 5 years is more likely to succeed than under the Partial Treatment Alternative. After timing and arrangement of treatment units have been evaluated for effects to water quality, it is most likely the landscape-level objective could be achieved in 5 years (in comparison to other action alternatives). As with all action alternatives, wildfire could achieve the numerical objective in one or more seasons within the 5-year period, although achievement of site-specific objectives would be less predictable.

Effects to riparian functioning condition of streams would be the same as with the Limited Treatment alternative, with a higher likelihood of success in achieving site-specific objectives for riparian areas. Likelihood of achieving the riparian objective for reducing expansion juniper in riparian areas is also higher than for other action alternatives. Project units would also be spread between drainages based on site-specific, post-treatment evaluation in order to reduce potential of any adverse cumulative effects to riparian areas, water quality, and fish.

Continuation of Current Management Alternative
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire and juniper cutting by nonmechanized methods in riparian areas (wilderness and WSAs would be treated with appropriate NEPA analysis). Potential effects to riparian functioning condition would be generally the same as the Full Treatment Alternative, although it is likely treatments would be applied at a smaller scale to areas within Steens Mountain Wilderness. Nonmeasurable project objectives could be achieved as with the action alternatives. However, no measurable objectives with specific timeframes would be applied to the Project Area as a whole. As with all action alternatives, timing and arrangement of treatment units would be evaluated in advance for potential effects to water quality.

Preferred Alternative
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire and juniper cutting by nonmechanized methods in riparian areas. Effects to riparian function and water quality in approximately 69% of the total Project Area (outside Steens Mountain Wilderness) would be the same as with the Full Treatment Alternative. Within Steens Mountain Wilderness (31% of the total Project Area), the full range of treatments would also be available based on additional NEPA analysis. However, the scale of projects implemented would likely be much smaller, and the total number of acres treated much lower within the same time frame as that of the Full Treatment Alternative. For areas in wilderness left untreated, effects would be the same as those described under the No Treatment Alternative.

In comparison to the Full Treatment Alternative, juniper stands would be more likely to continue to expand and develop in riparian areas and associated uplands in substantial portions of 6th field HUCs of the Donner und Blitzen River system (4th field HUC) upstream from Page Springs, and in all or parts of the following 6th field HUCs outside the Donner un Blitzen system: Home, Kiger, McCoy, Threemile, and Wildhorse Creeks. Where juniper has already been identified as contributing to at-risk riparian functioning condition (4.7 miles in Deep Creek and South Fork Donner und Blitzen River), it is more likely at-risk functioning conditions would persist than with the Full Treatment Alternative. In streams where PFC has been achieved, but juniper was identified as a potential risk (5.9 miles in Home Creek and Mud Creek-upper Donner und Blitzen River), continued development of juniper stands could imperil functioning condition in the future if the scale of proposed treatments is not large enough to maintain riparian plant communities. In watersheds where juniper is present, but not yet established in riparian areas, the likelihood is great juniper would become established at some future time.

Outside of wilderness it is likely site-specific project objectives would be achieved in all riparian treatment areas, including stands in riparian areas in which little or no understory has survived. Within wilderness the likelihood of achieving site-specific objectives would be limited by the scale of projects successfully implemented. After timing and arrangement of treatment units have been evaluated for effects to water quality, it is most likely the landscape-level objective could be achieved in 5 years (in comparison to the other action alternatives), although wildfire may be required to have a greater contribution in wilderness. As with all action alternatives, wildfire could achieve the numerical objective in one or more seasons within the 5-year period, although achievement of site-specific objectives would be less predictable.

4.2.2 Biological Soil Crusts and Vegetative Resources

4.2.2.1 Biological Soil Crusts

The cumulative effects area is defined as the Project Area for this resource. Cumulative effects are included within the description of the potential effects.

The description of factors influencing distribution of biological soil crusts (TR-1730-2) found in Chapter 3 of this document are utilized below as categories for discussion of potential effects on biological soil crusts from selection of a given alternative. For a description of how these factors may influence biological soil crust distribution, see the Biological Soil Crust section of Chapter 3 of this document.

Potential Effects

No Treatment Alternative
Elevation - The No Treatment Alternative would allow the continued modification of vegetative communities by juniper expansion. The focus of this modification would be in the juniper belt, which occurs primarily from 4,500 to 6,500 feet in elevation in the Project Area. Biological soil crusts occur in old-growth and expansive juniper populations, but are not as readily evident in the modified understory of the recent (post-1870 trees) juniper population expansion. This may be a function of light reduction, moisture interception, disturbances, and site-specific soil chemistry.

Soils and Topography - Shallow, less productive and deeper, more productive soils support biological soil crusts. Juniper expansion influences these two generic soil categories differently. Juniper expansion is more rapid in deeper soils and the populations that occur are denser in productive soils; whereas, shallow, less productive soils are generally where juniper expansion is limited and old-growth juniper tends to occur.

The risk of large-scale, high-intensity wildfire as an effect of selecting the No Treatment Alternative could threaten remnant biological soil crusts in dense juniper stands in deep soils. Risk of wildfire is much less of an issue where soils are poor and shallow which is a function of the natural lack of fuels. Since biological soil crusts are generally more common in less productive soils with large interspaces between vascular plants, the larger percentage of biological soil crusts in the juniper belt should not be adversely influenced by large-scale fires.

Initially there should be very little influence on biological soil crusts in poor soil areas as a result of selecting the No Treatment Alternative. Over the next 20-80 years, juniper populations could increase in poor soil areas to the point where fire could scorch the soil and biological soil crusts.

Disturbance - As a fire burns through an area, some vegetation and biological soil crusts are left uninfluenced. The mosaic pattern in vascular vegetation may be mirrored by biological soil crust communities. Biological soil crusts also occur in areas without vascular vegetation, so the total remaining biological soil crust cover in a burned area should be sum of the remnant cover in the vascular vegetation mosaic and the unburned interspaces or areas of naturally low fuels. Selection of the No Treatment Alternative could produce situations where large-scale, high intensity wildfire events burn entire areas without leaving a mosaic of unburned vegetation. If this occurs, natural recovery of biological soil crusts could be slowed considerably due to the reliance on recolonization from fewer unburned biological soil crust populations.

Timing of precipitation - Moisture regimes can play a large role in biological soil crust community composition. Increased juniper cover reduces available precipitation from each rain event. Amount of precipitation reaching the ground in a stand of juniper can be significantly altered compared to sagebrush-dominated systems. Increases in moisture interception could result in a lack of biological soil crusts in expanded juniper populations where foliar cover has increased dramatically.

Biological soil crusts play a varied role in a functioning ecosystem. In a given ecoregion ecological roles of biological soil crusts can vary widely in their importance and would depend on crust composition and biomass, as well as characteristics of the specific ecosystem being considered (TR-1730-2).

General cumulative effects to biological soil crusts could include effects from alterations of historical fuel loads in the Project Area. Increased fuel loading can provide conditions leading to large-scale, high-intensity fire events (resulting in loss of biological soil crusts over large continuous areas). Loss of a mosaic of unburned biological soil crusts could result in an extended recovery time at that site. Even after early recovery, biological soil crusts in large, uninterrupted burnt areas could be susceptible to disturbance from wind (dust) or water events.

Through new monitoring efforts, information specific to the Andrews RA is currently being gathered.

Partial Treatment Alternative
Elevation - The Partial Treatment Alternative would reduce continued modification of vegetative communities by juniper expansion in some portions of the Project Area. The focus of this modification would be in the juniper belt. Biological soil crusts may benefit from reduced juniper population expansion and associated cover. Benefits may be a function of light or moisture increase.

Soils and Topography - Risk of large-scale, high-intensity fire as an effect of selecting the Partial Treatment Alternative would be diminished in some areas, but could threaten biological soil crusts in untreated areas with dense juniper stands. The risk of large-scale wildfire is much less of an issue where soils are poor and shallow which is a function of the natural lack of fuels. Since biological soil crusts are more common in less productive soils with large interspaces between vascular plants, the larger percentage of biological soil crusts in the juniper belt should not be ad by large-scale fires.

Initially there may be very little influence on biological soil crusts in untreated areas as a result of selecting the Partial Treatment Alternative. Over the next 20-80 years, juniper populations could increase in untreated areas and modify biological soil crust communities.

Disturbance - Prescribed burning in the form of broadcast, jackpot or individual tree burning could have an effect on biological soil crusts. By removing biological soil crust cover through burning some areas, especially areas with a moss/shrub component, could experience prolonged biological soil crust recovery periods. Biological soil crusts in areas of naturally low fuels (low sagebrush sites) would less likely have affects from fire. The intent of proposed prescribed fire is to create a vegetation mosaic of seral stages. As fire burns through an area, some vegetation is left unburned as are biological soil crusts. Mosaic patterns in vascular vegetation may be partially mirrored by biological soil crust communities. Biological soil crusts also occur in areas without vegetation, so the total remaining biological soil crust cover in a burned area should be the sum of cover in unburned vegetation and untreated interspaces or areas of naturally low fuels.

Fencing would not have any wide-spread influence on biological soil crusts unless the structure concentrates wildlife or livestock in small areas resulting in localized compaction or mechanical disturbance.

Post-fire reseeding or planting of native or desirable nonnative vegetation could benefit biological soil crusts by increasing perennial plants and providing micro-site moisture soil stability. This method, in concert with post-treatment rest from grazing, has recently been shown to benefit biological soil crust recovery in moss dominated biological soil crust communities (Hilty et al. 2004).

Use of large tracked or wheeled machines to either grind or cut and pile brush and trees could cause localized compaction to soil and biological soil crusts.

By reducing buildup of fuels, especially from increasing numbers of juniper, chances of a large-scale, high-intensity fire in the North Steens Project Area would be reduced as well as potential for creation of large, uninterrupted burnt areas.

Effects to biological soil crusts in wilderness or WSAs would be substantially the same as the No Treatment Alternative.

Timing of precipitation - The amount of precipitation reaching the ground in a stand of juniper can vary significantly compared to sagebrush-dominated systems. Moisture interception could account for lack of abundant biological soil crust populations in expanded juniper populations where foliar cover has increased dramatically. The Partial Treatment Alternative would reduce interception of precipitation in treated areas.

Information specific to the Andrews RA is currently being gathered via new monitoring efforts. The BMPs would be developed and implemented as determined necessary by the Field Manager.

Over the next 20-150 years, the total biological soil crust cover may increase in the Project Area as treated areas with proper site-specific soil chemistry are restored to pre-juniper expansion conditions.

Limited Treatment Alternative
The Limited Treatment Alternative would reduce continued modification of vegetative communities by juniper expansion in larger portions of the Project Area than the Partial Treatment Alternative. Effects in treated areas from this alternative would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.

Initially there may be very little influence on biological soil crusts in untreated areas as a result of selecting the Limited Treatment Alternative; however, over the next 20-80 years, juniper populations could increase in untreated areas to the point where large-scale, high-intensity wildfires could scorch the soil and biological soil crusts.

Full Treatment Alternative
The Full Treatment Alternative would reduce continued modification of vegetative communities by juniper expansion in larger portions of the Project Area than the Partial Treatment Alternative. Effects from this alternative in treated areas would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.

Initially there may be greater influence on biological soil crusts in treated areas as a result of selecting the Full Treatment Alternative; however, over the next 5-50 years, juniper populations would decrease in treated areas to the point where historic-scale wildfires would maintain the shrub and biological soil crust mosaics once again.

By reducing buildup of fuels, especially from increasing numbers of juniper, chances of a large-scale, high-intensity fire in the North Steens Area would be reduced as well as potential for creation of large, uninterrupted burnt areas.

Continuation of Current Management Alternative
Potential effects from the Continuation of Current Management Alternative on biological soil crusts are substantially the same as those described in the No Treatment Alternative. The primary difference, however, is the Continuation of Current Management Alternative would allow for new treatment proposals under new environmental analysis.

In areas where new proposals occur and are implemented, effects to biological soil crusts would differ from the effects expected from selection of the No Treatment Alternative and would be the same in nature to effects described under the Partial treatment Alternative.

Preferred Alternative
Potential effects of the Preferred Alternative on biological soil crusts are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on biological soil crusts within wilderness are the same as those described in the Continuation of Current Management Alternative and referenced sections of the No Treatment Alternative.

4.2.2.2 Forestry/Woodlands

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative, juniper would continue to expand into mountain big sagebrush, quaking aspen, low sagebrush, and riparian plant communities. Ninety-five percent (95%) or greater of western juniper woodlands within the Project Area have established since the 1870s. Prior to juniper establishment and growth these areas were primarily mountain big sagebrush plant community. Tree density and cover would also continue to increase in existing woodlands. The increase in juniper would negatively affect associated woody and herbaceous vegetation. In low sagebrush and existing old-growth juniper woodlands, effects of juniper increase would be less obvious. The lower potential site productivity of low sagebrush and old-growth juniper stands limits the ability of young juniper to establish. Fewer sites are available for seedlings, and once a seed germinates competition for resources is more intense in these low productivity sites. Once juniper becomes established on shallow soil sites, it is a very effective resource competitor. Younger trees would be very active and capable of suppressing associated vegetation, including old-growth trees.

Associated shrubs and herbaceous plants would continue to be reduced in a more productive big sagebrush plant community. On shallower soil big sagebrush plant community shrubs and herbaceous vegetation would be reduced to very low levels, potentially less than 2% cover. However, on deeper soils herbaceous vegetation would persist even under higher cover of juniper. Deeper soil sites would have much more dense juniper woodlands than shallower soil areas.

Reduction in vegetation would open sites to soil erosion from water. Risk of erosion would be greatest in late transition to fully-developed woodlands. Bare ground is highest under these conditions. Soil erosion would primarily occur following summer thunder storm or during winter months when soils are frozen.

Establishment of juniper across the Project Area would effectively homogenize the structure of vegetation. Conversion of mountain big sagebrush, quaking aspen, low sagebrush, and riparian plant communities to juniper woodlands simplifies the structure of vegetation. Plant communities once of varying heights, cover, and composition would become more similar as juniper dominates. Western juniper would become the dominant feature on the landscape where there was once a mosaic of sagebrush, quaking aspen and riparian plant communities. The casual observer would not be able to identify the underlying changes in plant and animal communities because of increasing tree cover. However, those differences would still be present. Other species would be suppressed by tree cover.

Increase in juniper would reduce presence and diversity of other plant species. Diversity of wildlife species would decrease and favor woodlands species. Middle to high elevation mountain big sagebrush, quaking aspen, and riparian plant communities are important for many wildlife species utilizing these areas in spring, summer, and early fall. The adjacent Five Creeks Project will cut and prescribe burn over 10,000 acres on the northern end of Steens Mountain in Three Rivers RA. Treatment of those stands will help restore sagebrush plant communities and habitat for sagebrush obligate species.

The homogenization of fuels layers would also place old-growth juniper woodlands at risk of burning. The risk would be from fires burning into old-growth stands from adjacent, fully-developed woodlands and from an increase in younger juniper in these shallow soil areas.

Partial Treatment Alternative
Woodlands within wilderness and WSAs would continue to experience an increase in juniper. Western juniper would eventually become the sole woody species in the plant community. Understory herbaceous plants would also be suppressed. The degree to which herbaceous plants are affected depends on soil depth. Perennial grasses and forbs have been found to be reduced to less than 1% cover on shallow soil sites dominated by juniper (Miller et al. 2005). However, on deeper soils commonly found in quaking aspen and some mountain big sagebrush sites, shallower rooted perennial grasses and forbs may remain in the understory of very dense juniper woodlands.

Areas outside of wilderness and WSAs that have been cut, burned, or both, would transition toward sagebrush dominance. Initial stages would be dominated by herbaceous grasses. Ground cover would initially be the same as or slightly below pre-burn conditions. However, within 2-4 years herbaceous ground cover would surpass pre-treatment values. Sagebrush would begin to recolonize burned areas within the first year, but may take up to 20 years to reach pre-burn cover values.

Standing, dead trees would remain upright for approximately 10 years. Cut trees not burned would retain needles for 2-3 years. Rate of decomposition of woody material would depend on the amount of soil contact. Once wood contacts the soil surface, rate of decomposition would increase dramatically. Some larger cut trees would still be apparent for up to 15 years following cutting.

Quaking aspen and riparian hardwood stands outside of wilderness and WSAs would revert from juniper dominance toward hardwood dominance. Suckering from aspen and sprouting from riparian hardwoods would create a dense stand of stems initially. As suckers grow and become larger, weaker stems would be suppressed and eventually eliminated from the stand. Total number of quaking aspen trees would self-thin over time. Areas where only juniper trees were cut and quaking aspen were left standing would experience a release of younger juniper. The result would be a mixed post-treatment stand of juniper and hardwoods.

Overall, approximately 50-60 % of expansion woodlands outside of wilderness and WSAs would be converted to sagebrush, quaking aspen, and riparian woodlands through the life of the project (approximately 25 years).

Treatment of juniper in part of the Project Area would help to increase diversity at the plant community, watershed, and landscape level. Areas would be converted back to shrub dominance after passing through an herbaceous phase in some cases. Animal species preferring shrub and herbaceous-dominated systems would increase. Areas converted to shrub and herbaceous plant dominance would help to increase connectivity of sagebrush plant communities.

Natural ignitions would be managed to reduce influence of juniper in Steens Mountain Wilderness and WSAs. Success of natural ignitions to meet the management goal would be dependent on stand structure and understory composition. Fire would be capable of moving from the ground to the juniper canopy in areas where sagebrush is still present in the understory. The level necessary to carry a fire depends on fire weather conditions. In general, areas with an understory sagebrush cover greater than 10% would require a wind of at least 5 miles per hour (mph). Areas with understory sagebrush cover less than 10% to 5% would require a wind greater than 15 mph to carry into the canopy. Areas with understory sagebrush cover less than 5% would probably not burn under conditions safe for firefighters and the general public. Each naturally-ignited wildland fire within Steens Mountain Wilderness and WSAs would be evaluated per the Fire Management Plan and Wildland Fire Use Plan. If the fire is believed to be capable of meeting resource objectives and safety concerns can be mitigated, the fire would be managed for resource benefits.

Cut juniper (outside of wilderness and WSAs) could be available for removal for firewood or commercial uses. Removal from the site may require additional mechanized equipment. Use of this equipment may have effects to residual vegetation. Limiting mechanized equipment to times when plants are dormant (fall, winter and early spring) and soils are either dry or frozen would limit effects. Existing roads would be utilized and not improved to facilitate removal of cut material. There would be no effect to the nutrient balance on the site because only bole wood would be removed. Limbs and needles, where a majority of the nutrients exist, would be left on site. The remote location and road system limits the commercial value of cut juniper.

Old-growth juniper and quaking aspen woodlands would also be restored by removal of younger juniper. These woodlands would provide habitat for many wildlife species onsite and from adjacent areas.

Cumulative effects of the Partial Treatment Alternative include increasing the structural diversity across the area north of Steens Loop Road. The Five Creeks Project Area, north of the proposed Project Area, will also reduce levels of western juniper dominance. Cutting and burning within the two projects would create a mosaic of multiple successional stages and plant communities. However, south of Steens Loop Road in Steens Mountain Wilderness and WSAs, western juniper would continue to increase density and cover within mountain big sagebrush, quaking aspen and riparian plant communities. Across this southern portion of the Project Area, structure of vegetation would shift from a diverse landscape to simplified juniper woodlands. Unique plant communities in wilderness and WSAs would be suppressed or lost due to juniper increase.

Limited Treatment Alternative
The Limited Treatment Alternative would have the same effects on woodlands as the Partial Treatment Alternative with the following exceptions. Additional areas could be treated with fire under this alternative. Treatment of these areas would help to return these woodlands to a condition closer to historic than is the present condition. Reduction in trees (through prescribed fire and fire use) established after 1870 would help to restore old-growth stand characteristics. Treatment in these stands would comprise less than 1% of the landscape.

Treatment of juniper in part of the Project Area would help to increase diversity at the plant community, watershed, and landscape level. Areas would be converted back to shrub dominance after passing through a herbaceous phase in some cases. Animal species preferring shrub and herbaceous-dominated systems would increase in the Project Area following reestablishment of shrub cover. Areas converted to shrub and herbaceous plant dominance would help to increase connectivity of sagebrush plant communities.

Prescribed burning would occur in Steens Mountain Wilderness and WSAs. Prescribed burning would be limited to areas where the understory sagebrush cover is sufficient to carry a fire into the canopy of western juniper. Shrub cover is dependent in part to current fire weather conditions. In general, areas with an understory sagebrush cover greater than 10% would require a wind of at least 5 mph. Areas with understory sagebrush cover less than 10% to 5% would require a wind greater than 15 mph to carry into the canopy of western juniper. Areas with understory sagebrush cover less than 5% would probably not burn under conditions safe for firefighters and the general public. Naturally-ignited fires would also be managed for resource benefits under this alternative. Fires, prescribed and wildland fire use incidents, would burn in a mosaic pattern and follow areas where fuels are sufficient to carry fire. Dense areas of western juniper would be left unburned within the burned area perimeter.

Effects of removal of cut western juniper would be the same as the Partial Treatment Alternative.

Old-growth juniper and quaking aspen woodlands would also be restored by removal of younger juniper. These woodlands would provide habitat for many wildlife species onsite and from adjacent areas.

A larger area would be available for treatment than in the Partial Treatment Alternative. The larger area coupled with the adjacent Five Creeks Project increases the area that would be converted to herbaceous dominated plant communities in the first 5 years following initiation of the project. Following that initial herbaceous plant phase, mountain big sagebrush and other shrubs would begin to reestablish and eventually dominate the site. Shrubs should begin to dominate the site within 10 years of treatment and should be fully occupying the treated areas within 20 to 30 years of treatment (Miller et al. 2005).

Full Treatment Alternative
The Full Treatment Alternative would restore old-growth juniper woodlands at a faster rate than other alternatives.

Treatment of juniper across the Project Area would help to increase diversity at the plant community, watershed, and landscape level. Areas would be converted back to shrub dominance after passing through a herbaceous phase in some cases. Conversion to shrub and herbaceous plant communities would be quicker

than the Limited Treatment Alternative because of the potential inclusion of some mechanical treatments in the WSAs and juniper cutting within Steens Mountain Wilderness. Areas converted to shrub and herbaceous plant dominance would help to increase connectivity of sagebrush plant communities.

Old-growth juniper and quaking aspen woodlands would also be restored by removal of younger juniper. These woodlands would provide habitat for many wildlife species onsite and from adjacent areas.

Cumulative effects of the Full Treatment Alternative would be the same as the Limited Treatment Alternative.

Continuation of Current Management Alternative
Effects to this resource are the same as those contained in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
Potential effects of the Preferred Alternative on forestry/woodlands are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on forestry/woodlands within wilderness are the same as those described under the Continuation of Current Management.

4.2.2.3 Noxious Weeds

The noxious weeds section utilizes the Project Area for the purposes of effects analysis. Noxious weed invasions do, however, have potential to affect areas outside the Project Area. The PDEs are designed to avoid this issue.

Potential Effects

The assumptions for this resource are the PDEs would be effective in preventing noxious weed spread and establishment. This assumption is critical for the following input and analysis.

No Treatment Alternative
Juniper expansion and wildfire events would continue to create expanses of modified habitat susceptible to invasion by noxious weeds. Survey and treatment would be difficult to perform, and noxious weeds could continue to spread undetected. The application of approved noxious weed control methods including mechanical, biological, and chemical treatments on new and existing sites would continue to utilize an integrated weed management approach.

Partial Treatment Alternative
The Partial Treatment Alternative would use prescribed fire (outside wilderness WSAs) in addition to other methods to restore rangeland habitat in the effected environment. Some noxious weeds possess the ability to spread rapidly through habitat disturbed by fire. Noxious weeds can capitalize on nutrients released from burned vegetation; this can also occur due to creation of bare spots and areas of reduced vegetation that can provide niches for noxious weeds to occupy. Biennial thistles, dalmatian toadflax, and medusahead rye are very effective at exploiting these niches. In addition, noxious weed seeds are easily introduced to these disturbed areas by birds, rodents, livestock, infested vehicles, and outside sources such as hunters and other recreationists. Incidentally, existing and new populations of weeds located within the North Steens Project Area could increase in number due to creation of potential seedbeds from fire disturbance related to the project. However, the proposed Project Area is unique as it has relatively few infestations of noxious weeds and should resist any rapid spread of noxious weeds, particularly with an aggressive survey and treatment strategy.

If juniper expansion continues to the detriment of other native vegetation, more opportunities for noxious weed invasion would occur. Reduction of juniper should reverse this process. Presently, few significant noxious weed infestations exist within the North Steens Project Area. However, the Project Area is increasingly visited by people arriving from areas infested with weeds. An increase in visitors increases

probability of noxious weed introductions. Initially, prescribed fire would open up available niches by creating disturbance. This, combined with an increase in visitation and concomitant noxious weed introduction, could cause an initial increase in new weed populations. However, once native vegetation is released in response to juniper removal, habitat would be more able to resist infestation. The out year effect would be improved habitat and decreased frequency of noxious weed introduction and spread when combined with an aggressive survey and treatment strategy.

Limited Treatment Alternative
In treated areas, potential effects would be the same as the Partial Treatment Alternative, but with more fire disturbance (prescribed and natural).

Cumulative effects would be the same as the Partial Treatment Alternative but with decreased potential for noxious weed invasion due to further decreased juniper expansion from prescribed fire treatments.

Full Treatment Alternative
Potential effects would be the same as the Partial Treatment Alternative and Limited Treatment Alternative, but with the greatest potential for fire disturbance (prescribed and natural).

Cumulative effects would be the same as the Partial Treatment Alternative and Limited Treatment Alternative, but with decreased potential for noxious weed invasion due to further decreased juniper expansion from prescribed fire treatments.

Continuation of Current Management
Effects to this resource are the same as those contained in the No Treatment and Partial Treatment Alternatives for untreated and treated areas, respectively. New proposals could still be analyzed and implemented, however.

Cumulative effects to this resource are the same as those contained in the No Treatment Alternative.

Preferred Alternative
Potential effects of the Preferred Alternative on noxious weeds are the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. The potential effects of the Preferred Alternative on noxious weeds within wilderness are the same as those described under the Continuation of Current Management.

4.2.2.4 Vegetation

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative, juniper would continue to increase cover and density on mountain big sagebrush, quaking aspen, and riparian plant communities. Plant species diversity would be decreased across the Project Area with increasing juniper. As western juniper increases density and cover, the composition of understory plants would become similar across the landscape. Increasing western juniper cover and density reduces the number of plant species present and favors shallow-rooted plants. Western juniper woodlands would form in place of mountain big sagebrush, quaking aspen and riparian plant communities. Subtle differences in plant community composition and structure would be hidden by formation of juniper woodlands.

Sagebrush cover and density would be reduced by increasing juniper. Reduction in sagebrush cover would be related to the species and subspecies of sagebrush present and soil type. Loss of sagebrush would be quickest on the mountain big sagebrush plant communities on southern aspects. Soils are often shallower than in valley bottoms or north aspects. Understory vegetation may also be drastically reduced on these south aspects and shallower soils. Deep-rooted perennial grasses and forbs may persist in communities longer than shrubs, but eventually competition would also reduce their cover and density. Shallower rooted perennial grasses (Sandberg's bluegrass, bottlebrush squirreltail) and perennial forbs (phlox, buckwheat)

may persist longer than deeper rooted perennial grasses. On deeper soil with north aspects, shrubs would be drastically reduced or eliminated, but understory grasses and forbs may persist even under a fairly dense juniper canopy.

Western juniper density and cover would increase in low sagebrush plant communities, but at a much slower rate than in the more productive mountain big sagebrush plant community. Low sagebrush would be reduced, but understory plants would not be suppressed to the same degree as in mountain big sagebrush plant communities. Early growth and termination of the annual life cycle permit these plants to persist.

Middle to lower elevation quaking aspen stands and riparian plant communities would be reduced by increasing juniper under the No Treatment Alternative. The rate of juniper growth is greatest on these sites. Juniper has potential to form closed woodlands with canopy covers in excess of 75% on these sites. Under these conditions understory vegetation is all but eliminated. Only a small number of annual plants and very shade tolerant herbaceous plant species would exist under this level of juniper canopy coverage. The combination of juniper competition and drastic reductions in light levels would eliminate quaking aspen, willow, alder, and cottonwoods from the plant community, or restrict them to small openings in the stand. The soil surface would accumulate a litter layer composed of dead juniper needles, which are more resistant to decomposition than hardwood leaves. The chemistry of juniper needles would also shift the litter layer and surface soil horizon pH toward a more acidic condition than under quaking aspen woodlands.

Reestablishment of sagebrush plant communities would be slowed under the No Treatment Alternative. Areas dominated by annual plants or crested wheatgrass seedings would be maintained in these conditions. Establishment of sagebrush would be slow because of limited seed dispersal. Areas dominated by annual grasses and forbs would also remain at a much higher risk for fire than plant communities dominated by perennials.

Cumulative effects to vegetation would be the same as those described in the Forestry/Woodlands section.

Partial Treatment Alternative
In wilderness and WSA western juniper would continue to increase density and cover as no treatment would occur within these areas. Treatment outside wilderness and WSAs in juniper woodlands would shift plant composition toward herbaceous and shrubby vegetation. Burning would create an herbaceous plant community dominated by perennial grasses and forbs. Initial stages following prescribed fire may be dominated or co-dominated by annual forbs. Many forbs are native and important forage species for many smaller mammal and avian species. Mountain big sagebrush and other associated shrubs would begin to reestablish within the first 3-5 years. Sprouting shrubs, rabbitbrush, snowberry, horse brush, and to some extent antelope bitterbrush would be the first to reestablish. Mountain big sagebrush must establish from seed, and therefore would take longer than sprouting shrubs. Shrub cover would reach pre-burn and pre-western juniper encroachment levels within 25-30 years.

Quaking aspen stands, where juniper has been cut or prescribed burned, would shift toward a younger age class. The understory vegetation would also be released. Shrubs and herbaceous plants would dominate the post-cutting plant community and herbaceous plants would dominate the post-burn plant communities. Quaking aspen suckers would also begin to appear in the first year following treatment. The degree of suckering would be dependent on condition of the pre-treatment clone and site productivity. More productive sites would have more suckers than less productive sites if clones are capable of responding. Fencing aspen stands would help suckers obtain a height where browsing would not limit response. Fencing may not be necessary in quaking aspen stands greater than 75 acres as impacts of browsing would be spread over a sufficient area to minimize effects.

Riparian areas would respond the same as quaking aspen stands. High-site productivity would help increase response to cutting and burning. Riparian hardwoods would sprout following treatment. Areas burned would be initially dominated by herbaceous plants. Comparable to quaking aspen stands, degree of sprouting would be dependent on condition of pre-treatment hardwoods and site productivity.

Drier Wyoming big sagebrush plant communities would be shifted toward dominance by perennial plants. Wyoming big sagebrush would also be planted in areas where shrub density and cover are below expectations. Establishment of Wyoming big sagebrush would take a number of years to reach the values of adjacent sagebrush stands.

Low sagebrush, mountain mahogany, and meadow plant communities are scattered throughout the project unit areas. None of these areas are targeted for treatment, but may be included in project units. Low sagebrush and mountain mahogany plant communities occur on shallow soils. Low sagebrush areas are often used as fuel breaks and, therefore, would not be burned in prescribed fires. Mountain mahogany also occurs on shallow, rocky soils, but these stands have greater fuel loading and may burn. Mountain mahogany is a weak sprouter but a prolific seeder. Burning would decrease surface litter. The seed for mountain mahogany germinates best when on mineral soil.

Meadow communities would also be treated with other plant communities. Prescribed fires would remove current year's growth and have little effect on established perennial grasses and forbs.

Cumulative effects to vegetation would be the same as those described in the Forestry/Woodlands section. Diversity at different spatial scales and connectivity of shrub and herbaceous vegetation would be increased. The Project Area occupies northern portions of a fairly continuous block of sagebrush plant communities. Reestablishment of shrub communities would help to restore sagebrush systems on a regional scale. This is important to animals that may utilize habitat during only portions of the year.

Limited Treatment Alternative
Effects on vegetation would be the same as under the Partial Treatment Alternative, but the total number of acres available for treatment would increase under this alternative. Juniper would be cut using appropriate technology for the land designation. Many cut sites would be burned following fuel curing. Initially relying on management of wildfires within wilderness would slow the return of these areas to sagebrush-dominated plant communities. Wildfires rarely ignite in desired locations, and subsequent fire effects are seldom beneficial. Most naturally-ignited fires within wilderness and WSAs would be small initially, but as adjacent areas are treated the size of fires may increase.

Cumulative effects to vegetation would be the same as those described in the Forestry/Woodlands section. Diversity at different spatial scales and connectivity of shrub and herbaceous vegetation would be increased. The Project Area occupies the northern portions of a fairly continuous block of sagebrush plant communities. Reestablishment of shrub communities would help to restore sagebrush systems on a regional scale. This is important to animals that may utilize the habitat during only portions of the year.

Full Treatment Alternative
Effects of the Full Treatment Alternative would be the same as under the Limited Treatment Alternative. However, timeframes would be shorter. Progression toward shrub dominated plant communities would begin sooner because treatments happen quickly, but there would be more land in early successional stages in the first few years of the project. Application of treatments in Steens Mountain Wilderness and WSAs would increase acres treated each year. These areas would be converted to desired plant communities. Following conversion of plant communities, return of appropriate fire regimes would also begin.

Cumulative effects to vegetation would be the same as those described in the Forestry/Woodlands section. Diversity at different spatial scales increased and connectivity of shrub and herbaceous vegetation would be increased. The Project Area occupies northern portions of a fairly continuous block of sagebrush plant communities. Reestablishment of shrub communities would help to restore sagebrush systems on a regional scale. This is important to animals that may utilize habitat during only portions of the year.

Continuation of Current Management
Effects to this resource are the same as those discussed in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
Potential effects of the Preferred Alternative on vegetation are the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on vegetation within wilderness are the same as described under the Continuation of Current Management.

4.2.3 Fish, Wildlife and Wild Horses and Burros Resources

4.2.3.1 Fisheries

Potential Effects

General Discussion
Effects to fish and fish habitat resulting from juniper expansion are primarily a reflection of effects to stream flows (loss of perennial flows and higher peak flows), loss of habitat complexity, altered nutrient cycling, elevated sediment balance, and higher water temperature. In general, PFC represents these key habitat elements, and may be considered as surrogate for potential effects to fish populations (see Section 4.2.1.3 Wetlands, Riparian Areas and Water Quality). Effects of fire to fish and fish habitat have specific implications which have not been discussed in previous sections, and are addressed in the section Potential Effects Common to All Action Alternatives below. Effects to PFC from implementing different management tools are not reconsidered in this section.

Rieman et al. in a 1995 study (in Boise National Forest) determined redband trout and bull trout appear to be well-adapted to disturbance such as large-scale, high-intensity wildfire. The authors described fire events as "pulsed disturbance" with effects that may be considered adverse but limited in time as opposed to chronic "press" disturbance such as poorly-built roads or continuous timber harvest. The chronic nature of habitat degradation resulting from juniper expansion can be described as a press disturbance. Broadly distributed habitat within stream systems provide refuge for fish outside areas most severely affected by large pulse disturbances, and migratory behavior ensures fish are not likely to be concentrated only in a small area subject to intense effects. Results of the study indicated potential for dramatic recovery (sometimes within 1-year) from large-scale, high-intensity wildfire in which local, direct mortality was observed. Another study (Dunham et al. 2003) addressed landscape perspectives on persistence of native fish through fire events, and recognized clear advantages from management of habitat elements before wildfire occurs.

All action alternatives propose to adjust the timing of treatments throughout the Project Area to reduce likelihood of adverse cumulative effects. Treatment of any project unit with fire would result in relatively small-scale "pulse disturbance" that would occur while fish are distributed throughout the affected stream system. Since redband trout have been documented as capable of recovering quickly after large-scale, high-intensity wildfires (very large-scale pulse disturbance), and salmonids are generally considered to be among the slowest-recovering taxonomic group, the broadly distributed small-scale pulses resulting from use of prescribed fire are unlikely to have any long-lasting effect (over decades) to fish populations with affected watersheds.

Effects to stream temperature would have a greater influence on fish populations as a cumulative increases occurring through time between 6th field HUCs, rather than as a limited local change from a single treatment area. Loss of juniper canopy in any treatment unit would likely contribute to elevated stream temperatures in the short term (1-3 years). In riparian areas where topography contributes the majority of shade during peak summer temperatures or the treatment area is small or riparian shrub vegetation remains after treatment, any change is unlikely to be measurable. In areas where juniper currently provides the majority of shade, it is possible loss of juniper canopy could contribute to a measurable increase in stream temperature. However, this factor would be considered when designing treatment units, and would help determine details of the implementation plan.

No Treatment Alternative
Selection of the No Treatment Alternative would maintain current condition and trend for fish habitat throughout the Project Area. Adverse effects to fish from juniper-dominated riparian areas and uplands throughout the Project Area would occur within the short term (1-3 years) or several years following high peak flows that increase sediment load and reduce habitat complexity. Elevated sediment inputs resulting

from such events can reduce habitat availability for fish by filling pools and reducing available hiding and thermal cover and over-wintering habitat for fish. Although fish populations within a stream or stream system may remain relatively unaffected or even benefit from events that occur in a more-or-less normal cycle of flooding, repeated events at greater frequency may result in accumulation of habitat changes from which fish populations may not easily recover.

Long-term adverse impacts (beyond 3 years) to fish and fish habitat would occur over a period of years to decades if elevated levels of sediment become chronic, soil infiltration and groundwater recharge decreases, stream temperatures become elevated, and nutrient cycles that support fish prey become altered. Chronic sediment presence reduces spawning success by impacting spawning gravels and smothering eggs or trapping newly-hatched fish in the gravels below the streambed surface. Also, habitat for many macroinvertebrates, which are a major food source for predatory salmonids such as redband trout, becomes altered. As groundwater recharge decreases, less cool water would be available to augment late season flows (Andrews/Steens PRMP/FEIS p. 3-3). Extent of perennial flows in streams may be diminished, which reduces the stream's capacity to support riparian vegetation, and further reduces the stream system's capacity to buffer effects of peak flow events. The extent of fish presence in stream systems would shrink as perennial flows decrease.

Loss of desired riparian vegetation would also affect in-stream nutrient cycling. As juniper dominates riparian strips, biological input is altered from one dominated by deciduous and herbaceous species to one dominated by juniper leaf litter. While total nutrient input may not decline, nutrient input from juniper litter may not be as readily available for macroinvertebrates. This would cause a shift in diversity and density of aquatic macroinvertebrates. In addition, terrestrial invertebrates such as worms, beetles, and grasshoppers can be an important food source for trout during certain times of year and would likely be less prevalent in juniper due to dryer soils and less succulent vegetation.

Since fish are currently well-distributed in streams throughout the Project Area and adverse effects such as chronic (persistent and lasting) increased sediment, elevated water temperature and altered nutrient balance move downstream through aquatic systems, potential for cumulative effects to fish habitat and fish populations, especially in the downstream portions of watersheds, would be apparent. Cumulative effects within 4th field HUCs would eventually lead to lower numbers of fish and reduced population viability at a local and regional scale.

Potential Effects Common to All Action Alternatives

No measurable project objectives for fish and fish habitat have been identified for the action alternatives. Rather, a general habitat improvement objective has been identified which clearly links riparian functioning condition to fish habitat. Therefore, a description of potential effects common to all action alternatives for fish and fish habitat would reflect potential effects to riparian functioning condition. Life history information and overlapping presence for fish species in the Project Area suggests habitat needs are essentially the same, with caveats for use of specific niches within stream systems at various life history stages. Since Great Basin redband trout is the most widespread fish species in the Project Area, for the purposes of this analysis it has been treated as the "surrogate species" to represent effects to fish habitat in general. Therefore, beneficial, neutral or adverse effects to riparian functioning condition are assumed to affect different species more or less equally.

Partial Treatment Alternative

Watersheds representing approximately 70-75% of the total Project Area would not be available for treatment by active management other than use of wildfire. Consequently, adverse effects to fish and fish habitat are likely to accumulate within these areas over the next one or more decades, unless wildfire occurs. Since timing, frequency and specific location of wildfire events cannot be predicted with accuracy, the scope and intensity of effects within these areas, adverse or beneficial, cannot be predicted.

In wilderness and WSAs where juniper has already been identified as contributing to at-risk riparian functioning condition (7.9 miles in Bridge Creek, Deep Creek, and South Fork Donner und Blitzen River), it is likely at-risk functioning conditions would persist and habitat condition for fish would deteriorate over the next decade. Habitat conditions could deteriorate in the next several decades after which restoration

of habitat conditions or even restoration of perennial flows to support fish presence in low-order reaches would require manipulation of physical processes. In streams where PFC has been achieved, but juniper was identified as a potential risk (5.9 miles in Home Creek and Mud Creek-upper Donner und Blitzen River), continued development of juniper stands could endanger functioning condition, perhaps over the next five to ten decades. In watersheds where juniper is present but not yet established in riparian areas, the likelihood is great juniper would become established.

Chronic adverse effects to riparian functioning condition in wilderness and WSAs have potential to work in concert to produce adverse cumulative effects to fish populations in higher-order reaches of 4th field HUCs, especially Donner und Blitzen River, which drains the majority of the Project Area. It is possible, or even likely, these adverse cumulative effects could overwhelm any beneficial effects from treating the rest of the Project Area. Cumulative effects could threaten persistence of fish in portions of some streams, and reduce the health of fish populations within the Project Area and in basins that receive tributary flows.

Limited Treatment Alternative
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire in riparian areas. Expansion and development of juniper stands could be arrested in riparian areas and associated uplands in all 6th field HUCs. In streams where PFC has been achieved but juniper was identified as a potential risk (5.9 miles in Home Creek and Mud Creek-upper Donner und Blitzen River), juniper treatment may succeed in maintaining or improving fish habitat, if stands are not already fireproof. In watersheds where juniper is present but not yet established in riparian areas, prescribed fire in uplands could ensure juniper does not degrade fish habitat.

Chronic adverse effects to riparian functioning condition in wilderness and WSAs could still produce adverse cumulative effects to fish populations in higher-order reaches of 4th field HUCs if prescribed fire without juniper cutting (or wildfire) does not meet site-specific objectives for improving riparian functioning condition. However, site-specific objectives would be achieved in at least some riparian areas, and it is less likely these adverse cumulative effects would overwhelm any beneficial effects from treating the rest of the watershed.

Full Treatment Alternative
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire and juniper cutting by nonmechanized methods in riparian areas (wilderness and WSAs would also be treated). Effects to riparian functioning condition of streams would be the same as with the Limited Treatment Alternative with a higher likelihood of success in achieving site-specific objectives for riparian areas.

Since all of the Project Area could be considered for the full range of treatment methods, chronic adverse effects to riparian functioning condition would not be permitted to develop in wilderness and WSAs. In comparison to other action alternatives, adverse cumulative effects to fish populations are not as likely to occur in higher-order reaches of 4th field HUCs. Prescribed fire with juniper cutting (or wildfire) is likely to meet site-specific objectives for improving riparian functioning condition wherever it is applied. In general, the Full Treatment Alternative is consistent with management implications summarized by Dunham et al. (2003) which stresses the importance of broad-scale or watershed approaches to management of aquatic ecosystems. Full treatment of watersheds recognizes critical links between uplands and riparian areas in influencing fish habitat, and is most likely to succeed in maintaining or improving fish habitat affected throughout 6th field HUCs. Careful prioritization and planning of treatments would mitigate inherent risks associated with habitat management on a watershed scale.

Continuation of Current Management
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire and juniper cutting by nonmechanized methods in riparian areas (wilderness and WSAs would also be treated after appropriate NEPA analysis). Potential effects to fish and fish habitat as reflected by riparian functioning condition would be the same as the Full Treatment Alternative, although it is likely treatments would be applied at a smaller scale to areas within Steens Mountain Wilderness following NEPA analysis.

Although all of the Project Area could be considered for the full range of treatment methods, chronic adverse effects to riparian functioning condition could develop in wilderness and WSAs if treatments are not implemented far enough in advance of juniper expansion and stand development. In comparison to the Partial Treatment and Limited Treatment Alternatives, adverse cumulative effects to fish populations are not as likely to occur in higher-order reaches of 4th field HUCs. However, this would depend upon the actual proportion of the Project Area successfully treated through individual project-level analysis. Prescribed fire with juniper cutting (or wildfire) is likely to meet site-specific objectives for improving riparian functioning condition wherever it is applied.

Preferred Alternative
Watersheds representing 100% of the total Project Area would be available for treatment by active management, including prescribed fire and juniper cutting by nonmechanized methods in riparian areas. Effects to fish and fish habitat in approximately 69% of the total Project Area (outside of Steens Mountain Wilderness) would be the same as with the Full Treatment Alternative. Within Steens Mountain Wilderness (31% of the total Project Area) the full range of treatments would also be available. However, the scale of projects implemented would likely be much smaller, and total number of acres treated much lower within the same time frame as that of the Full Treatment Alternative. For areas in wilderness left untreated, effects would be the same as those described under the No Treatment Alternative.

The Preferred Alternative carries with it an inherent risk treatments in special management areas may not occur in an adequate time frame and at an adequate scale to avoid the onset of chronic effects to hydrologic cycles, riparian function and fish habitat. Since special management areas contain most of the headwater reaches of the affected watersheds, uplands and riparian areas at the most advanced stage of juniper cover in these areas would need to be prioritized for treatment in order to contribute beneficial cumulative effects to downstream portions of the Project Area.

4.2.3.2 Migratory Birds

Potential Effects

No Treatment Alternative
Under this alternative, juniper populations would increase in size and density over the landscape, which would favor some woodland species of birds. As sagebrush habitat is reduced over time, sagebrush-dependent species may decrease in abundance; however, sagebrush species utilizing woodland habitats would still be present. Species preferring open grasslands could also be reduced in abundance.

Should a wildfire occur, juniper canopy cover could decrease up to 50%, depending on fire size and intensity. Wildfires could affect both big and low sagebrush sites. Since wildfires tend to occur during hotter and drier times of year (late July-early August) the resultant increase in burn intensity could affect recovery of sagebrush habitats. Due to current, heavy fuel loading, wildfires often leave fewer islands of remnant vegetation such as sagebrush; loss of islands may retard natural recovery of the overall site.

A lack of a mosaic burn pattern (due to scale and intensity of the fire event) could result in a grassland community persisting for longer periods of time than would be anticipated with a prescribed fire. This would benefit grassland species and probably some habitat generalists.

Continued expansion of juniper down slope and subsequent reduction of habitat could affect riparian obligate species. Depending on size and extent of wildfires, juniper canopy in riparian areas could be reduced which could improve habitat for riparian species as long as fire intensity does not also remove native riparian woody species and associated seed sources.

The cumulative effects area for migratory birds, Special Status Species – Fauna, and wildlife in general covers more than the Project Area but less than the Burns District. Migratory birds and bats cover much more than the cumulative effects area but cumulative effects are discussed mainly for nesting/roosting and foraging habitat within this defined area. The cumulative effects area for wildlife is defined as the following: Beginning at the junction of Highway 205 and Diamond – Grain Camp Road, south on Highway 205 on the

west side of Steens Mountain to the junction with East Steens Road; north along this road to the junction with Highway 78 at Folly Farm; west along a line from Folly Farm to the point of beginning.

Within the cumulative effects area, which is a little more than twice the acreage of the Project Area (about 750,000 acres), about 75,000 acres have been treated with prescribed fire from 1992 to present and naturally-ignited fire has burned about 153,000 acres during that same time period. The 1992 date was chosen with the assumption prescribed and naturally-ignited fires in mountain big sagebrush types before that time have returned to a sagebrush canopy usable by sagebrush dependent species. This may not be the case for fires occurring in Wyoming big sagebrush or low sagebrush areas before that time. Approximately 47,000 acres of the effected area have been converted to crested wheatgrass seedings since the 1960s. The majority of seedings occur northwest of the Project Area. Some seedings (approximately 13,000 acres) were rehabilitation efforts after naturally-ignited fires. Crested wheatgrass still dominates with little to no reinvasion by sagebrush. The amount of juniper cuts that have occurred in this effects area includes the 2,700 acres within the project, plus about 3,000 acres north of the Project Area on the north end of Steens Mountain. Burns District GIS does not record cuts on private land. Approximately 276,000 acres in the cumulative effects area have some level of disturbance affecting suitability of habitats for various migratory birds, Special Status animals and other wildlife species. Since no actions would take place under this alternative (with possibility of naturally-ignited wildfire and proposed projects such as the Five Creeks, East Ridge and East Steens Projects), the acreage of migratory bird habitat affected would be about 346,000 acres (about 46%) within the cumulative effects area.

Cumulative effects of this alternative on migratory birds would be loss of grassland, sagebrush, aspen, and riparian habitats and a subsequent decrease in species dependent on those habitats. This would continue indefinitely. Aspen and sagebrush would only be available at higher elevations above juniper. As juniper expands into lower elevations, most other habitats would be lost. This would favor woodland species over other suites of species. Migratory bird species diversity would decrease as other habitats are lost. Activities outside the Project Area, including juniper cutting, prescribed and naturally-ignited fire, would be the only forces reducing juniper within the cumulative effects area.

Partial Treatment Alternative

General Analysis for Annual Treatments

Woodland species of migratory birds could be adversely affected by some features of the action alternatives (except the No Treatment Alternative) since the main effect in areas where actions could occur depending on the alternative, would be cutting and burning of juniper woodlands. The reduction of expanding juniper each year would crowd returning birds into other woodland habitats near treatments or force them to other juniper areas to find suitable habitat. This could reduce productivity of birds since crowding of birds results in greater species density in areas of limited resources. Over the course of the project, late transitional juniper in big sagebrush and juniper woodlands would be reduced by about 75%, which would affect local populations of woodland migratory birds, especially those using denser stands of younger juniper. Activities, such as cutting and jackpot burning of trees and individual tree burning, may reduce the amount of scattered juniper that could reach woodland status during the life of this project. Other woodland species that nest and use younger juniper would be affected the most through loss of habitat. Most woodland species would still be present in the Project Area, but at reduced numbers. These variations in number of individuals would still be well within the natural variation of these birds with the past fluctuations of juniper through time. Cutting of juniper, if done before July 15, would affect those bird species nesting in juniper by destroying nests, eggs, and young. This would reduce species productivity and add to the reduction in overall abundance of this suite of migratory birds.

Sagebrush-dependent species could be negatively affected since mountain and, to a much lesser extent, Wyoming big sagebrush would be burned with junipers in scattered and transitional stands. This burning would not be a complete burn (up to 50% canopy reduction of big sagebrush), but would reduce big sagebrush available for sagebrush nesting species. Affected species would be forced into nearby sagebrush habitat or out of the area to other available sagebrush habitats. The shifted populations would reduce productivity of these birds which could reduce species abundance though the species would still be present in the Project Area. In the long term (25-50 years) as sagebrush revegetates burned areas, additional habitat for sagebrush-dependent species would be provided. Cutting and jackpot burning or individual burning of

scattered junipers in big sagebrush vegetation types would have minimal affect on sagebrush species as most of the sagebrush canopy would be left intact and still useable by these species.

The effects of this level of burn could have beneficial effects for grassland species initially. Burned areas could stay in grassland dominated habitat for 25 years or longer depending on elevation, species of sagebrush and size of the burned area. Wyoming big sagebrush may not return to some burned areas for at least 40-50 years depending on size of the burned area, available seed source for naturally reseeding the burned area, and understory vegetation. Mountain big sagebrush could return to pre-burn densities in 25-30 years, although some higher elevation sites within the Project Area have seen pre-burn densities return in 15 years. Low sagebrush may take more than 100 years to return to the burn areas. Shrub density would determine at what point the area is no longer useable by most grassland species.

Species that are habitat generalists, whether ground, shrub or tree nesters, could be negatively affected if nesting habitat is reduced. Burned areas would provide less vertical structure, which could force some species into other, more structurally diverse habitats adjacent to the treatment area or outside the Project Area. This displacement may also reduce productivity of some of these species.

Habitat generalists could also be negatively affected if juniper treatments occur before July 15 through the direct loss of active nest sites with young. This type of action could reduce productivity in some local populations.

Riparian obligate species of migratory birds would not be affected by removal of junipers from riparian areas since riparian shrub and woody species would be avoided during burning. Depending on viability or lack of remnant populations of woody riparian species, replanting with native stock could increase the rate at which riparian areas support desirable woody species. Riparian obligate species should have more available habitat as junipers are reduced in riparian areas and replaced by willows, cottonwoods, or other riparian shrub and tree species.

Under this alternative, treatment actions would not take place in Steens Mountain Wilderness and WSAs. The effects of this alternative in wilderness and WSAs would be the same as described in the No Treatment Alternative. Those areas outside of wilderness and WSAs, mainly north of the North Loop Road would be affected as described in the general analysis above. The actions would be occurring over a smaller portion of the whole Project Area (~87,000 acres), so the project may be completed in less than 10 years depending on funding and weather conditions. This would not necessarily allow for restoration of some burned big sagebrush vegetation to a 10% canopy cover before adjacent project units are treated. Grassland species of migratory birds would probably increase until sagebrush returned to burned areas.

Refer to Migratory Birds No Treatment Alternative (paragraphs 5 and 6) for the description of the cumulative effects area. Under the Partial Treatment Alternative actions would take place on about 87,000 acres within the Project Area. The area affected by treatments in the cumulative effects area would be about 433,000 acres which is about 57% of the Project Area.

Cumulative effects of this alternative would be juniper would decrease dramatically while sagebrush would be reduced in the north end of the Project Area. This would increase habitat for grassland species and decrease habitat for woodland species and sagebrush species. Areas treated prior to this project would be returning to a usable sagebrush canopy cover. Sagebrush habitat would increase over time in the treated areas which would provide more habitat than at present for sagebrush dependent species. These effects would occur over most of the described cumulative effects area except in wilderness and WSAs. The cumulative effects of no treatment occurring in wilderness and WSAs on migratory birds would be loss of grassland, sagebrush, aspen, and riparian habitats and a subsequent decrease in species dependent on those habitats. This would continue indefinitely. Aspen and sagebrush would only be available at higher elevations above the juniper. As juniper expands into lower elevations, most other habitats would be lost. This would favor woodland species over other suites of species. Migratory bird species diversity would decrease as habitat diversity decreases.

Limited Treatment Alternative
Refer to the general analysis in the Partial Treatment Alternative for effects of annual treatments on migratory birds. These annual treatments would occur over a larger area than in the Partial Treatment Alternative, which would have a greater effect on woodland species since juniper would be reduced to a greater extent over the landscape. Initially, grassland species would have more habitat available over a greater portion of the landscape until shrub cover returns to burned areas. Shrub-dependent species would lose habitat same as the Partial Treatment Alternative but over a greater portion of the landscape. These species would benefit as shrub canopy cover increases. The amount of time for shrub cover to return to useable levels for these species would depend on size and mosaic pattern of the burned area and available sources of seed in proximity of the burned area.

Refer to the No Treatment Alternative in Migratory Birds (paragraphs 5 and 6) for the description of the cumulative effects area. Since actions would take place on about 130,000 acres within the Project Area under this alternative and with proposed projects such as the Five Creeks and East Steens Projects, the portion of the cumulative effects area affected by disturbance would be about 476,000 acres which is about 63% of the Project Area.

Cumulative effects of this alternative on migratory birds would be an increase in grassland areas mainly in the north end of the Project Area, but also in wilderness and WSAs while juniper and sagebrush habitat would decrease. Juniper would decrease by 60% while sagebrush would be reduced in some areas. This would increase habitat for grassland species and decrease habitat for woodland species and sagebrush species. These effects would occur over most of the described cumulative effects area due to past actions and proposed actions. Some sagebrush would be returning to treated areas while others are being treated in the effects area. Juniper woodlands would be reduced from the present condition but areas would still have sufficient juniper to support woodland species. Grassland areas would increase for a few years then stabilize as these areas return to a sagebrush canopy, then decrease over time as proposed projects are completed. Riparian habitats should increase over time as treatments are completed and juniper is reduced in these areas.

Full Treatment Alternative
Refer to the general analysis in the Partial Treatment Alternative for effects of annual treatments on migratory birds. These annual treatments would occur over a larger area than in the Limited Treatment Alternative during the life of the project. Approximately 188,000 acres would be treated during the course of the project with emphasis on reduction of the juniper canopy. This should result in juniper canopy being only 20-30% of present in the Project Area. Habitat for woodland species would decrease as well as populations of woodlands species. The amount of grassland habitat would increase over the course of the project, which would benefit grassland species. Sagebrush habitat would decrease during a portion of the project. The return of sagebrush to treated burned areas would depend on elevation, size of the burned area, mosaic pattern of the burn, and available seed sources in close proximity to the burned area. Effects of these actions on riparian species would be the same as described in the Partial Treatment Alternative except more acreage would be treated compared to any other alternative.

Refer to the No Treatment Alternative (paragraphs 5 and 6) in Migratory Birds for the description of the cumulative effects area. Since actions would take place on about 188,000 acres within the Project Area under this alternative and with proposed projects such as Five Creeks and East Steens Projects, the cumulative effects area affected by disturbance would be about 534,000 acres which is about 71% of the Project Area..

Cumulative effects of this alternative on migratory birds would be the juniper canopy being only 20-30% of present in the Project Area. Habitat for woodland species would decrease as well as populations of woodlands species. The amount of grassland habitat would increase over the course of the project, which would benefit grassland species. Sagebrush habitat would decrease during a portion of the project. Return of sagebrush to treated burned areas would depend on elevation, size of the burned area, mosaic pattern of the burn, and available seed sources in close proximity to and intermixed in the burned area. These effects would occur over most of the described cumulative effects area due to past actions and proposed actions. Some sagebrush would be returning to treated areas while others are being treated in the effects area. Juniper woodlands would be reduced the most from present but areas of juniper would still be available to support woodland species. Grassland areas would increase for a few years, then stabilize as these areas

return to a sagebrush canopy, then would decrease as proposed projects are completed. Riparian habitats should increase over time as treatments are completed and juniper is reduced in these areas.

Continuation of Current Management Alternative
In untreated areas, which would be the majority of the landscape, effects of the Continuation of Current Management Alternative are the same as the effects of the No Treatment Alternative. In small areas treated over time across the landscape (under other NEPA documents), effects of the Continuation of Current Management Alternative would be the same as those described in the Partial Treatment Alternative. The primary difference between the Partial Treatment and Continuation of Current Management Alternatives is the scale and rate at which treatments would occur across the landscape. This would be slower than any of the Action Alternatives (except the No Treatment Alternative), but would still occur over time assuming project proposals occurred, were analyzed and funded.

The cumulative effects to this resource for untreated areas are the same as those described in the No Treatment Alternative.
Since few actions would take place under this alternative except those covered under other NEPA analysis (with the possibility of naturally-ignited wildfire and proposed projects such as the Five Creeks, East Ridge and East Steens Projects), the amount of affected migratory bird habitat would be about 400,000 acres (about 53%) within the cumulative effects area.

Cumulative effects of this alternative on migratory birds in treated areas would be loss of grassland, sagebrush, aspen, and riparian habitats and a subsequent decrease in species dependent on those habitats. This would continue indefinitely. Small pockets of treatment areas would occur within the Project Area as small projects are completed. Aspen and sagebrush would be available at higher elevations above the juniper with some smaller areas returning to sagebrush in small treatment areas over time. As juniper expands into lower elevations, most other habitats would be lost. This would favor woodland species over other suites of species. Migratory bird species diversity would decrease over time. Activities outside the Project Area, including cutting, prescribed and naturally-ignited fire, would be the main actions reducing juniper within the cumulative effects area.

Preferred Alternative
The potential effects of the Preferred Alternative on migratory birds are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. The potential effects of the Preferred Alternative on migratory birds within wilderness are the same as those described under the Continuation of Current Management.

4.2.3.3 Wildlife

Potential Effects

No Treatment Alternative
Pronghorn antelope, mule deer, and elk would be affected by the continued expansion of juniper into sagebrush, mixed shrub, aspen, and grassland vegetation types. This loss of habitat would eventually reduce the habitat capacity for supporting current populations of these species.

Wildfires, small or large, would reduce canopy cover of juniper and return burned areas to grasslands. To the extent fires burn through low sagebrush areas, these areas would generally not return to a low sagebrush stand for possibly 100 years after fire. Burned mountain big sagebrush areas might return to a sagebrush canopy within 25-30 years (Ziegenhagen 2003) but this would depend on availability of sagebrush seed to be reintroduced into burned areas.

In Wyoming big sagebrush communities, recovery occurs more slowly than in mountain big sagebrush community types. Sagebrush seed has low viability and a limited timeframe yearly in which it can be distributed. Natural spread of sagebrush seed occurs only a short distance (< 5 meters) from the seed producing plant, so full revegetation of burned areas through natural processes may require many years. The presence of cheatgrass in Wyoming big sagebrush and lower elevation low sagebrush sites may inhibit normal recovery due to competitiveness.

While grasslands would provide forage for pronghorn, lack of low sagebrush would keep pronghorn from using the area yearlong. This also applies to mule deer and elk, with the former requiring both Wyoming and mountain big sagebrush for different parts of their yearlong habitat. Loss of mountain big sagebrush stands would reduce fawning habitat available for mule deer. Elk would utilize mountain big sagebrush and low sagebrush for forage and cover as well as remaining juniper for hiding and thermal cover.

With continued juniper expansion, aspen stands at lower elevations would be lost. These stands are important foraging areas for mule deer and elk and important calving areas for elk. Under the scenario where fire occurs in juniper stands with weakened aspen stands, response of aspen to removal of juniper would depend on viability of the remaining aspen clone and extent ground surface scorching from fire intensity does not reduce aspen clone response further.

Other species of wildlife would be affected differently depending on species habitat requirements, such as vegetative seral stage at which certain habitat characteristics occur, reproductive capacity, ability to reoccupy burned areas after treatment, and species adaptability.

Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since no actions would take place under this alternative (except for the possibility of naturally-ignited wildfire and proposed projects such as Five Creeks and East Steens Projects), the cumulative effects area affected by disturbance would be about 346,000 acres.

Even though juniper expansion in the Project Area would reduce habitat for most wildlife species in the absence of large naturally-ignited fires, other past actions and proposed actions should maintain or restore habitat in other parts of the cumulative effects area. Overall, this alternative would affect habitat for some species beneficially while most other species are affected negatively.

Partial Treatment Alternative
Pronghorn antelope would benefit from annual treatments, especially cutting and burning of dense stands of juniper, which would convert to grasslands within several years after treatment. Increases in grasses and forbs would benefit pronghorns, while loss of juniper would have little effect on escape cover. Cutting and jackpot burning or individual burning of juniper in low sagebrush vegetation types would benefit antelope by maintaining cover of low sagebrush, an important part of their diet and kidding cover. Burning of up to 50% of big sagebrush with only scattered juniper would release forbs in the understory pronghorn would utilize. Depending on size of the burn and available food sources post-treatment, pronghorn may make extensive use of burned areas. These actions under this alternative would affect only those areas outside of wilderness and WSAs. Lack of treatment in the rest of the Project Area would affect pronghorn habitat as described under the No Treatment Alternative.

Mule deer would be affected by loss of thermal, escape, and hiding cover from cutting and burning of dense woodlands and late transitional sagebrush and juniper. Some scattered juniper would be left along ridges and throughout the landscape to maintain ravel corridors and refuge from heavy winter storms. Loss of up to half of mountain big sagebrush with no juniper, or less dense stands of juniper, would provide some benefits as understory vegetation is released providing higher quality forage for deer during spring when females are in need of increased nutrition for fetus growth. Loss of mountain big sagebrush canopy cover would reduce the amount of area available for fawning, especially around aspen stands. Although it has been shown most fawning activity occurs near aspen stands, big sagebrush is also important hiding cover for fawns.

Mule deer would also be affected by loss of Wyoming big sagebrush next to existing seedings in lower elevations on the north and west sides of the Project Area. Seedings essentially provide very little structural diversity for mule deer and lack big sagebrush, which is a requirement during winter months when many deer are in that area. Loss of Wyoming big sagebrush next to seedings reduces winter forage and thermal cover. While reduction of Wyoming big sagebrush may increase forb and grass composition in the understory, it also opens up sites to cheatgrass invasion, which is common in many lower elevation big sagebrush sites.

Bitterbrush, a preferred fall browse species for deer, would likely be lost in areas where prescribed fire is used to treat mountain big sagebrush/juniper types. New seedlings may be seen in years following burning depending on seed caches created by small mammals and viability of the seed cached. Loss of bitterbrush could have some effect on mule deer by reducing available browse during fall and winter months. Under this alternative, these actions would occur on only a portion of the Project Area and not in wilderness or WSAs, so effects on mule deer habitat in these areas would be as described in the No Treatment Alternative.

Elk would be affected negatively by loss of hiding and thermal cover due to reduction of juniper in each unit but would be beneficially affected by increase in grasses and forbs after treatment. To the extent aspen stands are treated under this alternative, there would be an increase in new aspen shoots, which elk would utilize. Since this alternative does not include wilderness and WSAs, effects on elk habitat in these areas would be the same as described in the No Treatment Alternative.

Small mammals such as various species of mice, voles and shrews, would be affected in the first few years of post fire treatment by loss of habitat. Some species with wider ranges of variability in habitat requirements would survive and may thrive. Small mammals would not be evident in any numbers the first year following burning activities. As habitat conditions improve, they would immigrate into treated areas. The larger the area burned, the greater period of time it would take for some small mammals to return to treated areas. Burrowing animals such as gophers, should survive since they exist mainly underground and feed on roots. As forbs increase in the treated areas, more food would be available. More mobile small mammals such as jackrabbits and cottontails would move to other habitat and would use burn areas for foraging and untreated habitats for cover. As with other wildlife, under this alternative, the treated area does not include wilderness or WSAs so effects to habitat in these areas would be the same as described in the No Treatment Alternative.

Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since actions would take place on about 87,000 acres within the Project Area under this alternative and with proposed projects such as the Five Creeks and East Steens Projects, the cumulative effects area affected by disturbance would be about 433,000 acres.

Cumulative effects of this alternative on wildlife species would generally result from reduction of juniper in treated areas. Sagebrush cover would also be reduced in these areas while grasslands would be dominant for 10-15 years. These effects, along with past actions and proposed actions, should improve habitat conditions outside of wilderness and WSAs for most species. Within wilderness and WSAs, the only factors affecting the expansion of juniper would be naturally ignited fires. Increase in juniper cover in these areas would reduce wildlife habitat for most species and reduce species diversity. Overall, this alternative would affect habitat for some species beneficially while most other species would be affected negatively.

Limited Treatment Alternative
Refer to the Partial Treatment Alternative for effects of annual treatments on different wildlife species. In this alternative, these effects would occur over a larger area since there would be some treatments in wilderness and WSAs.

Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since actions would take place on about 130,000 acres within the Project Area under this alternative and with proposed projects such as the Five Creeks and East Steens Projects, the cumulative effects area affected by disturbance would be about 476,000 acres which is about 63% of the Project Area.

Cumulative effects of this alternative on wildlife species would generally result from reduction of juniper in treated areas. Sagebrush cover would also be reduced in these areas while grasslands would be dominant for 10-15 years. These effects, along with past actions and proposed actions, should improve conditions for most species. Overall, this alternative would affect habitat for some species beneficially while others species are affected negatively.

Full Treatment Alternative
Refer to the Partial Treatment Alternative for effects of annual treatments on different wildlife species. In this alternative, these effects would occur over the maximum area possible since treatments would also

include many different methods in wilderness and WSAs. Approximately 188,000 acres would be treated during the course of the project with emphasis on reduction of juniper canopy. This should result in the juniper canopy being only 20-30% of present canopy.

Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since actions would take place on about 188,000 acres under this alternative and with proposed projects such as 5 Creeks and East Steens Project, the cumulative effects area affected by disturbance would be about 534,000 acres. This represents treatment on 71% of the cumulative effects area.

Cumulative effects of this alternative on wildlife species would result from a 70-80% reduction in juniper canopy over the Project Area. Old-growth juniper and other patches would be left on ridges to allow for wildlife travel corridors and thermal cover. There would be a decrease in sagebrush canopy cover overall in the first few years of project implementation, but areas treated with fire should return to 10% canopy cover in about 20 years. Grasslands would persist in burned areas for about 10-15 years. Loss of Wyoming big sagebrush cover in mule deer winter range from the Granddad and Pueblo fires of 2006 will affect mule deer for up to 50 years unless planned rehabilitation efforts to restore sagebrush cover are successful. These effects, along with past actions and proposed actions, should improve conditions for most species. Overall, this alternative would beneficially affect habitat within the cumulative effects area the most for some species, while other species are affected negatively.

Continuation of Current Management Alternative
In untreated areas, which would be the majority of the landscape, effects of the Continuation of Current Management Alternative are the same as effects of the No Treatment Alternative. In the small areas treated over time across the landscape (after additional NEPA analysis), effects of the Continuation of Current Management Alternative would result from cutting and burning of dense stands of juniper, which would convert to grasslands within several years after treatment. Increase in grasses and forbs would be a benefit to pronghorns, and loss of juniper would have little effect on escape cover for pronghorn. Depending on size of the burn and available food sources post-treatment, pronghorn may make extensive use of burned areas. Loss of juniper would not affect mule deer thermal cover as there would be substantial juniper cover left in untreated areas, and sagebrush would return to treated areas, providing cover and forage. Increase in forbs and grass cover in treated areas would be beneficial for deer during the growing season by providing nutritious forage. Elk would also benefit from these treatments but would not be affected by loss of juniper since there would be many areas left with juniper cover.

Small mammals such as various species of mice, voles and shrews adapted to structurally diverse habitat would be affected in the first few years by loss of habitat. Some species with wider ranges of variability in habitat requirements would survive and may thrive. Small mammals would not be evident in any numbers the first year following burning activities. As habitat conditions improve, they would immigrate into treated areas. The larger the area burned, the longer it would take for small mammals to return to treated areas. Burrowing animals such as gophers, should survive since they exist mainly underground and feed on roots. As forbs increase in treated areas, more food would be available. More mobile small mammals such as jackrabbits and cottontails would move to other habitat and would use burn areas for foraging and untreated habitats for cover. Effects from enacting this alternative would evolve more slowly than from any of the action alternatives (except the No Treatment Alternative) but would still occur, assuming projects are proposed, analyzed, and funded.

Cumulative effects to this resource in untreated areas would be the same as those described in the No Treatment Alternative for wildlife while areas treated would have effects to wildlife the same as those described for the Partial Treatment Alternative. Even though juniper expansion in the Project Area would reduce habitat for most wildlife species some habitats in other parts of the cumulative effects area should restore over time.

Preferred Alternative
The potential effects of the Preferred Alternative on wildlife are the same as potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on wildlife within wilderness are the same as those described under the Continuation of Current Management.

4.2.3.4 Special Status Species – Fauna

Potential Effects

Effects to fish and fish habitat have been described in Section 4.2.3.1, Fisheries.

Lahontan Cutthroat Trout
Within the Project Area, only treatments in the Wildhorse Creek Unit have the potential to affect the species. See Section 4.2.3.1, Fisheries, for a discussion of general effects to fish habitat. No other specific effects to this species in Wildhorse Creek are likely.

Great Basin Redband Trout
See Section 4.2.3.1, Fisheries, for a discussion of general effects to fish and fish habitat. Since Great Basin redband trout is the most widespread fish species in all units of the Project Area, effects to fish and fish habitat are primarily effects to redband trout.

Malheur Mottled Sculpin
See Section 4.2.3.1, Fisheries, for a discussion of general effects to fish and fish habitat. In general, effects to redband trout and redband trout habitat would be the same for Malheur Mottled Sculpin. No other specific effects to this species are likely.

No Treatment Alternative
Project area Special Status Species include bald eagle, Columbia spotted frog, greater sage-grouse, Northern goshawk, Swainson's hawk, Preble's shrew, wolverine, California bighorn sheep, several species of bats, long-billed curlew, western burrowing owl, and sage sparrow.

Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for a description of the cumulative effects area. Since no actions would take place within this alternative except for the possibility of naturally-ignited wildfire and proposed projects such as Five Creeks and East Steens Projects, the cumulative effects area affected by disturbance would be about 346,000 acres.

Bald eagles would not be directly affected by continued juniper expansion. An increase in juniper numbers and age could result in additional roost trees; however, a large-scale, high-intensity fire could destroy roost trees. The Burns District Bald Eagle Winter Roost Habitat Management Plan (1986) directs BLM to conduct vegetation management around roosts to prevent loss.

Cumulative effects to bald eagles would be the continued expansion of juniper which may eventually provide roost sites in areas other than the Donner und Blitzen River drainage. Bald eagles would not be affected under this alternative.

With selection of this alternative, juniper expansion could affect lower elevation Columbia spotted frog habitat. Loss of willows and other deciduous riparian shrubs could continue and restrict beaver use of riparian areas. Beaver ponds, which provide habitat for Columbia spotted frogs, could be eliminated. Upper elevation sites would not be affected unless juniper expands upslope.

Greater sage-grouse habitat could be affected from loss of winter, breeding, nesting, early to late brood-rearing and migratory habitat. The only habitat not affected would be higher elevation late brood-rearing areas near Fish Lake and above. Future juniper expansion would continue to degrade lower elevation sagebrush habitats. It is expected within 50-80 years, areas where juniper are presently at a low density would approach woodland stand characteristics. At woodland density, most leks would be surrounded by juniper, which would reduce the area available for males to strut and increase raptor perches close to leks. This would also reduce escape cover near leks and increase susceptibility of displaying males to ground predators. Nesting and early brood-rearing habitat would also be reduced in most sagebrush vegetation types. The increase of raptor and raven perches could increase susceptibility of nests to depredation by ravens, and hens and young chicks to predation by raptors. The amount of forbs available for hens in prebreeding time, a critical factor in successful nesting and production of viable eggs, would be affected. Loss of sagebrush and grass cover could affect nesting. Increase in juniper may also continue to affect

migratory routes between lower elevation nesting and early brood-rearing habitat and upper elevation late brood-rearing habitat. As juniper increases in density, sagebrush cover, which is important for concealing movements, would be reduced with a proportional increase in raptor perches. This could reduce bird numbers.

Wildfire could affect greater sage-grouse habitat differently depending on size and intensity of fires. Smaller (fewer than 5,000 acres) wildfires reducing juniper canopy and leaving islands of shrubs may help in restoring vegetation to a grassland/shrub type. Recovery time may be longer depending on intensity and elevation at which fire occurs and type of sagebrush burned. Larger wildfires intense enough to produce a canopy fire may additionally reduce juniper canopy, but would also burn more sagebrush habitat, potentially resulting in sustained grasslands. Lack of mature sagebrush would reduce seed production required to revegetate the burned area. Sagebrush seed is very small and seed dispersal distance from sagebrush is quite short.

Cumulative effects of this alternative on greater sage-grouse would also include the following: some areas treated with prescribed fire or burned through wildfire should have returned to a sagebrush canopy useable by sage-grouse; areas where juniper were cut and not burned should have returned to a sagebrush canopy during this time. Most areas where juniper is not treated would become unusable habitat for sage-grouse. Habitat for sage-grouse over most of the cumulative effects area would decrease.

Northern goshawk habitat could continue to be affected. Many lower elevation aspen stands have been affected by juniper, which has reduced their viability and would eventually reduce their capacity to reproduce clones thus reducing nesting habitat. Should a wildfire occur and burn juniper/aspen stands, fire could rejuvenate aspen stands, but high-intensity wildfires may reduce clone production by destroying roots. Reduction in clone potential could affect availability of nest trees. Unless these aspen stands are fenced from browsing wildlife and livestock, recovery could be slowed and possibly stopped. Aspen stands above the juniper belt would not be affected and would still provide nesting and foraging habitat for goshawks.

Cumulative effects of this alternative on Northern goshawk would also include the following: remaining nesting habitat would be aspen stands above the juniper belt, those aspen stands treated in the juniper belt with prescribed fire, and where only juniper were cut or burned by naturally-ignited fire.

As juniper continues to expand down slope into Swainson's hawk habitat, more trees could be available for nesting, but foraging areas would be decreased affecting hawk reproductive capabilities. Small wildfires would reduce some nesting habitat, but restore some foraging habitat. One large wildfire could reduce potential nesting habitat, but open a larger area for foraging, increasing long-term productivity.

Cumulative effects of this alternative on Swainson's hawk would also include the following: while acreage of juniper would increase in the Project Area, proposed juniper reduction projects in other parts of the cumulative effects area would reduce nesting habitat and increase foraging habitat. Other past projects and wildfires have already reduced some possible nesting habitat and increased some foraging habitat.

Juniper expansion could affect Preble's shrew habitat. Small wildfires could improve shrew habitat over time by reducing juniper canopy and allowing native forbs, grasses, and shrubs to return. A large-scale, high-intensity wildfire would reduce cover for shrews over a vast area, which may decimate shrew populations in the burn area until vegetation recovers.

Cumulative effects of this alternative on Preble's shrew would also include the following: while Preble's shrew habitat would be reduced in the Project Area, other past treatments, naturally-ignited fires, and proposed treatments would restore some shrew habitat.

Wolverine and wolverine habitat should not be affected by this alternative.

This alternative could affect California bighorn sheep by an increase of juniper, which reduces shrubs, grasses, and forbs on which sheep depend. While juniper is a part of bighorn sheep habitat in some areas on Steens Mountain, sheep may avoid areas with dense juniper stands. Small or large wildfires occurring in bighorn habitat could reduce canopy cover of juniper and eventually increase sheep foraging habitat.

Cumulative effects of this alternative on bighorn sheep would be that increasing juniper across the landscape and increasing juniper density would reduce habitat quality and quantity.

Roosting habitat for bats in cliffs, rock crevices, abandoned mines, and old-growth juniper trees would not be affected by this alternative. To the extent a small or large wildfire would kill old-growth juniper, some roosting habitat could be affected.

Long-billed curlew habitat would probably not be affected. Larger wildfires could increase habitat for long-billed curlew by increasing grasslands. The newly-created grasslands would be used by birds relative to the distance from other required habitats (such as meadow habitat needed for foraging).

The western burrowing owl would not be affected by this alternative since the only known location for this species is in crested wheatgrass seedings near the Project Area. There could be other locations since this species uses abandoned badger burrows.

Partial Treatment Alternative
Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since actions under this alternative would take place on about 87,000 acres, and with proposed projects such as the Five Creeks and East Steens Projects, the cumulative effects area would be about 433,000 acres.

Since no actions would occur in wilderness, where the only suspected bald eagle winter roost in the Project Area is located, there would be no potential effects to bald eagles. Continued expansion of juniper may eventually provide roost sites in areas other than the Donner und Blitzen River drainage

Potential effects on Columbia spotted frogs under this alternative would be the same as under the No Treatment Alternative since most known sites for this species are found in wilderness or WSAs.

Greater sage-grouse habitat in general would be affected in this alternative through cutting and burning of denser juniper woodlands in areas outside of wilderness and WSAs. Most dense juniper woodlands, late stage transitional big sagebrush and juniper areas as well as a good portion of mountain big sagebrush with limited juniper canopy would be treated with prescribed fire. This would reduce juniper canopy and convert these areas to grasslands for at least 15 years until sagebrush naturally revegetates. If burn intensity is too high, revegetation through seeding could be necessary to restore vegetative cover whether grass, forb or shrub. Adjacent to the dense juniper woodlands, sage-grouse habitat would be negatively affected since mountain big sagebrush, and to a much lesser extent Wyoming big sagebrush, could be burned along with junipers. Most sagebrush associated with this level of burning is mixed in with denser juniper stands transitioning to woodlands. This method would not be used to the same extent in sagebrush with scattered junipers. Cutting and jackpot burning or individual tree burning of junipers in less dense stands would have no measurable effect on sage-grouse habitat as most sagebrush canopy would be left intact and useable. As sagebrush revegetates the burned areas over 25 years post treatment, additional habitat for sage-grouse would be created as sagebrush canopy cover increases in percentage.

Leks, which occur in low sagebrush sites, would not be affected unless cutting and jackpot burning of juniper trees occurred near a lek. This action would reduce the number of roost trees near the lek and reduce the possibility of predation on displaying sage-grouse.

Less dense stands of juniper within big sagebrush and low sagebrush vegetation types treated with cutting and jackpot burning or individual tree burning would affect nesting habitat beneficially by reducing the number of raptor and raven perches while maintaining canopy cover of sagebrush. Nesting habitat in big sagebrush could be affected if a prescribed burn is conducted to reduce big sagebrush canopy and allow for grasses and forbs to revegetate after the burn. The greater percentage of canopy burned, the more nesting habitat would be affected. While this may improve habitat for sage-grouse such as forb and insect availability, reduction in big sagebrush cover could affect the amount of suitable nesting sites. Female sage-grouse would move to other available habitat but nesting success would likely decrease.

Travel corridors would be opened up in areas dominated by juniper. Areas cut and burned would have reduced numbers of dead standing trees, which may reduce the number of raptor perches. It is not known how dead standing trees affect sage-grouse use of burned areas. Presumably sage-grouse would be able to see raptors sitting in dead trees more easily than in live trees due to lack of foliage. Once sagebrush cover returns, sage-grouse would have more protection while migrating between lower elevation nesting and early brood-rearing habitat and upper elevation late brood-rearing habitat. This would also be true for migration from higher elevations to lower elevation winter areas.

Under this alternative, these treatments would occur only outside of wilderness and WSAs, so about 87,000 acres would be treated. The remaining acreage in the Project Area in wilderness and WSA could have effects on sage-grouse the same as described under the No Treatment Alternative.

Cumulative effects of this alternative include a decrease of 40-50% in juniper while sagebrush would be reduced in the north end of the Project Area. This would decrease habitat for sage-grouse for up to 15 years until sagebrush cover reached 10%. Areas treated prior to this project would be returning to a usable sagebrush canopy cover. Sagebrush habitat would increase over time in treated areas which would provide more habitat than at present for sage-grouse. These effects would occur over most of the described cumulative effects area except in wilderness and WSAs. Cumulative effects of no treatment occurring in wilderness and WSAs on sage-grouse would be loss of sagebrush and wetland habitats which would continue indefinitely. Sagebrush would only be available at higher elevations above juniper. As juniper expands into lower elevations, most other sagebrush habitat would be lost. This would translate into a loss of many habitats on which sage-grouse depend. This combined with the loss of Wyoming big sagebrush habitat in the Granddad and Pueblo fires of 2006 has affected about 346,000 acres (46%) within the cumulative effects area. Unless restoration efforts are successful in reestablishing sagebrush to these recently burned areas, cumulative effects would persist for 50 years or longer until these areas revegetate naturally. Completeness of burns from these wildfires would slow natural revegetation due to lack of local seed source. According to the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* (ODFW 2005), Burns District was below the goal of retaining greater than or equal to 70% of sage-grouse range as sagebrush habitat in advanced structural stages (greater than 5% sagebrush canopy cover). These two wildfires have reduced this percentage of sagebrush cover below 65%. Efforts to reduce juniper have occurred in other parts of the BLM Burns District to restore ecosystem function and reestablish sagebrush cover. The rate of sagebrush reestablishment and return of at least 10% sagebrush cover for sage-grouse habitat is slower than the rate which sagebrush is being removed from sage-grouse habitat.

Northern goshawk nesting habitat in aspen stands would be avoided if nests are identified during surveys prior to treatment. Aspen stands treated via cutting and burning of juniper would be affected by reduction of juniper and release of new shoots after the burn. Depending on size and density of the aspen stands after treatment (40+ years), they could provide nesting habitat for goshawks. Aspen stands in wilderness and WSAs would not be treated and would affect goshawks same as the No Treatment Alternative.

Cumulative effects of this alternative on Northern goshawk would increase nesting habitat outside wilderness and WSAs through reduction of juniper in lower elevation aspen stands. Aspen stands above the juniper belt would persist and continue to provide nesting habitat. Other past actions and proposed actions may help to restore aspen stands throughout the cumulative effects area.

The cutting and burning of late transitional and dense juniper woodlands would decrease the number of trees available for nesting Swainson's hawks, but would open up grassland habitat for foraging. While cutting and individual burning of juniper in low sagebrush would reduce the number of perches/roosts, it would still provide foraging habitat for this hawk. Since actions under this alternative would occur outside of wilderness and WSAs, habitat availability for nesting would be the same as the No Treatment Alternative in much of the Project Area.

Cumulative effects of this alternative on Swainson's hawk would be while acreage of juniper would increase in wilderness and WSAs, proposed juniper reduction projects in other parts of the cumulative effects area would reduce nesting habitat and increase foraging habitat. Other past projects and wildfire have already reduced some possible nesting habitat and increased some foraging habitat.

In areas treated under this alternative, Preble's shrew habitat could be affected through loss of sagebrush cover and aspen cover. While this shrew is associated with wet areas such as springs or streamside vegetation, it also uses sagebrush vegetation and aspen stands quite extensively. Removal of juniper from riparian areas and restoration of riparian habitat would benefit this species. Loss of sagebrush and aspen vegetation types would affect other portions of the population by reduction of suitable habitat and create habitat fragmentation. Although aspen stands would regenerate within a few years, sagebrush would take longer and it may take many years for the Preble's shrew to repopulate areas. Those areas not treated in wilderness and WSAs could affect Preble's shrews as described in the No Treatment Alternative.

Cumulative effects of this alternative on Preble's shrew would be while Preble's shrew habitat would be reduced in the Project Area, other past treatments, naturally-ignited fires, and proposed treatments would restore shrew habitat in other areas.

Wolverine habitat would not be affected since most of the actions in this alternative are not occurring in wolverine habitat.

California bighorn sheep habitat would not be affected by this alternative since most of the actions would occur outside of wilderness and WSAs where most of the bighorn sheep habitat exists. Effects would be the same as the No Treatment Alternative.

Cumulative effects of this alternative on California bighorn sheep would be through past actions and proposed actions. Some juniper cover in sheep habitat has been and more should be reduced improving sheep habitat.

Roosting habitat for bats in cliffs, rock crevices, and abandoned mines would not be affected by this alternative. Cutting and burning of young juniper could increase foraging habitat for some species of bats and could reduce foraging areas, for those species foraging around junipers.

Cutting and burning of juniper would probably increase habitat for long-billed curlew by increasing grassland habitats. New grasslands would be used relative to the distance from other habitats needed by the curlew such as meadow habitat for foraging.

The effects of this alternative on burrowing owls include potential habitat increases since new grasslands could be created with the reduction of juniper canopy cover.

Cumulative effects of this alternative on wolverine, bats, long-billed curlew, and western burrowing owls would be from past actions and proposed actions and should have no cumulative effects on habitat for these species.

Limited Treatment Alternative
Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since actions would take place on about 130,000 acres within the Project Area under this alternative and with proposed projects such as the Five Creeks and East Steens Projects, the cumulative effects area affected by disturbance would be about 476,000 acres.

Bald eagles would not be affected by this alternative even though actions would take place in wilderness or WSA where a winter roost is suspected. Once winter roost trees are identified, the Burns District Bald Eagle Winter Roost Habitat Management Plan (1986) directs BLM to conduct vegetation management around roosts to protect the roost trees and other possible future roost trees. Treatment would occur during late spring to fall months when eagles would not be present. Other actions would be designed to avoid further treatments within 400 meters (1,320 feet) of identified roosts. Therefore, these actions would have no direct or cumulative effects on bald eagles.

Columbia spotted frogs would be affected by this alternative through reduction of juniper canopy, which would open up riparian areas for revegetation by riparian plant species. Increases in woody riparian species through natural revegetation or planting with native stock, could allow for expansion of beaver populations and pond habitat, which spotted frogs use. Depending on progression of treatments in different project

units, resulting habitat changes may not occur for 15-20 years. Treatments would be designed to avoid existing spotted frog habitat or completed at a time of year when spotted frogs are hibernating.

Cumulative effects of this alternative on Columbia spotted frogs would be reduction of juniper in riparian areas and restoration of those habitats would be beneficial for spotted frogs.

Refer to the Partial Treatment Alternative for general analysis of annual treatments on sage-grouse habitat. More acreage would be treated in this alternative over the life of the project so effects described would occur over more of the landscape. Areas of juniper and mountain big sagebrush burned early in the project timeframe should be returning to a sagebrush-dominated structure useable by sage-grouse. Wyoming big sagebrush sites, if burned, would not return to a sagebrush-dominated site during the life of the project and may need to be reseeded depending on rate of sagebrush return. Areas treated by broadcast burning next to existing crested wheatgrass seedings on the north and west sides of the Project Area would create nonsuitable habitat for sage-grouse. Since these seedings are in lower elevation Wyoming sagebrush habitat, the possibility of these areas returning to a usable sagebrush canopy cover during the life of the project is small. It would take more than 50 years for reestablishment of sagebrush since there would be very little seed source left. Also, many of these areas with big sagebrush around seedings have cheatgrass in the understory which would increase in these sites after treatment. This would require restoration activities to try to return these areas to a perennial plant community. In wilderness and WSAs, treatments would be limited to using only prescribed fire without cutting of juniper to carry fire. This would result in dense juniper stands remaining untreated by fire within these areas. While areas of less dense juniper may be treated, big sagebrush would be reduced as well as a reduction of sage-grouse habitat.

Cumulative effects of this alternative would be a 60% decrease of juniper while sagebrush would be reduced in the north end of the Project Area. This would decrease habitat for sage-grouse for up to 15 years until sagebrush cover reached 10%. Areas treated prior to this project would be returning to a usable sagebrush canopy cover. Sagebrush habitat would increase over time in treated areas which would provide more habitat than at present for sage-grouse. These effects would occur over most of the described cumulative effects area even in wilderness and WSAs, where prescribed fire could be used. Cumulative effects of this treatment occurring in wilderness and WSAs on sage-grouse would be loss of sagebrush habitat in an attempt to reduce juniper overstory. More sagebrush would be lost with this treatment than with treatments available outside wilderness and WSAs. This combined with the loss of Wyoming big sagebrush habitat in the Granddad and Pueblo fires of 2006 affected about 476,000 acres (63%) within the cumulative effects area. Unless restoration efforts are successful in reestablishing sagebrush to these recently burned areas, cumulative effects would persist for 50 years or longer until these areas revegetate naturally. The completeness of burns from recent wildfires would slow natural revegetation due to lack of local seed source. According to the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* (ODFW 2005), Burns District was below the goal of retaining greater than or equal to 70% of sage-grouse range as sagebrush habitat in advanced structural stages (greater than 5% sagebrush canopy cover). These two wildfires have reduced this percentage of sagebrush cover below 65%. Efforts to reduce juniper have occurred in other parts of the BLM Burns District to restore ecosystem function and reestablish sagebrush cover. The rate of sagebrush reestablishment and return of at least 10% sagebrush cover for sage-grouse habitat is slower than the rate which sagebrush is being removed from sage-grouse habitat.

Refer to the Partial Treatment Alternative for Special Status Species – Fauna for general analysis of annual treatments on Northern goshawk habitat. In this alternative, more aspens stands would be treated which increases the possibility of affecting goshawk habitat. If nest trees are identified during surveys, areas around nests would not be burned. Cutting of juniper outside wilderness and WSAs, in areas around nest trees could take place after August 15 each year to allow young birds to fledge.

Cumulative effects of this alternative on Northern goshawk would be increased nesting habitat in treated lower elevation aspen stands. About 40 years post treatment, nesting habitat would return for goshawks. Aspen stands at higher elevations would still be available for goshawk nesting habitat. Other past actions and proposed actions should help to restore aspen stands throughout the cumulative effects area.

Effects of actions in this alternative on Swainson's hawk would be the same as the Partial Treatment Alternative except juniper would be reduced over more of the landscape, which may affect nesting habitat,

but would provide more foraging habitat as grasslands increase after treatments. There should still be suitable juniper trees for nesting.

Cumulative effects of this alternative on Swainson's hawk would be proposed juniper reduction projects in other parts of the cumulative effects area would reduce nesting habitat and increase foraging habitat. Other past projects and wildfires have already reduced some possible nesting habitat and increased some foraging habitat.

Habitat for Preble's shrew would be affected as described in the Partial Treatment Alternative. More sagebrush, aspen, and riparian habitat would be treated over the length of the project, but some areas treated early in the project should be returning to useable habitat by the end. Riparian areas and aspen stands should respond quickest to treatments and return to useable habitat. The amount of time for Preble's shrew to return to former habitat would depend on amount of suitable habitat remaining, spatial distribution of habitat, and ability of remaining habitat to support viable, sustained populations until such time treated areas return to suitable habitat.

Cumulative effects of this alternative on Preble's shrew would be while Preble's shrew habitat would be reduced more in the Project Area, proposed treatments in other parts of the cumulative effects area would reduce habitat even more. Other past treatments and naturally-ignited fires in the cumulative effects area should be returning to shrew habitat. Shrew habitat would be restored once juniper cover is reduced in sagebrush, aspen, and riparian habitats and these habitats return.

Effects on wolverines are unlikely. Most proposed treatments in the Project Area target juniper expansion. Wolverine habitat in the Project Area has little to no juniper so no direct or cumulative effects to wolverine habitat are anticipated.

Bighorn sheep habitat could be affected by activities proposed under this alternative. Since more actions would be conducted in wilderness and WSAs, it is possible bighorn sheep habitat would be affected by juniper reduction, which would improve sheep habitat. Loss of shrubs would have some affect on availability of some forage but the resulting increase in grasses and forbs would benefit bighorn sheep overall.

Cumulative effects of this alternative on California bighorn sheep would be through past actions and proposed actions. Juniper cover would be reduced in sheep habitat improving sheep habitat immediately as well as through the reduction of juniper over time.

Effects to bats, long-billed curlew, and burrowing owls, both direct and cumulative, would be the same as described in the Partial Treatment Alternative except these effects would occur over more of the Project Area.

Full Treatment Alternative
Refer to the No Treatment Alternative (paragraphs 5 and 6) for Migratory Birds for the description of the cumulative effects area. Since actions would take place on about 188,000 acres within the Project Area under this alternative and with proposed projects such as the Five Creeks and East Steens Projects, the cumulative effects area affected by disturbance would be about 534,000 acres or 71% of the cumulative effects area.

The direct and cumulative effects of actions in this alternative on bald eagles and Columbia spotted frog would be the same as described in the Limited Treatment Alternative.

Refer to the Partial Treatment Alternative for general analysis of annual treatments on sage-grouse habitat. The most acreage, approximately 188,000 could be treated in this alternative over the life of the project so effects described would occur over more of the landscape. Juniper canopy should be reduced to 20-30% of present in the Project Area. Areas of juniper and mountain big sagebrush burned early in the project timeframe should be returning to a sagebrush-dominated structure useable by sage-grouse. There would still be extensive areas of grasslands from more recent burns that would eventually return to a sagebrush-dominated canopy. Wyoming big sagebrush sites, if burned, would not return to a sagebrush-dominated site during the life of the project and may need to be reseeded depending on rate of sagebrush return.

Areas treated next to seedings on the north and west sides of the Project Area would create greater voids of unsuitable habitat for sage-grouse as discussed in the Partial Treatment Alternative.

Cumulative effects of this alternative would be a 75% decrease in juniper while sagebrush would be reduced throughout the Project Area. This would decrease habitat for sage-grouse for up to 20 years until sagebrush cover reached 10%. Areas treated prior to this project or early in the treatment cycle could be returning to a usable sagebrush canopy cover. Sagebrush habitat would increase over time in the treated areas which would provide more habitat than at present for sage-grouse. These effects would occur over most of the described cumulative effects area even in wilderness and WSAs, where prescribed fire could be used. The cumulative effects of this treatment occurring in wilderness and WSAs on sage-grouse would be loss of sagebrush habitat in an attempt to reduce juniper overstory. More sagebrush would be lost with this treatment than with treatments available outside wilderness and WSAs. This combined with the loss of Wyoming big sagebrush habitat in the Granddad and Pueblo fires of 2006 affected about 534,000 acres (71%) within the cumulative effects area. Unless restoration efforts are successful in reestablishing sagebrush to these recently burned areas, cumulative effects would persist for 50 years or longer until these areas revegetate naturally. The completeness of burns from recent wildfire would slow natural revegetation due to lack of local seed source. According to the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* (ODFW 2005), the Burns District was below the goal of retaining greater than or equal to 70% of sage-grouse range as sagebrush habitat in advanced structural stages (greater than 5% sagebrush canopy cover). These two wildfires have reduced this percentage of sagebrush cover below 65%. Efforts to reduce juniper have occurred in other parts of the BLM Burns District to restore ecosystem function and reestablish sagebrush cover. The rate of sagebrush reestablishment and return of at least 10% sagebrush cover for sage-grouse habitat is slower than the rate which sagebrush is being removed from sage-grouse habitat.

Effects of this alternative on Northern goshawk would be the same as the Limited Treatment Alternative except more aspen stands would be treated over the course of the project, increasing the possibility of affecting goshawk nesting and foraging habitat by reducing aspen trees used for nesting and reducing cover in foraging areas. Identified nest trees would be protected from treatment same as described in the Limited Treatment Alternative.

Cumulative effects of this alternative on Northern goshawk would be nesting habitat would increase the most but may not reach this point until 40 years post treatment. Other past actions and proposed actions should help to restore aspen stands throughout the cumulative effects area.

Effects of actions in this alternative on Swainson's hawk would be the same as those described in the Limited Treatment Alternative except juniper would be reduced the most over the life of the project. This would affect nesting habitat but suitable nest trees should remain in the Project Area. More foraging area would be available over the course of the project.

Cumulative effects of this alternative on Swainson's hawk would be proposed juniper reduction projects in other parts of the cumulative effects area would also reduce nesting habitat and increase foraging habitat. Other past projects and wildfire have already reduced some possible nesting habitat and increased some foraging habitat. Overall, while nesting habitat would be reduced the most, Swainson's hawks would still have sufficient nesting habitat and habitat foraging habitat.

Habitat for Preble's shrew would be affected the same as described in the Limited Treatment Alternative. More sagebrush, aspen and riparian habitat would be treated over the length of the project but some areas treated early in the project should be returning to useable habitat by the end. Riparian areas and aspen stands should respond the quickest to treatments and return to useable habitat. The amount of time for Preble's shrew to return to former habitat would depend on amount of suitable habitat remaining, spatial distribution of habitat, and ability of remaining habitat to support viable populations that would sustain until such time treated areas return to suitable habitat.

Cumulative effects of this alternative on Preble's shrew would be while Preble's shrew habitat would be reduced the most in the Project Area, proposed treatments in other parts of the cumulative effects area would reduce habitat even more. Other past treatments and naturally-ignited fires in the cumulative effects

area should be returning to shrew habitat during the time frame of this project. Shrew habitat would be restored the most over time once juniper cover is reduced in sagebrush, aspen, and riparian habitats and functionality returns to treated areas.

To the extent treatments conducted under this alternative take place in the higher elevations of Steens Mountain, wolverine habitat could be affected. Even though most treatments in the Project Area are designed to treat juniper expansion, project units occur in wolverine habitat, which could have an effect on habitat by reducing cover types used by wolverine.

Cumulative effects of this alternative on wolverine would be negligible since most treatments would occur in other areas outside wolverine habitat and no planned treatments outside the Project Area would occur in wolverine habitat.

Bighorn sheep habitat would be affected same as the Limited Treatment Alternative. Since more actions would be conducted in wilderness and WSAs, bighorn sheep habitat would be affected by reduction of juniper, which would improve aspects of sheep habitat. Loss of shrubs would have some affect on availability of some forage but the resulting increase in grasses and forbs would benefit bighorn sheep overall.

Cumulative effects of this alternative on California bighorn sheep would be that through past actions and proposed actions, some juniper cover has been reduced in sheep habitat. This alternative would reduce juniper cover the most and should improve aspects of sheep habitat the most.

Effects to bats, long-billed curlew, and burrowing owls, both direct and cumulative, would be the same as those described in the Partial Treatment Alternative except these effects would occur over most of the Project Area.

Continuation of Current Management Alternative
In untreated areas, which would be the majority of the landscape, effects of the Continuation of Current Management Alternative are the same as the effects of the No Treatment Alternative. In small areas treated over time across the landscape (under other NEPA documents), effects of the Continuation of Current Management Alternative would be the same as those described in the Partial Treatment Alternative. The primary difference between the Partial Treatment and Continuation of Current Management Alternatives is scale and rate at which treatments would occur across the landscape. This would be slower than any of the action alternatives except the No Treatment Alternative, but would still occur over time assuming project proposals occurred, were analyzed, and funded.

The cumulative effects of this alternative on sage-grouse would include the following: Although some areas treated with prescribed fire or burned through wildfire should have returned to sagebrush canopy useable by sage-grouse, other recently-treated areas would be in a stage not suitable for use; areas where juniper were cut and not burned should have returned to a sagebrush canopy during this time; areas not treated would continue to see increases in juniper density and a reduction of available habitat for sage-grouse; and this would not conform to the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* (ODFW 2005) since sagebrush habitat would be decreasing over time.

Cumulative effects of this alternative on Northern goshawk would include the following: Remaining nesting habitat would be aspen stands above the juniper belt, aspen stands treated in the juniper belt with prescribed fire, and aspen stands where only juniper were cut or burned. Treated aspen stands would reach nesting potential in about 40 years.

Cumulative effects of this alternative on Swainson's hawk would include the following: While acreage of juniper would increase in the Project Area, proposed juniper reduction projects in other parts of the cumulative effects area would reduce nesting habitat and increase foraging habitat. Other past projects and wildfire have already reduced some possible nesting habitat and increased some foraging habitat.

Cumulative effects of this alternative on Preble's shrew would include the following: While Preble's shrew habitat would be reduced in the Project Area, other past treatments and wildfires and proposed treatments would restore some shrew habitat.

Preferred Alternative
Potential effects of the Preferred Alternative on Special Status Species - Fauna are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. Potential effects of the Preferred Alternative on Special Status Species - Fauna within wilderness are the same as those described under the Continuation of Current Management.

4.2.3.5 Wild Horses and Burros

Potential Effect

For all alternatives, the area of potential affect is defined as the South Steens HMA.

No Treatment Alternative
The No Treatment Alternative would increase the likelihood of a decreased amount of forage available to all herbivores in the affected HMA. Effects to wild horse populations could be pronounced if climatic or operational restraints delay scheduled gathers. Increased competition between wild horse populations and other animal populations reliant upon the same limited resources could be exacerbated if the No Treatment Alternative is selected.

Wild horse habitat could decrease as tree and shrub densities increase. Available forage and foraging areas could decrease, which could cause animals to concentrate in areas with available forage. Such areas are those with diverse understory species. Increased wild horse utilization could stress understory plant species causing them to decline. With continued forage decline, AMLs for affected HMAs could be reduced, thus shrinking the wild horse herd population. A reduced population size could also affect herd genetic diversity.

However, available forage for wild horses could increase. As a result of increasing dense vegetation, wildfire could destroy sagebrush and juniper woodlands. This expanded grassland could result in more forage availability for wild horses, and wild horse concentration in the area would be expected to increase.

Partial Treatment Alternative
In untreated areas, the Partial Treatment Alternative could decrease forage available to all herbivores in the affected HMA. Effects to wild horse populations could be pronounced if climatic or operational restraints delay scheduled gathers. Increased competition between wild horse populations and other animals reliant upon the same limited resources could be exacerbated if the Partial Treatment Alternative is selected.

In other areas where increased juniper management is proposed, forage available to all herbivores in the affected HMA would increase. Effects to wild horse populations could be pronounced if gathers need to occur on shorter sensitive timelines or if budgetary or operational restraints delay scheduled gathers. Competition between wild horses and other animals reliant upon the same limited resources could be lessened if the Partial Treatment Alternative is selected.

Future proposed activities, such as fuel treatments and fire managed for resource benefit could further benefit wild horse habitat. Future wild horse population management could also improve wild horse health characteristics.

Limited Treatment Alternative
In some areas, the Limited Treatment Alternative could increase forage available to all herbivores in affected HMAs. Effects to wild horse populations could be pronounced if climatic or operational restraints delay scheduled gathers. Increased competition between wild horse populations and other animals reliant upon limited resources would be less than under the Partial Treatment and No Treatment Alternatives, but could still be exacerbated if the Limited Treatment Alternative is selected.

In areas where increased juniper management is proposed, forage available to all herbivores in the affected HMA would increase. Effects to wild horse populations would be the same as those described in the Partial Treatment Alternative.

Future proposed activities, such as fuel treatments and fire managed for resource benefit could further benefit wild horse habitat. Wild horse population management could also improve wild horse health characteristics.

Full Treatment Alternative
In limited site-specific areas, the Full Treatment Alternative could increase forage available to all herbivores in the affected HMA. Effects to wild horse populations could be pronounced if climatic or operational restraints delay scheduled gathers. Competition between wild horse populations and other animas reliant upon the same limited resources would be less than under the Partial Treatment and Limited Treatment Alternatives and greater under the Continuation of Current Management Alternative.

In areas where fairly immediate increased juniper management is proposed, forage available to all herbivores in the affected HMA would increase. Effects to wild horse populations could be pronounced if gathers need to occur on shorter sensitive timelines or if climatic or operational restraints delay scheduled gathers. Competition between wild horse populations and other animal populations reliant upon the same limited resources would be reduced if the Full Treatment Alternative is selected.

Future proposed activities, such as fuel treatments and fire managed for resource benefit could further benefit wild horse habitat. Future wild horse population management could also improve wild horse health characteristics.

Continuation of Current Management Alternative
Effects on horses would be the same as those discussed in the No Treatment Alternative. Limited treatments could occur under other environmental documentation and would result in potential effects the same as those described in the Partial Treatment Alternative.

Preferred Alternative
Potential effects on wild horses are the same as those described in the Full Treatment Alternative.

4.2.4 Cultural, Visual, and Special Management Oriented Resources

4.2.4.1 Cultural Heritage

Potential Effects

The cultural resource cumulative effects area encompasses the entire Project Area.

No Treatment Alternative
With the exception of fire suppression, the No Treatment Alternative poses some of the greatest potential effects to cultural resources (including the Riddle Brothers Ranch Historic District) of all alternatives. Provisions can be made for locating and protecting sites that could sustain damage from fire effects only in conjunction with planned management activities.

Intense fires are known to damage surface archaeological sites and could damage subsurface site components. Under this alternative, increased erosion and ground visibility in unmanaged juniper woodlands could result in increased effects to archaeological sites both from burn over and juniper invasion in these areas.

Potential cumulative effects to cultural resources under the No Treatment Alternative could include continued and accelerated damage to cultural site constituents from excessive heat fires, further exposure of site constituents to post-unmanaged wildfire, fire suppression activities, subsurface site alteration from juniper expansion into site areas, and increased illegal collection of cultural artifacts.

Potential cumulative effects to the Riddle Brothers Ranch Historic District under the No Treatment Alternative could include the heightened possibility of damage to the Historic District features from excessive and unmanaged fires, fire suppression activities, and continued alteration of the District's visual landscape.

Partial Treatment Alternative
Fire activities may affect cultural resources in a number of ways. Effects could include destruction of burnable cultural resources (i.e., historic buildings and features); destruction of, or damage to pre-contact rock art, surface scatters of stone artifacts, and waste stone debris; and damage to hydration rinds on obsidian artifacts.

Wildfire suppression activities and wildland fire use such as OHV use, bulldozing of control lines, and occupation of fire camps can damage cultural resources through sediment compaction and artifact displacement and breakage. Soil chemistry at archaeological sites can be dramatically and permanently altered by fire retardants, especially in areas of low annual rainfall where leaching would be minimal. Fire removes ground cover and exposes rock and soil to erosion, subjecting subsurface archaeological site components and features to damage from wind and water erosion and illegal collecting.

Post-fire activities such as planned plantings and seeding can also affect cultural resources through soil/sediment compaction, alteration of groundcover and visibility, and crushing damage to site constituents.

Even though wildfire suppression activities and wildland fire use can damage cultural resources in specific ways, well-planned prescribed fire and wildland fire use would be preferable to allowing fires to burn unchecked. These effects would be mitigated through prior cultural inventory, systematic surface artifact collection, and post-fire monitoring. After a few seasons of plant growth, ground cover decreases ground visibility.

Prior to project implementation, a Class III cultural resource inventory would be required. The survey would follow the terms of the *Protocol for Management Cultural Resources on Lands Administered by the Bureau of Land Management in Oregon*. These surveys would encompass all lands within the planned Project Area including Federal, State, and private holdings. These surveys would be restricted to those physical environments containing sufficient on-ground or created fuels which could cause potential harm to lithic properties through prescribed fire and wildland fire use.

The District Archaeologist or designee would assess site exclusion or treatment modification during the treatment planning phase.

Potential effects to cultural resources would be eliminated by project redesign or various scientific data recovery methods such as recordation, surface collection, subsurface testing, or excavation. The basis for this inventory and mitigation process is Section 106 of the National Historic Preservation Act of 1966. A predictive model to locate significant sites would be created. Affects by other resource uses would be mitigated when found on a
case-by-case basis. Protection of cultural resource localities through law enforcement surveillance and other protective measures would occur.

Prescribed burning can permanently affect key components within Riddle Brothers Ranch Historic District (see Riddle Brothers Ranch Historic District Cultural RMP). Wildfire, prescribed fire, wildland fire use, planting, seeding, cutting of juniper, and piling of woody debris all affect Historic Districts by altering those criteria defining the District as eligible for nomination to the National Register of Historic Places. These criteria include prescribed fire and wildland fire use activities such as OHV use, soil disturbances, and occupation of fire camps can damage all aspects of the "historic" structures and features and the American Indian site constituents within the Riddle Brothers Ranch Historic District.

Even though fire can damage Riddle Brothers Ranch Historic District in specific ways, well-planned prescribed fire and wildland fire use would be preferable to allowing wildfires to burn unchecked within and immediately surrounding the Historic District. Potential effects to the Historic District would be eliminated by prescribed fire project design including black lining and/or modified ignition techniques aimed at removing fire-prone vegetation from the Historic District (site preservation) and removal of juniper limbs and boles to at least 50 feet from standing structures and features.

Post-fire activities such as planned plantings and seeding can also affect the integrity of the Historic District through soil/sediment compaction, alteration of groundcover and visibility, crushing damage to the site

constituents, and alteration of the site environment (one key criterion for National Register eligibility). Potential effects to Riddle Brothers Ranch Historic District from this activity would be eliminated by pre-planning for seeding and planting type, location, and compliance with eligibility criteria (in consultation with the District Archaeologist).

Effects to cultural resource sites in the past could have included grazing pressure, OHV and mechanized vehicle use, and illegal collecting. Complete data are not available for the levels of current effects within sites caused by unmanaged fire. Effects to cultural resources are lowest where uses of public lands are restricted to those causing the least amount of ground disturbance.

Past effects to cultural resources within the Project Area but unrelated to the current treatment plan could have included loss of cultural artifacts from crushing, illegal collecting, and high heat fires. These losses would have been more prevalent over the last 50-100 years with the advent and increase in mechanized vehicles, fire suppression activities, and removal of topsoil exposing cultural artifacts to weathering and fire. Other past effects could have included crushing of cultural artifacts from cattle and/or sheep grazing, soil compaction, erosion, landscape modification, and increased interest in collecting of artifacts. These activities may have buried sites.

Even with adherence to site protection restrictions during the planning process this alternative could cause cumulative effects. Greater ground visibility resulting from planned treatments could result in greater levels of illegal collecting within cultural resource localities in areas of heavy public use. This potential increase in illegal effects could contribute cumulatively, but only until the vegetation returned after several growing seasons.

If "no treatment" areas are defined to protect potentially eligible sites from effects of cutting and burning, these pockets of uncut standing foliage could increase cumulative effects. These cumulative effects over time could include heavier or greater rangeland and wild ungulate use within the site area(s) creating soil compaction, soil and artifact vertical and horizontal displacement, and artifact crushing.

Pockets of uncut standing foliage could also create areas of more palatable camping for off-road recreationists, also increasing the potential for soil compaction; horizontal and vertical displacement of surface and near surface artifacts and soils; and illegal collecting of artifacts and/or damage to structures, petroglyphs, arboglyphs, and other cultural features.

Any instance of degradation affects site information potential.

Effects to the Riddle Brothers Ranch Historic District could include continued juniper expansion, legal and illegal mechanized vehicle use, more intensive public use, trespass by unauthorized public, and illegal collecting and/or vandalism. Photographic histories of Riddle Brothers Ranch Historic District show the steady progression of flora change, thus changing not only the landscape of Riddle Brothers Ranch Historic District but increasing potential of permanent and devastating fire damage.

As detailed in this chapter, adherence to site protection restrictions during the planning process would cause negligible to no cumulative effects under this alternative. Potential positive effects to Riddle Brothers Ranch Historic District could include the lessening of potential for devastating fire damage and a return to the Riddle Brothers Ranch Historic District's original visual landscape.

Limited Treatment Alternative

Potential effects to Cultural Heritage and Riddle Brothers Ranch Historic District areas would be substantially the same as described for the Partial Treatment Alternative. Potential effects to Cultural Heritage and Riddle Brothers Ranch Historic District would be eliminated by consultation and project redesign where necessary.

The Limited Treatment Alternative would reduce continued modification of vegetative communities by juniper expansion in larger portions of the Project Area than the Partial Treatment Alternative. Effects from

this alternative in treated areas would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.

With adherence to site protection restrictions during the planning process as detailed in Chapter 4, effects to the Riddle Brothers Ranch Historic District under this alternative would cause no significant cumulative effects. Potential positive cumulative effects to Riddle Brothers Ranch Historic District could include the lessening of potential for devastating fire damage and a return to the Riddle Brothers Ranch Historic District's original visual landscape.

Full Treatment Alternative
The Full Treatment Alternative would reduce continued modification of vegetative communities by juniper expansion in larger portions of the Project Area than the Partial Treatment Alternative. Effects from this alternative in treated areas would be the same as those described in the Partial Treatment Alternative. Effects from this alternative in untreated areas would be the same as those described in the No Treatment Alternative.

General cumulative effects to cultural resource sites in the past could include grazing pressure, OHV and mechanized vehicle use, and illegal collecting (see the Andrews/Steens PRMP/FEIS at 4.9.5 – page 4-143). Complete data are not available for the levels of current cumulative effects within sites caused by unmanaged fire. Current cumulative effects to cultural resource are lowest where uses of public lands are restricted to those causing the least amount of ground disturbance.

Educated assumptions concerning past cumulative effects to cultural resources within the Project Area but unrelated to the current treatment plan could include loss of cultural artifacts from crushing, illegal collecting, and high heat fires. These losses would be more prevalent over the last 50-100 years with the advent and increase in mechanized vehicles, fire suppression, and removal of topsoil exposing cultural artifacts to weathering and fire. Other past cumulative effects could include crushing of cultural artifacts from cattle and/or sheep grazing, soil compaction, erosion, landscape modification, and increased interest in collecting of artifacts. Some sites may have been further buried by any of these activities.

Even with adherence to site protection restrictions during the planning process this alternative could cause cumulative effects. Greater ground visibility resulting from planned treatments could result in greater levels of illegal collecting within cultural resource localities in areas of heavy public use. This potential increase in illegal effects could contribute to potential cumulative effects, but only until vegetation returned within several growing seasons. Any instance of degradation cumulatively affects the site in terms of information potential.

If no treatment areas are created to protect potentially eligible sites from effects of cutting and burning, these pockets of uncut standing foliage could increase cumulative effects. These cumulative effects over time could include heavier or greater rangeland and wild ungulate use within the site area(s) creating soil compaction, soil and artifact vertical and horizontal displacement, and artifact crushing.

Pockets of uncut standing foliage could also create areas of more palatable camping for off-road recreationists, also increasing potential for soil compaction; horizontal and vertical displacement of surface and near surface artifacts and soils; and illegal collecting of artifacts and/or damage to structures, petroglyphs, arboglyphs, and other cultural features.

General cumulative effects to Riddle Brothers Ranch Historic District could include the continued floral (juniper) expansion, legal mechanized vehicle use, more intensive public use pressure, trespass by unauthorized publics, and illegal collecting and/or vandalism. Photographic histories of Riddle Brothers show the steady progression of flora change, thus changing not only the landscape of Riddle Brothers Ranch Historic District but increasing the potential of permanent and devastating fire damage.

With adherence to site protection restrictions during the planning process effects to Riddle Brothers Ranch Historic District under this alternative would cause no significant cumulative effects. Potential positive cumulative effects to Riddle Brothers Ranch Historic District could include lessening of potential

for devastating fire damage and a return to the Riddle Brothers Ranch Historic District's original visual landscape.

Continuation of Current Management Alternative
Effects to this resource are the same as those contained in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Cumulative effects to this resource are the same as those contained in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
The potential effects of the Preferred Alternative on cultural resources are the same as the potential effects described under the Full Treatment Alternative in areas, regardless of wilderness status.

4.2.4.2 Visual Resources

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative, wildfires would still occur and would be managed in a manner consistent with the RMP and FMP. No fuels reduction treatments as described in other action alternatives would occur. The following discussion analyzes potential effects on Visual Resources.

Visual Resources would not be affected by human-caused changes. However, continued juniper expansion and development of more continuous juniper stands (a solid, dark-green band) could populate the 4,500 to 7,500-foot elevation belt across the west side of Steens Mountain.

Potential exists for large, stand-replacing fires throughout the Project Area, which could blacken hundreds to thousands of acres. Form, line, color, and texture contrasts with the characteristic landscape could result. Form contrasts would arise from large, irregular forms in a landscape of generally small, irregular patches of vegetation and rock outcrops. Line contrasts could be created by combination of burned and unburned areas or, in time, forests versus grasslands. Color contrasts would result when the patchy black landscape is compared to the patchy to uniform gray-green and dark green vegetation. The alteration of moderately rough vegetation to a smoother, uniform landscape would result in texture contrasts on a large scale.

Because only wildland fire use would be allowed in WSAs and Steens Mountain Wilderness, there would be no human-caused effects to visual resources in these areas. However, potential would continue for large fires in WSAs and Steens Mountain Wilderness, which could blacken hundreds to thousands of acres. Fire could cause form, line, color, and texture contrasts. Form contrasts would arise from large, irregular burned areas in a landscape of generally small, irregular patches of vegetation and rock outcrops. Line contrasts would be the same as described above. Color contrasts would result when the patchy black landscape is compared to the patchy to uniform gray-green and dark green vegetation. The alteration of moderately rough vegetation to a smoother, more uniform landscape would result in texture contrasts. The VRM Class I objectives would be met, because these contrasts would not attract the attention of the casual observer more than any other wildland fire or prescribed fire without pre-treatment.

Other reasonably foreseeable activities that may affect visual resources include both BLM and non-BLM projects. Juniper reduction on private and public lands that occur in proximity to North Steens Projects may provide a visual contrast to areas left unburned in this Project Area that provide a larger landscape view. However, from a distance this contrast may appear to be a natural variation in vegetation. Any other projects on BLM-administered lands would be designed in a manner to comply with VRM Class guidelines; so overall, VRM objectives for VRM Classes I, II, III, IV across the landscape would be met.

Partial Treatment Alternative
Under the Partial Treatment Alternative, all treatment methods could occur outside of wilderness and WSAs. Treatments in wilderness and WSAs would be limited to management of naturally-occurring fire. Effects to Visual Resources within wilderness and WSAs would be the same as the No Treatment Alternative. For other areas the effects are described below:

Broadcast prescribed burning would result in small to large irregular forms across the landscape. Initially, forms would be predominantly black in color, but over time would become light to bright green or tan to yellowish, depending on vegetation and season. Potentially strong texture contrasts would be created between burned and unburned areas because of differences in vegetation types (trees to dead trees, grasses, and forbs). These changes would be expected to mimic that which would be observed associated with wildfire especially if no juniper cutting occurs as a pre-burning treatment.

Jackpot burning would create small, irregularly shaped patches randomly placed throughout the landscape. Initial color would be black, but would fade over time and would be replaced by various shades of green from grasses and forbs. There would be minimal texture changes, unless large-scale juniper removal accompanies jackpot burning.

Individual tree burning would create small-scale color contrasts, while strengthening existing vertical forms and lines. Dark green trees with brown to gray vertical cylinders and horizontal to diagonal lines would become black vertical cylinders with short, black horizontal to diagonal lines.

Temporary or permanent dark green metal posts with barbed wire fencing would add short green vertical lines and long horizontal lines to the landscape. The horizontal lines would become invisible with increasing distance from fencing.

Reseeding of crested wheatgrass and native vegetation with seed drills would create straight to curving lines of vegetation across seeded areas. Work in other areas has indicated using a drag and pulling the seed tubes so seed is dropped in a more irregular pattern greatly reduces drill furrows and rows. Any planting in riparian areas or bitterbrush patches would be at such a small scale there would be no effects to visual resources, except to help with vegetation recovery.

Total juniper reduction would remove vertical lines and forms and dark green colors attributable to junipers from the landscape, replacing them with horizontal lines and forms. Freshly cut, light tan tree trunks and stumps would contrast strongly with grayish, reddish browns of juniper trunks, tan to brown to reddish soils, and various green shades of vegetation. These contrasts, and vegetation color changes from green to red and tan, would be visible for approximately six months to 5 years before prescribed burning occurs. Piling of cut junipers would result in numerous, rough, spherical forms irregularly scattered across the landscape; however, these areas should blend in with adjacent vegetation within 3 years. After jackpot or prescribed burning, some horizontal lines and forms would remain, but vertical elements would be removed from the landscape.

Where commercial use of cut juniper is allowed, implementation guidelines related to vehicle use would need to be developed to minimize observable vehicle tracks that would remain in place long enough (past the next growing season) that unauthorized two-track routes might become established.

Cutting every third tree would add horizontal lines and forms to a mostly vertical landscape. Freshly cut, light tan tree trunks and stumps would contrast strongly with the grayish, reddish browns of juniper trunks, tan to brown to reddish soils, and various green shades of vegetation. Cut trees would have vegetation color changes from green to red and tan. If no burning occurs as described under the fall and leave treatment, these contrasts could persist for many years. If burned, which generally occurs within 2 years but can be up to 5 years, the color contrasts would decline. After burning, the vertical lines and forms (blackened standing tree trunks) would be observable, but for those trees left standing, contrasts would mimic a natural wildfire. For cut trees, the cut ends and burnt stumps and tree trunks would still be observable to those visitors traveling through the area. From a distance, the return of grasses and shrubs would help screen stumps and

burnt tree boles from view. If cut trees are piled and burned, no tree boles would remain. Burn circles would be observable for up to 3 years; however, where needed, seeding could help speed the return of vegetation to blend in with surrounding unburned areas.

Droop cutting would strengthen the vertical lines and forms by increasing the width of forms and changing horizontal to diagonal lines to roughly vertical. Freshly cut, light tan branch ends would contrast strongly with the grayish, reddish browns of juniper trunks and various green shades of vegetation. Types of contrasts associated with cutting of branches before and after burning would be the same as described for the treatment of cutting every third tree, however, at a much smaller scale because only branches would be cut, not trees. No stumps or boles would be observable, and effects would more closely mimic natural wildfire.

Limb and girdle cutting would have the same effects as droop cutting except girdle cuts may still be observable when directly adjacent to a girdled juniper. Burning would be expected to help reduce the contrast of girdle cuts by making the entire tree look black.

In addition to site-specific effects to visual resources from the above treatments, the Partial Treatment Alternative would introduce strong form, line, color, and texture contrasts into the characteristic landscape outside of WSAs and Steens Mountain Wilderness. Additional openings would be created increasing and repeating the existing random, patchy openings. Irregular lines would be created by the combination of burned and unburned areas. Colors within burned areas would initially be black, but would rapidly fade and become greener than the surrounding sagebrush in the spring. Overall texture of the Project Area would become rougher with creation of additional openings and smoother with conversion of juniper to grasses, forbs, and shrubs. Additionally, there is potential for color and texture contrasts to develop between treated lands outside the WSAs and wilderness and untreated lands within the WSAs and wilderness. Should these contrasts develop, they could attract the attention of the casual observer. However, if treatment units are designed with irregular rather than straight boundaries, the contrast described would better mimic natural variation in vegetation which would be expected to occur from wildfires at the landscape and viewshed levels. It would be expected that VRM Class II, III and IV objectives would be met.

Other reasonably foreseeable activities that may affect visual resources include both BLM and non-BLM projects. Juniper reduction on private and public lands in proximity to North Steens Projects may provide a visual contrast to areas left untreated. Less contrast may be observable where areas within this Project Area have also been treated. However, from a distance at the landscape and viewshed levels, this contrast is expected to appear to be a natural variation in vegetation. Any other projects on BLM-administered lands would be designed in a manner to comply with VRM Class guidelines, so overall, VRM objectives for VRM Classes I, II, III, IV across the landscape would be met.

Limited Treatment Alternative
Under the Limited Treatment Alternative, all treatment methods could occur outside of wilderness and WSAs. Treatments in wilderness and WSAs would be limited to wildland fire use and broadcast burning without juniper cutting. For areas outside of wilderness and WSAs, types of effects to Visual Resources under the Limited Treatment Alternative are the same as those described under the Partial Treatment Alternative. For wilderness and WSAs the effects are described below:

Broadcast prescribed burning would result in small to large irregular forms across the landscape. Initially, forms would be predominantly black in color, but over time would become light to bright green or tan to yellowish, depending on vegetation and season. Potentially strong texture contrasts would be created between burned and unburned areas because of differences in vegetation types (trees to dead trees, grasses, and forbs). These changes would be expected to mimic that which would be observed associated with wildfire especially given no juniper cutting would occur as pre-burning treating.

Types of effects from other reasonably foreseeable activities and effects under this alternative would be the same as the Partial Treatment Alternative, except more acres would be treated given prescribed fire could be used in wilderness and WSAs. This could result in additional contrast than under the Partial Treatment Alternative between areas treated and not treated, but again, from a distance at the landscape and viewshed

levels, this contrast is expected to appear to be a natural variation in vegetation. Any other projects on BLM-administered lands would be designed in a manner to comply with VRM Class guidelines, so overall, VRM objectives for VRM Classes I, II, III, IV across the landscape would be met.

Full Treatment Alternative
Under the Full Treatment Alternative, all treatment methods could occur within the entire Project Area. Types of effects to Visual Resources under the Full Treatment Alternative are the same as those described under the Partial Treatment Alternative, except potential for visual contracts between areas treated outside wilderness and WSAs would be less likely given the entire Project Area could be treated and larger stand-replacing fires would be much less likely to occur in treated areas. The scale of effects of the Full Treatment Alternative would be expected to be higher when compared to all other alternatives.

Treatments in areas with VRM Class I (wilderness and WSAs) would need to be designed in a manner that meets juniper treatment management objectives while trying to mimic visual effects of natural ecological changes and not leave long-term (over 1-5 years), unnatural appearing visual contrasts or features drawing the attention of observers. Where juniper treatment project objectives cannot be met within these constraints, treatments needed may result in effects that would not meet Class I objectives.

Types of effects from other reasonably foreseeable activities and effects under this alternative would be the same as the Partial Treatment Alternative, except more acres could be treated with potentially all treatment methods. This could result in additional contrast than under all other alternatives between areas treated and not treated, but again, from a distance at the landscape and viewshed levels, this contrast is expected to appear to be a natural variation in vegetation. Any other projects on BLM-administered lands would be designed in a manner to comply with VRM Class guidelines, so overall, VRM management objectives for VRM Classes I, II, III, IV across the landscape would be met.

Continuation of Current Management Alternative
Under the Continuation of Current Management Alternative, all treatment methods could occur within the entire Project Area, but only as provided for under further, site-specific planning and NEPA analysis. Types of effects to visual resources under the Continuation of Current Management Alternative are the same as those described under the Full Treatment Alternative, however, acres treated and scale of effects associated with those treatments would be expected to be less than the Full Treatment Alternative, but may be higher than the other alternatives depending on size and mix of treatments implemented under future, site-specific analysis.

Preferred Alternative
Under the Preferred Alternative, all treatment methods could occur outside of wilderness. Types of effects to visual resources under the Preferred Alternative are the same as effects described under the Full Treatment Alternative for those lands outside of wilderness. Given 6% of the Project Area (outside wilderness) would still be treated each year, the scale of effects would be the same as the Full Treatment Alternative.

For wilderness, further site-specific analysis as described under the Continuation of the Current Management Situation would be required. Effects to visual resources within wilderness would be expected to be less than the Full Treatment Alternative, but could be higher than other alternatives depending on size and mix of treatments implemented under future, site-specific analysis.

Types of effects from other reasonably foreseeable activities and effects under this alternative would be the same as the Full Treatment Alternative, except total acres treated would be expected to be smaller and treatments in wilderness would be dependent on future, site-specific analysis. There would still be contrasts between areas treated and not treated, but again, from a distance at the landscape and viewshed levels, this contrast is expected to appear to be a natural variation in vegetation. Any other projects on BLM-administered lands would be designed in a manner to comply with VRM Class guidelines, so overall, VRM objectives for VRM Classes I, II, III, IV across the landscape would be met.

4.2.4.3 Wild and Scenic Rivers

Potential Effects

Given 96% of WSR corridors acres fall within Steens Mountain Wilderness, effects to ORVs as described in other resource sections are the same as those described for wilderness. These effects are summarized below specific to WSRs.

Effects Common to All Alternatives
No effects to the free-flowing values of any of the WSRs are expected under any of the alternatives. Given the majority of BLM-administered lands within WSR corridors are also within wilderness, effects to the "wild" character of the WSRs is the same as those described in the wilderness section of this Chapter. Effects to outstandingly remarkable values are described below.

No Treatment Alternative
Under the No Treatment Alternative, wildfires would still occur and would be managed in a manner consistent with the RMP and FMP. No fuels reduction treatments as described in other action alternatives would occur.

Scenic:
Where no wildfire occurs, or where wildfire alone cannot meet juniper treatment objectives, areas where juniper expansion is occurring would likely continue to progress toward a juniper-dominated woodland. Scenic values could be compromised as junipers both expand into areas having open vistas, such as grasslands and shrublands, as they grow and mature, thereby, causing a reduction in scenic vistas in and along the WSR corridors. Juniper expansion could also lead to decline of scenic diversity through the loss of aspen groves and riparian vegetation.

Should wildfire occur, effects of low to moderate intensity wildfires would alter scenic values due to loss of vegetation, but these effects would be considered the natural processes that provide for a healthy ecosystem and many native grasses and forbs would be expected to return within 1-3 years and would continue to contribute to a diverse mosaic of vegetative scenery. Sagebrush species would take many years to decades to recover. Should larger, stand-replacing fires occur after juniper has suppressed native grasses and shrubs, recovery may be much slower due to a lack of seed source, and could make the area more vulnerable to invasion by noxious weeds.

Geologic:
The expansion or reduction of juniper woodlands is not expected to affect geologic values.

Recreational:
Types of recreational activities would likely remain the same, however, quality of the experience could be affected if juniper expansion progresses to the extent dense stands make access and travel more difficult. There could also be a short-term (days) restrictions to visitor use in areas that have wildfire activity, due to safety concerns.

Fish:
Expansion of juniper would result in a loss of riparian vegetation, causing more barren ground on stream banks and slopes and increased soil erosion. This could lead to an increase in water turbidity and degradation of fish habitat. Wildfires burning in areas of heavy concentration of junipers could also cause the same effects. Juniper expansion could also result in loss of upland and riparian vegetation which would also contribute increases in water turbidity and degradation of fish habitat.

These effects would be much less pronounced in areas where juniper expansion is in earlier stages and riparian vegetation is healthy enough to retain its natural resiliency to fire. In these areas wildfire often burns at a lower intensity and leaves some, if not much, of the riparian areas unburned, thereby, minimizing fish mortality.

Wildlife:
Expansion of juniper would result in a loss of habitat diversity for wildlife. Wildfire could help reduce chances of these effects if it occurs in areas where juniper is still vulnerable to being killed by fire, thereby, maintaining a more natural and diverse mosaic of wildlife habitats. To the extent large, stand-replacing fires occur, this loss could be for many years if not decades.

Vegetation and Botanical:
Expansion of juniper would result in a loss of plant diversity such as grasses, forbs, shrubs, riparian vegetation, and other tree species such as aspen and cottonwoods being replaced with a juniper-dominated woodland. Should a stand-replacing fire occur in areas where plant diversity has been suppressed, lack of native seed may delay recovery and make the burned area more vulnerable to invasion by noxious weeds.

These effects would be much less pronounced in areas where juniper expansion is in earlier stages and native vegetation is healthy enough to retain its natural resiliency for recovery after fire.

Cultural:
Further increases in juniper expansion in WSR corridors could have an adverse effect on this ORV, especially if there is an increase in probability of higher intensity wildfires, which can damage and expose cultural resources currently covered by vegetation and soil.

Historic:
Further increases in juniper expansion in WSR corridors could affect this ORV, especially if there is an increase in probability of wildfire due to unnaturally high concentrations of juniper and an associated increase in fuel loading in those areas. Fire events of any scale could have an effect on Riddle Brothers Ranch Historic District site in the Donner und Blitzen WSR corridor, especially to the numerous old wooden structures in the area.

Other reasonably foreseeable activities and their effects to WSR ORVs under this alternative vary by resource and are addressed in their respective resource sections of this chapter.

Partial Treatment Alternative
The management of naturally-occurring fire would be the only juniper reduction treatment method used in WSRs within wilderness and WSAs. The effects to WSRs in wilderness under the Partial Treatment Alternative are the same as described in the No Treatment Alternative except for Riddle Brothers Ranch which is described below.

Treatment in the Riddle Brothers Ranch Historic District (860 acres in the Ranch Project Unit) could include other treatments if deemed necessary for historic preservation purposes. The historic ranch and its structures are the dominant ORV in this area, and implementing any treatments deemed necessary would be expected to enhance this ORV by providing protection against damage or loss due to wildfire. Other ORVs would be protected as necessary.

Treatment of other acres within WSRs outside of wilderness and WSA would be according to the underlying land management designation. Types of effects are expected to be the same as those described under the Full Treatment Alternative except for Page Springs Campground which would only be treated as necessary to address fuel management concerns if present.

Other reasonably foreseeable activities and their effects to WSR ORVs under this alternative vary by resource and are addressed in their respective resource sections of this chapter.

Limited Treatment Alternative
Management of naturally-occurring fire and prescribed fire (broadcast burning) without juniper cutting would be the only treatment method used in WSRs (excluding Riddle Brothers Ranch Historic District and Page Springs Campground). Types of effects to WSRs under the Limited Treatment Alternative are the same as described in the No Treatment Alternative, given the effects of broadcast burning mimic that of a lower-intensity wildfire. The scale of effects would be expected to be higher than the No Treatment Alternative given more acres would be treated than might occur with wildfire alone. However, use of prescribed burning

may provide opportunities to design projects in a manner that reduces some of the undesirable effects to resources that can occur with a high-intensity, stand-replacing wildfire.

Treatment in the Riddle Brothers Ranch Historic District could include other treatments if deemed necessary for fuels management, natural habitat restoration and historic preservation purposes. The historic ranch and its structures are the dominant ORV in this area, and implementing any treatments deemed necessary for fuels management and historic preservation would be expected to enhance this ORV. Treatments associated with habitat restoration would be expected to enhance wildlife and fisheries ORVs.

Treatment of other acres within WSRs outside of wilderness and WSA would be according to the underlying land management designation. Types of effects are expected to be the same as those described under the Full Treatment Alternative except for Page Springs Campground which would only be treated as necessary to address fuel management concerns if present.

Other reasonably foreseeable activities and their effects to WSR ORVs under this alternative vary by resource and are addressed in their respective resource sections of this chapter.

Full Treatment Alternative
Under the Full Treatment Alternative, all proposed treatment methods could occur within WSRs (excluding Riddle Brothers Ranch and Page Springs Campground). Types of effects to WSR ORVs associated with management of naturally-occurring wildfires are the same as those described under the No Treatment Alternative. Types of effects to WSR ORVs associated with use of prescribed fire are the same as those described under the Limited Treatment Alternative. The overall scale of effects of the Full Treatment Alternative would be higher given more acres would be treated under this alternative. Effects associated with juniper cutting, piling, and burning are described below.

Scenic:
For areas treated, undesirable effects associated to scenic values resulting from juniper expansion into vistas, other key features like aspen groves would be reduced or prevented.

Manual (using nonmotorized or nonmechanized equipment) Treatments: If work is done manually, Project Areas treated would likely be smaller than with use of mechanized and motorized equipment. Screening work crew camps from view would be relatively easy. If left unburned, cut juniper trees and stumps would detract from scenic quality for many years to decades. By broadcast or jackpot burning, much of the trees would be consumed except stumps and tree boles of larger trees over 14 inches in diameter (at 12 inches from the ground). If viewed from a distance, grasses and shrubs would help screen many of the burned stumps and tree boles from view, but they would still be observable to those traveling through the treated area. If trees are hand piled and burned, tree boles would likely be fully consumed leaving only stumps. Where feasible, stumps could be cut closer to the ground and the end of the stumped cross-cut to look less unnatural.

Motorized/Mechanized (using motorized or mechanized equipment) Treatments: Larger equipment would be more observable, and where possible, work should be done outside the high use season. Types of effects of different treatments would be the same as those described under manual treatments; however, motorized and mechanized equipment would be used to accomplish the work.

Geologic:
Geologic values would not be affected by any of the treatment proposed in the Full Treatment Alternative.

Recreational:
Effects of manual treatments could include disturbances to visitor use whether by temporary (days) restrictions in use or encounters between visitors and work crews. These effects would be more pronounced in more popular areas near rivers or dispersed campsites. Cross-country travel for visitors would be possible, but more difficult in areas where juniper trees are cut and left unburned. These effects would be reduced in areas where cut trees are hand piled then burned.

Effects of treatments with motorized or mechanized equipment would be the same as described for manual treatments; however, there may be additional disturbance from presence and noise associated with power tools and equipment.

Fish:
Fish values would be expected to be enhanced given the proposed treatments would prevent or reduce negative effects associated with juniper expansion as described in the No Treatment Alternative.

Wildlife:
Wildlife values would be expected to be enhanced given proposed treatments would prevent or reduce negative effects associated with juniper expansion as described in the No Treatment Alternative. For areas where mature shrub species are an important habitat component of key wildlife species like greater sage-grouse, juniper cutting with either jackpot burning or pile burning would be expected to be more beneficial because it would reduce juniper expansion while minimizing shrub mortality.

Vegetation and Botanical:
Vegetation and botanical values would be expected to be enhanced given proposed treatments would prevent or reduce negative effects associated with juniper expansion as described in the No Treatment Alternative. Mortality and damage to some vegetation would occur as a result of treatments; however, it would be expected to be lower than under conditions associated with advanced juniper expansion.

Cultural:
Treatments such as juniper cutting with either jackpot or pile burning that provide for the greatest retention of ground cover both in terms of soil and vegetation would have the lowest impacts to cultural heritage values as long as any mechanized and motorized vehicle or equipment use is designed to minimize surface disturbance.

Historic:
Treatment in Riddle Brothers Ranch Historic District could include other treatments if deemed necessary for fuels management, natural habitat restoration and historic preservation purposes. The historic ranch and its structures are the dominant ORV in this area, and implementing any treatments deemed necessary for fuels management and historic preservation would be expected to enhance this ORV. Treatments associated with habitat restoration would be expected to enhance wildlife and fisheries ORVs.

Page Springs Campground which would only be treated as necessary to address fuel management concerns if present. Other reasonably foreseeable activities and their effects to WSR ORVs under this alternative vary by resource and are addressed in their respective resource sections of this chapter.

Continuation of Current Management Alternative
Types of treatments and effects to WSRs under the Continuation of Current Management Alternative are the same as described under the Full Treatment Alternative. However, any treatments would require site-specific NEPA analysis. For WSRs within wilderness a Minimum Decision Analysis (MDA) would also be completed and only those actions and minimum tools deemed necessary would be implemented. The scale of projects implemented would likely be much smaller and total number of acres treated much lower within the same time frame as the Full Treatment Alternative. For areas in WSRs left untreated, effects would be the same as those described under the No Treatment Alternative.

Preferred Alternative
Types of treatments and effects to WSRs under the Preferred Alternative are the same as described under the Full Treatment Alternative. However, any treatments would require site-specific NEPA analysis. For WSRs within wilderness a Minimum Decision Analysis (MDA) would also be completed and only those actions and minimum tools deemed necessary would be implemented. The scale of projects implemented would likely be much smaller and total number of acres treated much lower within the same time frame as the Full Treatment Alternative. For areas in WSRs left untreated, effects would be the same as those described under the No Treatment Alternative.

4.2.4.4 Wilderness

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative, wildfires would still occur and would be managed in a manner consistent with the RMP and FMP. No fuels reduction treatments as described in other action alternatives would occur. The following discussion analyzes potential effects on wilderness values.

Naturalness:
Western juniper expansion throughout large portions of Steens Mountain Wilderness would continue to expand. To the casual observer this would appear to be healthy juniper woodlands in a natural condition. However, increase in percent of closed canopy cover would cause a reduction in ground vegetation and an increase in percent of barren ground in affected areas. On such sites an increase in soil erosion is likely to occur. In addition, there would be a loss of native vegetative species diversity and an increase in noxious weed invasion from opportunistic noxious weed plant species. None of these conditions are natural or typical of open scattered stands of juniper, which usually hosts large amounts of vegetative groundcover including a variety of associated grass, shrub, and forb species. As conditions deteriorate, well-informed visitors to wilderness may notice a change in makeup of the system from one naturally vigorous to one reduced to an unhealthy condition. This would be especially true to some observers where plant communities such as aspen, mountain mahogany, sagebrush, and riparian habitats deteriorate as they are overtaken by invasive juniper. These effects are not only visual, but also negatively affect ecological integrity through decline in native plant diversity and contribute to degradation or loss of fish and wildlife habitat and habitat diversity.

In areas where canopy closure of junipers has reached the point of being able to carry fire from tree to tree, high intensity, stand-replacing fires may occur. An area's natural ability to recover from these high intensity fires may be severely compromised given a lack of native plant seed source. This could greatly increase the risk of severe soil erosion and vulnerability to invasion by noxious weeds. This could result in a need for later intervention in the form of emergency stabilization actions in compliance with wilderness management policy. While the area may still appear to have been affected by a natural wildfire, many other unique and supplemental values that helped make these areas desirable as designated wilderness could be greatly altered or lost in the long term (decades) under the No Treatment Alternative.

Wildness:
While wildness is not a wilderness value described either in the 1964 Wilderness Act or in BLM policy, it is a factor which receives attention from both the public and the agency. Webster's Revised Unabridged Dictionary defines wildness as, "The quality or state of being wild; an uncultivated or untamed state; disposition to rove or go unrestrained." Wildness, or rather the loss of it, by human manipulation could be considered to be "trammeling" or "placing limits upon" or "restricting" the wilderness environment.

Perception of wildness should not be affected by ongoing expansion of invasive juniper, if left untreated. Most wilderness visitors would not perceive the current and continued juniper expansion to be anything other than natural (see above). However, human influences related to wildfire suppression and past grazing practices in the late 1800s and early 1900s have been contributing factors to juniper expansion.

When appropriate, allowing naturally-occurring fires in wilderness to continue to burn would enhance wildness, given fire is a natural process. Any suppression efforts deemed necessary to protect human life and property would restrict fire as a natural process and reduce wildness.

Solitude:
The BLM recognizes opportunities for solitude are a function of the natural environment in that physical features of the unit influence social interaction (e.g., vegetative screening lessens the degree of social interaction with other visitors, influence of topographic screening on visitor interaction, as well as size and shape of a wilderness unit in how it influences visitor encounters and interaction).

Denser juniper stands and greater expanses of juniper would increase vegetative screening, thereby, enhancing opportunities for solitude. However, solitude would be reduced if extensive stand-replacing wildfires were to remove large areas of vegetative screening. Topographic screening would continue to support opportunities for outstanding solitude. There could be some short-term (days) disturbance to solitude associated with presence of work crews and equipment needed for any wildfire management or suppression efforts deemed necessary.

Primitive and Unconfined Recreation:
Should no wildfire occur, denser juniper stands could reduce opportunities for primitive and unconfined recreation by limiting those areas traversed by hikers, hunters, backpackers, and horseback riders. Greater juniper density could reduce some opportunities for primitive and unconfined recreation, especially if previously used sites or areas become dominated by junipers. Desirable settings such as riparian areas and aspen groves that contribute to outstanding natural and scenic diversity of wilderness would be reduced if these areas are lost or greatly modified by expansion of juniper.

For areas where wildfire does occur and most juniper are killed, burned areas would be converted from a more woodland type of recreation setting to a more open grassland and shrub setting. Some visitors would prefer the more closed forest recreation setting, while others would prefer the more open grassland and shrub setting. Depending on size, location and weather conditions, there would likely be temporary (days) use restrictions on public access to areas with active wildfires until determined to be safe for visitation to resume. Should low to moderate intensity wildfires occur, some visitors may choose to visit other areas until visual impacts of the fire decline and habitat needed to support some fishing and hunting activities returns. Recovery from smaller and low-intensity fires would be expected to occur within 1-5 years to the extent visitation associated with most recreational activities would return. Wildfires larger in size and more moderate in intensity may take several more years to recover, especially those associated with hunting of game species dependent upon more mature sagebrush shrub habitat. The type or quality of some outstanding recreational opportunities may be greatly reduced or lost for decades or longer should stand-replacing wildfires occur and natural recovery cannot restore the visual setting and habitat needed for fishing and hunting activities.

Supplemental Values:
Some supplemental wilderness values described in the Wilderness Act would be affected by present and continued expansion of juniper in Steens Mountain Wilderness. The three values in this category most affected would be scenery, vegetation, and wildlife.

Scenery in areas where wildfire does not occur could be affected by change in vegetation type from areas such as open sagebrush flats or slopes covered in aspen to scattered or dense juniper cover, thereby, altering scenic values of those areas. Scenic diversity would also decline as more areas became dominated by juniper.

In areas where wildfire does occur, both vegetation and scenery would be changed from a landscape of unburned trees and other plants to burned and blackened vegetation for 1-5 years until at least grass, forbs, and some shrub species return. If fire is a cooler, low-intensity burn, the result would most likely be a patch-work mosaic of burned and unburned areas. In the event of a stand-replacing wildfire, potentially large areas of landscape would be burned and blackened, and if an adequate native seed source is lacking, natural recovery may be prolonged by several years.

In areas where juniper expansion continues, grass and shrub habitat critical to some wildlife species may be lost. In areas where wildfire occurs and there is a good native plant seed source for recovery, wildlife habitat may recover over many years or decades for some sagebrush species. In areas where stand-replacing wildfires occur and there are not adequate native plant seed sources for recovery, wildlife habitat may be lost for many years if not decades. More specific effects to wildlife are discussed in Section 4.2.3.3.

Other reasonably foreseeable activities that may affect wilderness include both BLM and non-BLM projects. Juniper reduction on private and public lands occurring in proximity to North Steens Projects may displace some visitor use for 1-5 years, especially for projects greater in size (thousands of acres). This could result in at least limited increases in visitor use in portions of wilderness. This displacement is difficult to quantify given all variables affecting an individual's decisions to visit a particular area. However, activities in treated

areas outside of wilderness often involve use of motorized vehicles, so use of wilderness with its motorized-vehicle restrictions may not be as desirable to many of these visitors. Occasional motorized-vehicle use by grazing permittees may also be observable in portions of wilderness outside the No Livestock Grazing Area. If encounters occur, this could add to disturbances to both naturalness and solitude. These effects would be expected to be very temporary (minutes) in nature.

Partial Treatment Alternative
Given management of naturally-occurring fire would be the only juniper reduction treatment method used in wilderness under this alternative, effects are the same as the No Treatment Alternative.

Limited Treatment Alternative
Under the Limited Treatment Alternative, management of naturally-occurring fire would still occur in wilderness. Use of prescribed fire (broadcast burning) for juniper management could also occur if necessary; however, no juniper cutting would take place in wilderness.

Effects to wilderness values associated with management of naturally-occurring wildfires are the same as described under the No Treatment Alternative. Effects to wilderness values associated with use of prescribed fire are described below.

Naturalness:
Prescribed fire would result in some trammeling of the wilderness associated with human intervention during actual implementation of the project when work crews are on-the-ground and by hand setting fires with torches or other devices. Once the work was completed, the outcome of prescribed burning would have the appearance of a low- to moderate-intensity wildfire. This would help maintain the natural ecological integrity of wilderness by preventing or reducing undesirable ecological effects associated with mid to late stages of juniper expansion. Temporary or permanent fencing would generally not be needed in any areas burned within the No Livestock Grazing area of the wilderness. Where fences are needed, naturalness would be reduced in the area close to the fencing, but these effects would decline the further a visitor gets from the fence as it blends in with the returning vegetation. Installing fence along the skyline should be avoided, where possible, due to the greater contrast against the sky.

Efforts such as those described above have been undertaken in seven wildernesses and two WSAs managed by the USFS on the Apalachicola, Ocala, and Osceola National Forests in Florida. Effects to these areas for prescribed fire and use of treatments were analyzed in the EA, *Prescribed Fire in Wilderness on the National Forests in Florida*, for which the decision document was signed in November 1995. This was the first use of prescribed fire as a substitute for lightning-caused fire in management of wilderness when lightning-ignited fire does not occur with the frequency or intensity needed to maintain fire-dependent ecosystems. In addition, BLM Hollister RA and National Park Service have been jointly burning Pinnacles National Monument Wilderness and adjoining BLM WSAs since the early 1980s.

In the case of Steens Mountain Wilderness prescribed fire would only be undertaken if wildland fire use could not accomplish reducing effects to the wilderness environment caused by unnatural, large-scale invasive juniper expansion in a set period of time, which is subject to periodic review. If needed, the intent would be the initial use of prescribed fire to help restore conditions necessary for wildfire to successfully resume its natural role in the ecosystem. The challenge is in areas where juniper expansion has progressed to the level of being resistant to lower- to moderate-intensity wildfires or broadcast burning. This treatment alone may not be enough to restore natural ecological conditions. These areas would likely continue to progress to late stages of juniper expansion until a higher intensity, stand-replacing fire occurred.

Wildness:
The human manipulation of using prescribed fire would reduce wildness in wilderness during the period of treatment. Even in areas where treatment is implemented, if after treatment, wildfire's natural role in influencing distribution of juniper trees could be restored then wildness would be enhanced.

Solitude:
Wildland fire use and prescribed burning would reduce vegetative screening provided by juniper trees. However, some vegetative screening would still be provided by shrubs as they return or in unburned areas.

Aspen groves and riparian areas along or near popular rivers and streams would be expected to retain much of their vegetative screening. Where possible, individual or small groups of juniper trees would be left to provide screening around known campsites or unnatural features (e.g., water troughs, reservoirs, structures). Topographic screening would also continue to support opportunities for outstanding solitude. There could be some short-term (days) disturbance to solitude associated with presence of work crews and equipment needed to implement prescribed fire projects. Risk of stand-replacing fires and its effects to solitude as described in the No Treatment Alternative would be reduced.

While the opportunity for solitude may be reduced, actual solitude is expected to remain relatively easy for visitors to find given visitation is believed to be relatively low and popular areas like rivers and streams generally receiving more use would still retain much of their vegetative screening.

Primitive and Unconfined Recreation:
Types of effects to primitive and unconfined recreation are the same as those described under the No Treatment Alternative except with use of prescribed fire more areas would likely be treated. This would increase the number of areas needing temporary restrictions on visitor use during treatment and more areas would be converted from a more woodland-type of recreation setting to a more open grassland and shrub setting. However, these effects may be reduced by the greater flexibility provided by prescribed fire for public notification and timing of work. With additional use of prescribed fire, opportunities for primitive and unconfined recreation would be enhanced as wildlife habitat improves, vegetation and wildflowers respond to release of nutrients, and the landscape becomes more open and easily traversed in some places.

Supplemental Values:
Types of effects to supplemental values under this alternative would be the same as those described under the No Treatment Alternative, except more areas would be treated with the added treatment method of prescribed fire if necessary.

Other reasonably foreseeable activities are the same as described under the No Treatment Alternative. Given prescribed fire closely mimics effects of wildfire in wilderness, it is expected wilderness values would be maintained and ecological integrity would be enhanced.

Full Treatment Alternative
Under the Full Treatment Alternative, all proposed treatment methods including juniper cutting and piling could occur within wilderness. Effects to wilderness values associated with management of naturally-occurring wildfires are the same as those described under the No Treatment Alternative. Effects associated with use of prescribed fire are the same as those described under the Limited Treatment Alternative. Effects associated with juniper cutting and piling are described below.

Naturalness:
All methods would have beneficial effects helping to maintain ecological integrity within wilderness, thereby, helping to restore and preserve "natural" conditions and processes. However, to varying degrees treatment methods may affect the appearance of naturalness (free from the imprint of human activity). The intent of initial treatment would be to remove juniper trees resistant to wildfire alone and to restore wildfire's natural and historical role in influencing distribution of juniper trees.

Manual Treatments (using nonmotorized or nonmechanized equipment): Manual treatments could include cutting and girdling of juniper trees. Trees girdled and left standing would have a closer appearance to visual effects of wildfire especially from a distance. Upon closer inspection, girdling of trees would be observable.

Individual trees that are cut would leave both a stump and tree debris observable. Even if burned, larger juniper trees generally 14 inches in diameter (12 inches from the ground) are generally not entirely consumed, leaving a tree bole and sometimes larger branches observable for many years if not decades. Surrounding vegetation may help screen stumps and burned trees when viewed from a distance, but would be observable to those visitors traveling through treated areas. If trees are hand piled, there would be a better chance most, if not all, tree debris would be consumed when burned. Where feasible, effects associated with stumps could be reduced by cutting stumps closer to the ground and carving the end of the stump to look

less unnatural. Burn circles would be observable for up to 3 years; however, where needed, hand seeding could help with the return of vegetation to blend in with surrounding unburned areas.

Motorized/Mechanized (using motorized or mechanized equipment) Treatments: Types of effects to vegetation would be the same as those described for manually cutting juniper as described above except there would be some potential equipment or vehicle tracks observable if motorized vehicles or equipment is used. Projects would be designed to reduce establishment of tracks by doing work when the ground is frozen or covered with snow whenever possible. Generally visitors would not expect to encounter work crews with mechanized or motorized tools or equipment. If such encounters occurred, this could result in a reduction of visitor's perceived naturalness. Some visitor effects could be reduced with temporary use restrictions in areas being treated and doing treatments outside the high-use season.

Wildness:
All forms of treatment under this alternative represent some form of human intervention and manipulation, thereby, reducing wildness values in wilderness with management of wildfire having the lowest impacts. Even in areas where treatment is implemented, if after treatment, wildfire's natural role in influencing distribution of juniper trees could be restored then wildness would be enhanced.

Solitude:
For both manual and motorized/mechanized treatments, removal of juniper trees would reduce vegetative screening. However, some vegetative screening would still be provided by shrubs, especially in areas where broadcast burning does not occur. Aspen groves and riparian areas along or near popular rivers and streams would be expected to retain much of their vegetative screening. Where possible, individual or small groups of juniper trees would be left to provide screening around known campsites or unnatural features (e.g., water troughs, reservoirs, etc.). Topographic screening would also continue to support opportunities for outstanding solitude. Risk of stand-replacing fires and its effects to solitude would be very unlikely in areas treated under this alternative.

All treatment methods would involve use of some motorized equipment and vehicles within or near wilderness along with presence of work crews. This would result in disturbance to solitude from several days up to weeks if multiple entries are needed at different stages of treatment. Some visitor effects to solitude could be reduced with temporary use restrictions in areas being treated and by doing treatments outside the high-use season.

While the opportunity for solitude may be reduced, actual solitude is expected to remain relatively easy for visitors to find given visitation is believed to be relatively low and popular areas like rivers and streams generally receiving more use would still retain much of their vegetative screening.

Primitive and Unconfined Recreation:
Types of recreational activities would likely remain unchanged; however, some visitors would prefer a more closed forest setting while others would prefer the more open grassland and shrub setting. There would likely be temporary (days) use restrictions on public access to areas with active wildfires until it was determined safe for visitation to resume. Should low to moderate intensity wildfires occur, some visitors may choose to visit other areas until visual impacts of fire decline and habitat needed to support some fishing and hunting activities returns. Recovery from smaller, low-intensity fires would be expected to occur and some visitation associated with most recreational activities would return within 1-5 years. Higher intensity, stand-replacing wildfires would be less likely to occur in areas treated. With treatment of more areas, some opportunities for primitive and unconfined recreation would be enhanced as wildlife habitat improves, vegetation and wildflowers respond to release of nutrients, and the landscape becomes more open and easily traversed.

Supplemental Values:
Types of effects to supplemental values described in the alternatives above would also apply to this alternative, except more areas would be treated. This would allow for planning fire use in a manner that might reduce undesirable effects to supplemental values. An additional effect could be a reduction of scenic quality if large areas with cut trees (whether burned or unburned) are left after treatment.

Other reasonably foreseeable activities are the same as described under the No Treatment Alternative. Treatments within wilderness would need to be designed in a manner that meets juniper treatment management objectives while trying to mimic visual effects of natural, ecological changes and not leave long-term (over 1-5 years), unnatural-appearing visual contrasts or features drawing attention of observers. Where juniper treatment project objectives cannot be met within these constraints, further site-specific analysis might be needed to determine if wilderness management objectives could be met.

Continuation of Current Management Alternative
Effects of the Continuation of Current Management Alternative on wilderness could include the same types of treatments and effects as described under the Full Treatment Alternative. However, any treatments would require site-specific NEPA analysis. An MDA would also be completed for all projects in wilderness and only those actions and minimum tools deemed necessary would be implemented. Scale of projects implemented would likely be much smaller and total number of acres treated much lower within the same time frame as that of the Full Treatment Alternative. For areas in wilderness left untreated, effects would be the same as those described under the No Treatment Alternative.

Preferred Alternative
The effects of the Preferred Alternative on wilderness are the same as those described under the Continuation of Current Management Alternative.

4.2.4.5 Wilderness Study Areas

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative, wildfires would still occur and would be managed in a manner consistent with the RMP and FMP. No fuels reduction treatments as described in other action alternatives would occur.

Wilderness values associated with Lower Stonehouse WSA would not be affected because less than 2% of this WSA is located within the Project Area. Wilderness values associated with Blitzen River, Bridge Creek, Home Creek, High Steens, and South Fork Donner und Blitzen WSAs would be potentially affected as follows:

Naturalness:
The WSAs would continue to appear natural without imprints of human activities. In addition to appearance of naturalness, there are also potential effects to the natural ecological integrity of WSAs. Wildfires could help maintain native plant diversity and other ecological processes in WSAs if it occurs at a scale and under conditions similar to that which occurred under the historic fire regime. However, in some areas juniper expansion has progressed to the extent juniper trees are or would be old enough to have become fire resistant, and until greater canopy closure occurs wildfire may result in only limited juniper mortality. In these areas and other areas where wildfire does not occur at all, juniper expansion would continue resulting in undesirable, ecological effects described in greater detail in other resource sections in this chapter. Some of these effects include but are not limited to loss of native plants (grasses, forbs, and shrubs) that provide critical ground cover and a decline in native plant diversity especially in key areas like aspen groves and riparian areas. Loss of ground cover would result in increased soil erosion and sediment inputs into streams. This could lead to degradation or loss of fish and wildlife habitat and habitat diversity.

In areas where canopy closure of junipers has reached the point of being able to carry fire from tree to tree, high- intensity, stand-replacing fires may occur. An area's natural ability to recover from these high-intensity fires may be compromised given a lack of native plant seed source. This could increase the risk of severe soil erosion and vulnerability to invasion by noxious weeds resulting in intervention in the form of fire suppression or emergency stabilization actions following a wildfire, especially a high intensity, stand-replacing fire. While the area may still appear to have been affected by a natural wildfire, the ecological integrity of the WSAs may decline.

Solitude:
Denser juniper stands and greater expanses of juniper would increase vegetative screening, thereby, enhancing opportunities for solitude. However, solitude would be reduced if extensive, stand-replacing wildfires were to remove large areas of vegetative screening. Topographic screening would continue to support opportunities for outstanding solitude. There could be some short-term (days) disturbance to solitude associated with presence of work crews and equipment needed for any wildfire management or suppression efforts deemed necessary.

Primitive and Unconfined Recreation:
Should no wildfire occur, denser juniper stands could reduce opportunities for primitive and unconfined recreation by limiting those areas traversed by hikers, hunters, backpackers, and horseback riders. Greater juniper density could reduce some opportunities for primitive and unconfined recreation, especially if previously used sites or areas become dominated by junipers. Desirable settings such as riparian areas and aspen groves contributing to outstanding nature and scenic diversity of the WSAs would be reduced if these areas are lost or greatly modified by expansion of juniper.

For areas where wildfire does occur and most juniper are killed, burned areas would be converted from a more woodland type of recreation setting to a more open grassland and shrub setting. Some visitors would prefer a more closed forest setting while others would prefer the more open grassland and shrub setting. Depending on size, location and weather conditions, there would likely be temporary (days) use restrictions on public access to areas with active wildfires until it was determined safe for visitation to resume. Should low- to moderate-intensity wildfires occur, some visitors may choose to visit other areas until visual impacts of the fire decline and habitat needed to support some fishing and hunting activities returns. Recovery from smaller, low-intensity fires would be expected to occur and some visitation associated with most recreational activities would return within 1-5 years. Recreational use of larger, more moderate wildfire areas may take several more years to recover, especially those associated with the hunting of game species dependent upon more mature sagebrush shrub habitat. Should stand-replacing wildfires occur and natural recovery cannot restore the visual setting and habitat needed for fishing and hunting activities, then the type or quality of some outstanding recreational opportunities may be greatly reduced or lost for decades or longer.

Special Features:
Greater sage-grouse habitat in Bridge Creek, Blitzen River, South Fork Donner und Blitzen, and High Steens WSAs could be reduced through expansion of junipers. Available crucial mule deer winter range in Bridge Creek and Blitzen River WSAs could also be reduced. Redband trout habitat in Bridge Creek and High Steens WSAs could be affected by juniper expansion into riparian areas and reduction of riparian vegetation. Many special features contribute to the outstanding nature of wilderness characteristics described above.

Other reasonably foreseeable activities that may affect WSAs include both BLM and non-BLM projects. Juniper reduction on private and public lands that occur in proximity to the North Steens Project may displace some visitor use, especially for projects greater in size (thousands of acres). This could result in at least limited increases in visitor use in WSAs adjacent to or in proximity to treatment areas. This displacement is difficult to quantify given all the variables affecting an individual's decisions to visit a particular area. The WSAs would be expected to continue to offer outstanding solitude; however, more commonly used campsites might receive more use and those seeking solitude may need to look for other less used areas in the WSA if they wish to be out of site and sounds of others. While the types of recreational opportunities would not be expected to change, a temporary reduction in solitude may change use patterns. A decline in the quality of the recreation experience, if solitude is an important part of what an individual or group is seeking, may also be reduced.

Partial Treatment Alternative
Given management of naturally-occurring fire would be the only juniper reduction treatment method used in WSAs under this alternative, effects are substantially the same as the No Treatment Alternative.

Limited Treatment Alternative
Under the Limited Treatment Alternative, management of naturally-occurring fire would still occur. Use of prescribed fire (broadcast burning) for juniper management could also occur, however, no juniper cutting would take place in WSAs.

Wilderness values associated with Lower Stonehouse WSA would not be affected because less than 2% of this WSA is located within the Project Area. Wilderness values associated with Blitzen River, Bridge Creek, High Steens, Home Creek and South Fork Donner und Blitzen WSAs would be affected as follows:

Effects to wilderness values in WSAs associated with management of naturally-occurring wildfires are the same as described under the No Treatment Alternative. Effects associated with use of prescribed fire are described below.

Naturalness:
Visual effects of using prescribed fire without any juniper cutting would be expected to have the appearance of natural-occurring fire, and size and intensity of the fire could be more effectively managed to meet WSA and project management objectives. Since it is hard to predict scale and frequency of wildfire, it would be expected more areas would be treated by prescribed fire over the next several years than would be expected to occur under the management of wildfire alone. It would also be a more proactive treatment method than wildfire management alone, because it could be used to target areas in WSAs where fire alone is still adequate to meet project objectives. This would help maintain ecological integrity within WSAs by preventing or reducing undesirable ecological effects associated with mid to late stages of juniper expansion. However, for those areas where wildfire or prescribed fire cannot meet juniper management objectives, undesirable ecological effects associated with juniper expansion would likely continue. Risk of stand-replacing fires and its effects to naturalness and ecological integrity as described in the No Treatment Alternative would be reduced in areas where both wildfires and prescribed fires can be effectively used to reduce juniper expansion. Projects would be designed to minimize the need to use motorized vehicles off existing roads or ways to help reduce vehicle tracks and potential establishment of unauthorized vehicle routes.

Solitude:
Managing natural-occurring fire and prescribed burning to remove juniper would reduce vegetative screening. However, some vegetative screening would still be provided by shrubs as they return. Aspen groves and riparian areas along or near popular rivers and streams would be expected to retain much of their vegetative screening. Where possible, individual or small groups of juniper trees would be left to provide screening around known campsites or unnatural features (e.g., water troughs, reservoirs, structures). Topographic screening would also continue to support opportunities for outstanding solitude. There could be some short-term (days) disturbance to solitude associated with presence of work crews and equipment needed to implement prescribed fire projects. Some of these effects to solitude could be reduced with temporary use restrictions in areas being treated and doing treatments outside the high-use season. Risk of stand-replacing fires and its effects to solitude as described in the No Treatment Alternative would be reduced.

While the opportunity for solitude may be reduced, actual solitude is expected to remain relatively easy for visitors to find given visitation is believed to be low and popular areas like rivers and streams that generally receive more use would still retain much of their vegetative screening.

Primitive and Unconfined Recreation:
Types of effects to primitive and unconfined recreation are the same as those described under the No Treatment Alternative except with use of prescribed fire, more areas would likely be treated. This would increase need for temporary restrictions on visitor use during treatment and more areas would be converted from a more woodland type of recreation setting to a more open grassland and shrub setting. However, these effects may be reduced by the opportunities of prior notification and timing provided by planned prescribed fire. With additional use of prescribed fire, opportunities for primitive and unconfined recreation would be enhanced as wildlife habitat improves, vegetation and wildflowers respond to release of nutrients, and the landscape becomes more open and easily traversed.

Special Features:
Restoration of riparian habitats would benefit redband trout and other aquatic species. Scenery could be enhanced through greater diversity of landscapes found in the WSAs.

Other reasonably foreseeable activities and their effects to WSAs are the same as described under the No Treatment Alternative; however, the scale of effects may be higher given more acres may be treated over the life of the project than would be expected under management of wildfire alone.

Full Treatment Alternative
Under the Full Treatment Alternative, all proposed treatment methods including juniper cutting and piling could occur within WSAs.

Wilderness values associated with Lower Stonehouse WSA would not be affected because less than 2% of this WSA is located within the Project Area. Wilderness values associated with Blitzen River, Bridge Creek, Home Creek, and South Fork Donner und Blitzen WSAs would be affected as follows:

Effects to wilderness values in WSAs associated with management of naturally-occurring wildfires are the same as those described under the No Treatment Alternative. Effects associated with use of prescribed fire are the same as those described under the Limited Treatment Alternative. Effects associated with juniper cutting and piling are described below.

Naturalness:
Effects to naturalness are described by treatment method below. All methods would have beneficial effects of helping to maintain ecological integrity within WSAs by preventing or reducing undesirable ecological effects associated with mid to late stages of juniper expansion. Stand-replacing fire would also be very unlikely to occur in any areas treated with one or more of the treatment methods below.

Most treatments below would require some use of motorized vehicles to travel cross-country off existing ways. Where possible, timing, routes, and equipment used would be the minimum necessary to meet project objectives, and the project would be designed in a manner to minimize vehicle tracks and potential establishment of unauthorized vehicle routes.

Single Tree Burning: Trees of less than eight feet tall would be burned standing, so effects would likely mimic a wildfire.

Jackpot Burning: Generally larger juniper trees at least 14 inches in diameter (12 inches from the ground) are rarely entirely consumed, leaving a tree bole and sometimes larger branches that may be observable for many years if not decades. Surrounding vegetation may help screen many of the stumps and burned trees when viewed from a distance, but would be observable to those visitors traveling through treated areas. Where feasible, effects associated with stumps could be reduced by cutting stumps closer to the ground and carving the end of the stump to look less unnatural.

Pile Burning: This treatment could be accomplished by either hand piling or use of motorized equipment. Some work could be done in late fall and winter when soils are dry, frozen or covered with snow. Even with use of larger mechanized equipment, if the work can be done when the ground is frozen or covered with snow, tracks from mechanized equipment would not be observable in most areas and establishment of unauthorized vehicle routes would be unlikely. However, routes would have to be identified to help minimize damage to brush. Generally most, if not all, tree debris in piles is consumed when burned. The only remaining unnatural appearing feature would be stumps. Where feasible, effects of this treatment method could be furthered by a second cutting of stumps as close to the ground as possible and then carving the end of the stump to look less unnatural. Burn circles would be observable for up to 3 years; however, where needed, hand seeding could help with return of vegetation to blend in with surrounding unburned areas.

Broadcast Burning (with juniper cutting): For areas where all or most juniper trees are cut before broadcast burning, tree debris and stumps would be observable as described under jackpot burning. Utilizing juniper cutting methods such as cutting every third tree, droop cutting, and girdling could help reduce the amount of stumps and tree debris on the ground, thereby, reducing impacts to naturalness.

Fall and Leave (No Burning): This treatment could be completed with no motorized vehicle use off existing roads and ways. However, both stumps and tree debris would be observable for many years, if not decades, and would have very little similarity to the visual appearance of a wildfire.

Mixed methods: Depending on unit conditions and management objectives, a mix of treatment methods described above could be used to treat a given project implementation area.

Solitude:
All treatment methods described above including use of wildfire would also involve some motorized equipment and vehicles along with presence of work crews resulting in disturbance to solitude from several days up to weeks if multiple entries are needed at different stages of treatment. Some effects to solitude could be reduced with temporary use restrictions in areas being treated and doing treatments outside the high-use season.

Removal of juniper trees would reduce vegetative screening. However, some vegetative screening would still be provided by shrubs. Aspen groves and riparian areas along or near popular rivers and streams would still be expected to retain their vegetative screening. Where possible, individual or small groups of juniper trees would be left to provide screening around known campsites or unnatural features (e.g., water troughs, reservoirs, structures). Topographic screening would also continue to support opportunities for outstanding solitude. Risk of stand-replacing fires and its effects to solitude would be very unlikely in areas treated under this alternative.

While the opportunity for solitude may be reduced, actual solitude is expected to remain relatively easy for visitors to find given visitation is believed to be low and popular areas like rivers and streams that generally receive more use would still retain much of their vegetative screening.

Primitive and Unconfined Recreation:
Types of recreational activities would likely remain unchanged; however, some visitors would prefer a more closed forest setting while others would prefer the more open grassland and shrub setting. There would likely be temporary (days) use restrictions on public access to areas with active wildfires until it was determined safe for visitation to resume. Should low- to moderate-intensity wildfires occur, some visitors may choose to visit other areas until visual impacts of the fire decline and habitat needed to support some fishing and hunting activities returns. Recovery from smaller, low-intensity fires would be expected to occur and some visitation associated with most recreational activities would return within 1-5 years. Higher-intensity, stand-replacing wildfires would be less likely to occur in areas treated. With the treatment of more areas, some opportunities for primitive and unconfined recreation would be enhanced as wildlife habitat improves, vegetation and wildflowers respond to release of nutrients, and the landscape becomes more open and easily traversed.

Special Features:
Depending on treatment methods used, special features such as sage-grouse habitat could be expanded and improved. Restoration of riparian habitats would benefit redband trout and other aquatic species. Scenery could be enhanced through greater diversity of landscapes found in the WSAs.

Other reasonably foreseeable activities and their effects to WSAs are the same as described under the No Treatment Alternative except as a whole more acres would be treated under the Full Treatment Alternative. Acres treated would be the highest under this alternative; however, the WSA objective would be to implement the best mix of treatment methods at the right scale that meets juniper management project objectives in a manner so as not to impair their suitability for preservation as wilderness.

Continuation of Current Management Alternative
Types of effects to WSAs under the Continuation of Current Management Alternative are the same as those described under the Full Treatment Alternative. However, the scale of projects implemented would be much smaller and total number of acres treated much lower than under the Full Treatment Alternative. For areas in WSAs left untreated, effects would be the same as those described under the No Treatment Alternative.

Preferred Alternative
Potential effects of the Preferred Alternative on WSAs are the same as those described under the Full Treatment Alternative.

4.2.4.6 Parcels with Wilderness Characteristics

Given both parcels are directly adjacent to WSAs, it is expected effects to parcels with wilderness characteristics are the same as those effects described under each alternative for WSAs.

4.2.5 Fire and Livestock Management, Recreation, Transportation/ Roads, and Social and Economic Values Resources:

4.2.5.1 Fire Management

Potential Effects

No Treatment Alternative
Increase in juniper would continue to increase fuels continuity across the Project Area. The condition class would remain a 3, indicating a large 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. Wildfires would also become more difficult to suppress because of greater fuel loading. 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. Use of mechanical equipment would also be increased because of increase in large woody vegetation.

Continued suppression would increase the likelihood of large-scale, high-intensity wildfires. Wildfire management actions would be limited to suppression. Wildfires would continue to be a rare event, but the risk 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. Either areas of high priority would be at risk, or fires would grow because of low resource levels. Most wildfire events occur in clusters because of ignition by convective storms. Multiple lightning strikes may ignite multiple fires. Potential for large, high intensity wildfires would increase the priority of suppression.

The adjacent Five Creeks Project will help to reduce dominance of western juniper in sagebrush and associated plant communities. The Project Area will move through herbaceous and shrubby plant phases following management actions of that project. Fire will become more common in that area due to the shift toward more appropriate fire regimes. The North Steens Project Area would continue to increase western juniper cover and density. Number of trees and space they occupy would continue to increase at the expense of understory herbaceous plants. At some point in the future, number of trees and cover would reach the point where fires from adjacent fires would move through the canopy of western juniper stands within the North Steen Project Area. Western juniper trees would be killed by fire, but because of the dense stand of trees, there would be no understory plants left to respond following fire. To maintain a desirable perennial plant cover the area must be seeded. If seeding does not occur, the area would be open for invasive annuals and noxious weeds.

Partial Treatment Alternative
Under the Partial Treatment Alternative juniper within WSAs and Steens Mountain Wilderness would continue to increase density and cover. Fuel continuity would also continue to increase. Fires would burn through these areas at greater intensity and with higher severity than in adjacent sagebrush, quaking aspen or riparian plant communities within the rest of the project unit. Mechanical and prescribed fire treatments would reduce dominance of juniper in mountain big sagebrush, quaking aspen, and riparian plant communities. Outside wilderness and WSAs mechanical treatments in dense juniper may be coupled with late fall, winter, and early spring burning of heavy fuels accumulations. Burning at this time of year would reduce risk of ignition during fire season and reduce total heating on soil from fuels accumulations. In areas where machinery is used to pile juniper, work would be done using low- impact, tracked machines during winter months when soils are frozen. Reductions in juniper would also help to reduce fuels continuity and loading.

Seeding drier sagebrush plant communities would help reduce influence of cheatgrass. Fuels continuity would be reduced when perennial plants reestablish in these seeded areas. Perennial plants would also help to reestablish an appropriate fire regime. Wildfires would be less likely to burn at frequent intervals because of the continuity of perennial vegetation. Establishment of Wyoming big sagebrush through seeding or planting would also help to reestablish an appropriate fire regime.

Treatment of some areas in the Project Area would help to return the area to an appropriate fire regime and condition class. This could help fire crews with suppression because of lower flame lengths and fire line intensity. As larger areas are restored, more naturally-ignited fires may be considered for wildland fire use. Some crews required to suppress wildfires in juniper woodlands may be able to be shifted to other areas because of lower fire intensity.

The likelihood of large-scale, high-intensity fires would be reduced compared to the No Treatment Alternative. The partial treatment of western juniper woodlands would alter the fuels structure and reduce connectivity. Fire may become more common following treatment, but fires would be lower intensity and severity. The adjacent Five Creeks Project will also reduce dominance of western juniper connectivity of woodlands fuels. The fuel structure to the two Project Areas would be similar as there would be areas dominated by herbaceous plants and other areas dominated by shrubby vegetation. When the decision to suppress a fire is made, the lighter fuel areas would provide firefighters with the opportunity to directly attack the flaming front instead of backing off and attacking the fire indirectly with fire lines and burnout operations. As acres treated increases on the two Project Areas, the priority for a suppression response may be reduced. However, suppression responses would continue to occur across Steens Mountain to protect human life, private lands and resources.

Limited Treatment Alternative
Mechanical and prescribed fire treatments would reduce dominance of juniper in mountain big sagebrush, quaking aspen, and riparian plant communities. Mechanical treatments in dense juniper may be coupled with late fall, winter, and early spring burning of heavy fuels accumulations. Burning at this time of year would reduce risk of ignition during fire season and reduce total heating on soil from fuels accumulations. In areas where machinery is used to pile juniper, work would be done using low-impact, tracked machines during winter months when soils are frozen. Reductions in juniper would also help reduce fuels continuity and loading across the treated area.

Initially only wildland fire use would occur in Steens Mountain Wilderness and WSAs within Project Area boundaries. Naturally-ignited fires rarely occur in desired locations and have a high potential to yield undesirable effects. Under this condition, fires in dense juniper stands may only occur during severe weather conditions yielding severe fire effects, would not achieve resource objectives, and would pose a significant threat to human life and adjacent private lands. Wildfires would be suppressed because of threats to human life and private property. These fires would burn for a longer period of time because of large woody fuels. Control would take a considerable amount of time if not assisted by rain or other favorable climatic conditions.

Treatment would help to return the area to an appropriate fire regime and condition class. This could help fire crews with suppression because of lower flame lengths and fire line intensity. As larger areas are restored, more wildfires may be considered for wildland fire use. Some crews required to suppress wildfires in juniper woodlands may be able to be shifted to other areas because of lower fire intensity. There would also be less holdover fires that ignite a single juniper and tie up an engine or partial hand crew until suppressed. Crews could be sent to higher priority fires when the area has been converted to appropriate fire regimes.

Cumulative effects of the Limited Treatment Alternative would be the same as the Partial Treatment Alternative with the following exceptions. Additional areas would be treated in Steens Mountain Wilderness by applying prescribed fire. Addition of these areas would add the herbaceous dominated plant communities on the Steens. These projects would be limited to areas where sagebrush cover is still high enough to carry fire into the canopy of western juniper. Smaller areas within the more continuous woodlands would assist in breaking fuel continuity and reduce the treat of large-scale, high-intensity fires. Firefighting resources would be freed to attack higher priority fires once the plant communities have shifted to a mosaic of multiple successional stages. Wildland fire use would also be included as a management response. However,

wildland fire use incidents may require as much effort as a wildfire to manage. Length of time resources are committed may also be longer because incidents may last for a longer period of time.

Full Treatment Alternative
Effects from the Full Treatment Alternative would be the same as the Limited Treatment Alternative with the following exceptions:

Treatments would be implemented in Steens Mountain Wilderness and WSAs following current agency policy. These treatments would increase the acreage treated in a year and reduce time necessary to reestablish appropriate fire-adapted plant communities and fire regimes.

Wildland fire use would be implemented after agency treatments reestablish appropriate plant communities. Suppression actions may be greater than other alternatives. Suppression would be implemented to protect current projects and ensure management actions achieve desired results.

Treatment would return the area to an appropriate fire regime and condition class. The Full Treatment Alternative would achieve this goal faster than the other alternatives. Fire line intensity and flame lengths would be less in areas dominated by herbaceous or shrubby vegetation. This could help fire crews with suppression because of lower flame lengths and fire line intensity.

As larger areas are restored, more naturally-ignited fires may be considered for fire use. Some crews required to suppress fires in juniper woodlands may be able to be shifted to other areas because of lower fire intensity. There would also be less holdover fires that ignite a single juniper and tie up an engine or partial hand crew until suppressed. Crews could be sent to higher priority fires when the area has been converted to appropriate fire regimes.

Cumulative effects are the same as the Partial Treatment Alternative with the following exceptions. The Full Treatment Alternative would treat a larger number of acres per year across the whole Project Area. Treatment at this scale would reduce the time necessary to reach a shrub-dominated plant community across Steens Mountain.

Continuation of Current Management Alternative
Effects to this resource are the same as those contained in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
The potential effects of the Preferred Alternative on fire management are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. The potential effects of the Preferred Alternative on fire management within wilderness are the same as those described under the Continuation of Current Management.

4.2.5.2 Livestock Grazing Management

Potential Effects

Effects Common to All Action Alternatives
Reasonably foreseeable future actions may affect grazing management as ranchers seek replacement forage for livestock during implementation of these projects. There could be more local competition for private forage and hay, possibly driving the price upward temporarily. This could cause some ranchers to reduce herd size for a short time (2-3 years) or to market their calves earlier in the season to feed less hay. However, following treatment and at least 2 years of rest, the area should produce more available forage for livestock, wildlife and wild horses. Also see 4.2.5.6 Social and Economic Values.

No Treatment Alternative
Under the No Treatment Alternative, livestock grazing would be negatively affected by the increase in juniper density and cover and associated decrease in herbaceous vegetation as well as shrubs and forbs.

The increase in juniper and increased density of existing juniper woodlands would concentrate domestic livestock and wild herbivores into smaller areas, thereby, negatively affecting rangeland health. Areas that may be over utilized could include riparian areas, quaking aspen stands and meadows. Changes in rangeland health would be monitored by the BLM and the result could be a reduction in available AUMs for that pasture or allotment.

Increases in juniper would occur at the expense of native forage species such as Idaho fescue, Bluebunch wheatgrass, Thurber's needlegrass, Sandberg bluegrass, and others in the understory. Domestic livestock could be forced to graze at lower elevations or in other pastures for longer periods of time. Ultimately, when juniper woodlands are fully developed, forage for domestic livestock and wild herbivores would be decreased. Grazing could potentially increase on private lands and other sensitive areas. These lands are often in valley bottoms and near perennial water sources. The increase in use may have detrimental effects on these adjacent lands or other plant and animal species.

Under this alternative, ranchers would have a reduced forage base for their livestock operation. Juniper would continue to take over and create more closed canopy woodlands driving out understory vegetation leading to more time livestock spend on private land impacting private resources in a negative manner. Ranchers would be forced to find alternate forage (private pasture or hay), increasing the financial burden upon them and possibly causing some smaller ranches (typically family ranches) to sell. This would not only harm the local economy, but it would also be an impact upon the ranching heritage and lifestyle of the western U.S.

Partial Treatment Alternative
Effects on WSAs and wilderness would be the same as the No Treatment Alternative as no cutting or prescribed fire would occur. Eventually this would lead to a complete domination by juniper woodlands and a loss of almost all understory species. This would also lead to a loss of suitable grazing habitat for both domestic livestock as well as wild herbivores, causing the land supporting grazing (such as regular BLM and private land) to be used more intensively. The partial treatment alternative would be a step backward for plant and ecosystem health and for public land management for wilderness and WSA.

In areas outside wilderness and WSAs treatment of juniper, cutting and burning, would increase herbaceous plant production and forage availability. Increase in forage would help increase grazing distribution across the Project Area. Currently livestock grazing is limited by forage availability in parts of the Project Area. Juniper dominance has reduced forage availability and livestock are forced to utilize a smaller area. Treatment of juniper woodlands would also help increase the time plants are engaging in photosynthesis and green forage is available. Livestock would tend to stay in uplands for longer periods of time as a result decreasing grazing impacts on riparian areas.

Seeding of lower elevation Wyoming big sagebrush plant communities would also help spread use across the Project Area. Currently these areas are dominated by introduced annual plants. These annuals do not produce as much as perennial plants and tend to have a limited photosynthetic period. Establishment of seeded sagebrush would be facilitated by grazing in seeded areas. Grazing would reduce competition of cheatgrass and other palatable herbaceous plants with the sagebrush seedlings. The reduction in fine fuel would also reduce the risk of wildfire that would kill young sagebrush.

Reduction in juniper would increase available forage in the Project Area. Total numbers of livestock may not increase, but increased distribution of livestock and a longer period of photosynthesis during the grazing season would lead to healthier, more productive rangelands. The increase in flexibility to adjust grazing seasons to adapt to natural conditions present on-the-ground would help to reduce grazing pressure on other areas in and adjacent to the Project Area.

Since no treatment would occur in wilderness or WSA, ranchers would have a reduced forage base for their livestock operation. Ranchers would also experience reduced forage on remaining BLM-managed lands as treatment would only occur on 25-30% of the landscape. Juniper would continue to take over and create more closed canopy woodlands driving out understory vegetation leading to more time livestock spend on private land impacting private resources in a negative manner. Ranchers would be forced to find alternate forage (private pasture or hay), increasing the financial burden upon them and possibly causing some

smaller ranches (typically family ranches) to sell. This would not only harm the local economy, but it would also be an impact upon the ranching heritage and lifestyle of the western U.S.

Limited Treatment Alternative
Effects would be the same as the Partial Treatment Alternative except prescribed fire would be incorporated in wilderness and WSAs. A larger number of acres than under the Partial Treatment Alternative could potentially be treated; however, this alternative would not be effective for areas that have converted to juniper woodlands. This alternative would be effective in areas with a viable brush component acting as a fuel ladder to carry fire into the canopy of juniper woodlands. In some areas this treatment would provide an increase in available forage. Juniper dominance has reduced forage availability and domestic livestock and wild herbivores are forced to utilize a smaller area than they did traditionally. Treatment of juniper woodlands would increase the time green forage is available. Livestock would tend to stay in the uplands for longer periods because of green forage, reducing grazing impacts on riparian areas.

Seeding of lower elevation Wyoming big sagebrush plant communities would also help spread use across the Project Area. Currently these areas are dominated by introduced annual plants. Establishment of seeded sagebrush could be facilitated by grazing in the seeded areas. Grazing would reduce competition of cheatgrass and other palatable herbaceous plants with the sagebrush seedlings. The reduction in fine fuel would also reduce the risk of wildfire that would kill young sagebrush.

Reduction in juniper would increase the available forage in the Project Area. Total numbers of livestock may not increase, but increased distribution of livestock and a longer period of photosynthesis during the grazing season would lead to healthier, more productive rangelands. The increase in flexibility to adjust grazing seasons to adapt to natural conditions present on the ground would help reduce grazing pressure on other areas in and adjacent to the Project Area.

Restoration of adjacent seeded areas may be accelerated with increased forage produced by treatment of juniper. Forage production may be sufficient in most years to defer use of adjacent seeded areas until native shrubs and grasses can be reestablished.

Juniper cutting would not occur in wilderness or WSAs. Ranchers may have a reduced forage base for their livestock operation as prescribed fire alone may not be sufficient to provide the needed forage necessary for a sustainable grazing operation. Ranchers could also experience reduced forage on remaining BLM-managed lands as treatment would only occur on 30-45% of the landscape. Juniper would continue to take over on a smaller scale than under the Partial Treatment Alternative creating a closed canopy woodland subsequently driving out understory vegetation. This reduction in understory may lead to more time livestock spend on private land impacting private resources in a negative manner. Ranchers would be forced to find alternate forage (private pasture or hay), increasing the financial burden upon them and possibly causing some smaller ranches (typically family ranches) to sell. This would not only harm the local economy, but it would also be an impact upon the ranching heritage and lifestyle of the western U.S.

Full Treatment Alternative
Effects of the Full Treatment Alternative would occur sooner in WSAs and wilderness and regular BLM land to a healthier, properly functioning ecosystem. With this alternative broad, landscape-scale treatments could be implemented. This would speed recovery of traditional grazing lands currently occupied by closed canopy juniper woodlands and take pressure off lands in riparian areas or other areas more sensitive to grazing than some upland areas. In this alternative cutting and prescribed burning could occur in all lands managed by the BLM. Additional forage produced by actions from this alternative would not be translated into higher livestock numbers; instead it would mean fewer cattle concentrated in high-use areas and lower utilization levels (livestock more evenly distributed throughout the allotment or pastures) leaving more residual forage for benefit of wildlife, soil protection and generally properly functioning ecosystems.

Juniper reduction in the planning area would help to increase available forage in these areas. The increase in time spent in a pasture(s) would help reduce grazing pressure on other areas in and adjacent to the Project Area. The time to reach this outcome would be less in the Full Treatment than the Limited Treatment Alternative.

Restoration of adjacent seeded areas may be accelerated with increased forage produced by treatment of juniper. Forage production may be sufficient in most years to defer use of adjacent seeded areas until native shrubs and grasses can be reestablished.

Continuation of Current Management Alternative
Effects to this resource are the same as those contained in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources.

Preferred Alternative
Potential effects of the Preferred Alternative on grazing management are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. The potential effects of the Preferred Alternative on grazing management within wilderness are the same as those described under the No Treatment Alternative.

4.2.5.3 Recreation

Potential Effects

No Treatment Alternative
Under the No Treatment Alternative wildfires would still occur and would be managed in a manner consistent with the RMP and FMP. No fuels reduction treatments as described in other action alternatives would occur. The following discussion analyzes potential effects on recreation resources.

Overall, types of recreation opportunities available would not be affected; however, quantity and quality of recreational opportunities and visitation may be affected. Over many years to decades, continuing juniper expansion would reduce big game animal habitat which could result in a reduction of hunting opportunities. Replacement of aspen groves with juniper would result in a reduction of scenic viewing opportunities associated with fall colors. Reduction of these recreation opportunities could result in a decline in visitation, especially in the fall when use associated with hunting and viewing fall colors is at its highest.

Should a wildfire occur, visitor safety would be a concern and may result in temporary closure (days) of areas until it is deemed safe for visitor use to resume. Smoke from wildfires, especially larger fires, may temporarily (days) reduce visibility and scenic views of Steens Mountain and the surrounding area. In general, visitation may be reduced for several days in areas within and near wildfires due to noise and disturbance associated with fire fighting activities, temporary closures, visual impacts of smoke and any health concerns visitors may have related to sensitivity to smoke. Following the wildfire, recreation opportunities could be reduced or displaced from the burned area to an unburned area either within or outside the CMPA. Generally if the wildfire was of a low to moderate intensity, recreational activities are likely to resume within 1-5 years as vegetation returns.

In areas where juniper expansion becomes more pronounced, the chance for larger, stand-replacing wildfires could increase. Such fires can be difficult to control and may threaten developed recreation and historic sites of interest and may take many years to recover to the point they are again desirable for recreational use.

Partial Treatment Alternative
Under the Partial Treatment Alternative, all treatment methods could occur outside of wilderness and WSAs. Treatments in wilderness and WSAs would be limited to management of naturally-occurring fires and effects to wilderness would be the same as those described under the No Treatment Alternative. Effects to recreation resources for the rest of the Project Area would be as described below.

Effects associated with wildfire and prescribed broadcast burning without juniper cutting or piling would be the same as those described under the No Treatment Alternative. Cross-country travel by visitors on foot or horseback could be more difficult in areas where juniper cutting treatments occur. This would be especially true where cut trees are not burned or where jackpot burning or broadcast burning did not adequately consume cut trees. Areas where trees were cut, piled and then burned would be expected to be

the most effective for reducing this debris. Any debris not consumed by fire could remain on site for many years or decades following treatments; however, with burning most of each tree (except the bole) would be consumed and generally recreational activities are likely to resume within 1-5 years as vegetation returns. Some visitors may choose to visit other areas until complete recovery has occurred.

Big game hunting, wildlife viewing, wildflower viewing, and a variety of other recreation opportunities could be enhanced by implementation of this alternative. The regrowth of grasses and forbs, especially wildflowers, would eventually attract additional users to any burned areas. With treatment of aspen stands, increased aspen growth could increase the numbers of people visiting Steens Mountain to view fall colors.

The number of hunters in ODFW Steens Mountain Unit could also increase. Many hunters concentrate their camping, scouting, and hunting activities along Steens Loop Road and adjacent open roads. The increased number of hunters and vehicles during hunting seasons increases potential for vehicles being driven off designated routes, which is prohibited on BLM-administered lands in the CMPA. Use of motorized or mechanized transport cross-country from designated travel routes could create additional two-track vehicle routes and possibly attract additional cross-country use. Depending on amount of disturbance and location of these routes, they can be difficult to close.

Other reasonably foreseeable activities that may affect recreation include both BLM and non-BLM projects. While the types of recreational opportunities available would not be affected, juniper reduction on private and public lands that occur in proximity to North Steens Projects may displace some visitor use, especially for projects greater in size (thousands of acres). This could result in at least limited increase in visitor use to other areas in the vicinity of these projects not treated. This displacement is difficult to quantify given all the variables affecting an individual's decision to visit a particular area; however, as vegetation recovery progresses some visitation may resume. Since more acres would be treated, displacement would be expected to be higher than would occur under the No Treatment Alternative. The increase in treated areas in this alternative when combined with treated areas in other projects would help reduce the risk of displacement for many years associated with larger, high-intensity, stand-replacement fires when compared to the No Treatment Alternative.

Under this alternative only 25-30% of the Project Area would be treated at only 3% per year. Even with treatments outside the Project Area, it is expected the types of recreational opportunities offered within and in the vicinity of the Project Area would remain the same with relatively low and temporary changes to recreational use and visitation over the life of the project as described above.

Limited Treatment Alternative
Under the Limited Treatment Alternative, all treatment methods could occur outside of wilderness and WSAs. Types of effects to recreation resources for areas where all treatment methods could occur under the Limited Treatment Alternative are the same as those described under the Partial Treatment Alternative.

Treatments in wilderness and WSAs would be limited to wildfire use and broadcast burning without juniper cutting. Effects to recreation resources associated with wilderness and WSAs are described under the Limited Treatment Alternative in each of those respective sections of this chapter.

Displacement effects associated with this alternative and other reasonably foreseeable activities as described in the Partial Treatment Alternative would be expected to be higher given more acres would be treated. The increase in treated areas in this alternative, when combined with treated areas in other projects, would help reduce the risk displacement for many years associated with larger, high-intensity, stand-replacing fires when compared to the Partial Treatment Alternative.

Under this alternative 30-45% of the Project Area would be treated at only 4.5% per year. Even with treatments outside the Project Area, it is expected the types of recreational opportunities offered within and in the vicinity of the Project Area would remain the same. Potential changes in visitation may be higher than under the Partial Treatment Alternative, but would still be expected to be relatively low and temporary over the life of the project.

Full Treatment Alternative
Under the Full Treatment Alternative, all treatment methods could occur on all BLM-administered lands within the Project Area. Types of effects to recreation under the Full Treatment Alternative are the same as those described under the Partial Treatment Alternative and in the other sections of this chapter for wilderness and WSAs. The scale of effects of the Full Treatment Alternative would be expected to be higher when compared to all other alternatives given 45-60% of the Project Area would be treated at 6% per year. Even with treatments outside the Project Area, it is expected the types of recreational opportunities offered within and in the vicinity of the Project Area would remain the same. The types of changes in visitation would likely be higher than described for other alternatives as more acres would be treated.

Continuation of Current Management Alternative
Under the Continuation of Current Management Alternative, all treatment methods could occur within the entire Project Area, but only as provided for under further site-specific planning and NEPA analysis. Types of effects to recreation under the Continuation of Current Management Alternative are the same as those described under the Partial Treatment Alternative and in the other sections of this chapter for wilderness and WSAs. However, acres treated and scale of effects associated with those treatments would be expected to be less than the Full Treatment Alternative, but may be higher than the other alternatives depending on size and mix of treatments implemented under future, site-specific analysis.

Preferred Alternative
Under the Preferred Alternative, all treatment methods could occur outside of wilderness. For areas outside wilderness, types of effects to recreation under the Preferred Alternative are the same as effects described under the Partial Treatment Alternative. Given 6% of the Project Area would still be treated each year, the scale of effects outside wilderness would be the same as under the Full Treatment Alternative.

For wilderness, further site-specific analysis as described under the Continuation of Current Management Alternative would be required. Effects to the recreation resource within wilderness would be expected to be less than the Full Treatment Alternative, but could be higher than other alternatives depending on size and mix of treatments implemented under future, site-specific analysis.

4.2.5.5 Transportation/Roads

Potential Effects

Effects Common to All Action Alternatives
Juniper control projects typically cause visitor-use restrictions during the burning phase of project work. These restrictions are normally localized and only affect specific areas being burned during actual burning operations. Damaged routes would have priority status for maintenance; therefore, cumulative effects to route conditions are not expected.

No Treatment Alternative
Left untreated, the Project Area would remain susceptible to high-intensity fires. The exposure of bare soil from these fires would increase overland water flow during rain events and snowmelt, causing route surfaces to erode and possible landslides blocking routes. Impacts to travel routes would be short term pending maintenance by road crews that would normally occur within a few months. Some primitive routes typically receiving little use may not be maintained until they pose a safety concern. This lack of maintenance may limit some visitor motorized travel to remote areas within the Project Area.

Partial Treatment Alternative
Project implementation may temporarily restrict access to some routes during burning activities. Routes used as fire lines and access to burn areas may experience heavy use resulting in limited to moderate damage. Damaged routes would be maintained as needed, consistent with identified maintenance standards. Most routes would receive maintenance within 1-year of project implementation. Untreated areas within WSAs and wilderness could expect erosion impacts like those described under the No Treatment Alternative.

Limited Treatment Alternative
Effects to this resource are the same as the Partial Treatment Alternative except treated areas in WSAs and wilderness are expected to increase; therefore, erosion effects to routes should decrease under this alternative.

Full Treatment Alternative
Project implementation may temporarily restrict access to some routes during burning activities. Routes used as fire lines and access to burn areas may experience heavy use resulting in limited to moderate damage. Damaged routes would be maintained as needed, consistent with identified maintenance standards. Most routes would receive maintenance within 1-year of project implementation.

Continuation of Current Management Alternative
Project implementation may temporarily restrict access to some routes during burning activities. Routes used as fire lines and access to burn areas may experience heavy use resulting in limited to moderate damage. Damaged routes would be maintained as needed, consistent with identified maintenance standards. Most routes would receive maintenance within 1-year of project implementation. Untreated areas could expect erosion impacts like those described under the No Treatment Alternative.

Preferred Alternative
Potential effects on transportation/roads are the same as those described under the Full Treatment Alternative in areas outside wilderness. Routes within or bounded by wilderness are susceptible to erosion impacts described under the Continuation of Current Management.

4.2.5.6 Social and Economic Values

Potential Effects

Effects Common to All Alternatives
Historically, the economy within Harney County has been based on agricultural goods and related services. Although these continue to play a vital role, current trends show increasing revenue from tourism and recreation. Due to population increases in Oregon as well as publicity the Steens Mountain Area is receiving, it is likely tourism and visitation to the area would continue to increase in the reasonably foreseeable future. Economic activities conducted on lands within and adjacent to the Project Area, as well as economic conditions within the county, would add to beneficial effects on social and economic values. Anticipated recreation growth would increase the demand for recreation facilities. Increased recreation and tourism could provide opportunities for growth in retail and service sectors, thereby reducing unemployment. Growth in recreation and tourism could also lead to increased traffic, effects to the rural character of the region, and diminished opportunities for solitude or primitive experiences.

Other past, present and reasonably foreseeable activities in the area of potential effect (Harney County) for social and economic values would not measurably alter specific effects analyses for this resource. Other landscape juniper treatments have been, are being, and would continue to be, conducted in the County. Other smaller-scale activities have been done, are underway, and would be undertaken. Thousands of acres have been treated for hazardous fuels reduction, juniper reduction, and increased forest and rangeland health. Objectives of these projects are the same - ecosystem health.

Additional county-wide activities aimed at improvement of local social and economic conditions would add beneficially to the effects on those conditions brought about by the results of improvement in health of the land.

Effects Common to all Action Alternatives
Without a public land forage bank to utilize, as livestock operators are displaced from their allotments due to pre- and post-treatment rest requirements, they generally must seek replacement forage from private sources. The cost of replacement forage for pasturage ranges between $12 and $15 per month for a cow/calf pair. Replacement forage is often located some distance from the ranch operation headquarters. Current

costs for commercial hauling of cattle are $3.00 per loaded mile. In addition to cattle weight loss associated with hauling, unfamiliar terrain of new grazing areas may prevent animals from achieving normal weight gains.

No Treatment Alternative
With no treatment, rangeland conditions would continue to deteriorate due primarily to spread of juniper woodlands. As a result there could be a decline in rangeland habitat on which animals such as deer, elk, and antelope depend. This decline could cause a decrease in populations of such animals, in turn resulting in fewer wildlife viewing and hunting opportunities. As these recreational pursuits are closely linked to social values and to the local economy and beyond, there could be a detrimental effect on these values. In addition, rangeland deterioration could affect livestock operators who rely on healthy rangeland for economically viable and sustainable operations. As the local economy is heavily dependent on livestock grazing operations, a decline in production could affect the local economic and social base.

Under the No Treatment Alternative, effects of reduced rangeland health and forage production could impact agricultural production in the region and either put additional pressure on private lands or lead to reduction in overall production, thus affecting the economy. Viability of operations for affected livestock operators would be difficult, if not impossible, to maintain. Hunting and other recreational opportunities would likely be diminished. These consequences would add to an already struggling local economy. Ranching, hunting and other outdoor pursuits and local ways of life are linked, and inextricably tied, to the health of the land.

Partial Treatment Alternative
Adoption of this alternative would slow and reverse deterioration of rangeland conditions. As a result, there would be improvement in wildlife habitat, which could better provide wildlife viewing and hunting opportunities. This betterment could have an effect on the local economy as more wildlife enthusiasts would likely visit the area and bring dollars to area businesses. An increase in healthy rangelands could encourage more tourism and be a boon to local businesses. Rangeland improvement could bring about increased sustainability for livestock operations, further improving the local economy and supporting a well-established, local, rural-oriented social fabric.

Juniper treatment and increased rangeland health could increase forage production for both wildlife and livestock, thereby, maintaining or possibly increasing economic opportunities and fostering more desirable recreation opportunities with attendant economic benefits to the local economy.

Limited Treatment Alternative
Consequences of adopting this alternative would be the same as for the Partial Treatment Alternative with the exception that in the Limited Treatment Alternative, rangeland health would also increase inside wilderness and WSAs. Improvement of ecosystem health in these management areas could lead to increased use and more tourism with accompanying tourist dollars spent locally. On the other hand, some who view these kinds of areas as not appropriate for treatment might be less likely to visit if treatments are undertaken.

Juniper treatment and increased rangeland health could increase forage production for both wildlife and livestock, thereby, increasing economic opportunities and fostering more desirable recreation opportunities. Limited juniper treatment in special management areas could bring about a more historically natural condition which could benefit their aesthetic and desirable status as recreational destinations. Increasing recreation could bring about change to the character of local society but would contribute economically.

Full Treatment Alternative
Consequences of adoption of this alternative would be the same as for those of the Partial and Limited Treatment Alternatives.

Juniper treatment and increased rangeland health could increase forage production for both wildlife and livestock, thereby, increasing economic opportunities and fostering more desirable recreation opportunities.

Continuation of Current Management Alternative
Effects on social and economic values would be the same as those contained in the No Treatment and Partial Treatment Alternatives as described above and under Section 4.1.1, No Treatment Areas - Assumptions common to all resources. Juniper treatments could still occur under this alternative and improved rangeland health could increase forage production for both wildlife and livestock. This increase could result in increasing economic opportunities that could foster more desirable recreation opportunities.

With selection of the Continuation of Current Management Alternative, continued effects of reduced rangeland health and forage production could impact agricultural production in the region and either put additional pressure on private lands or lead to reduction in overall production, thus affecting an economy based heavily on agricultural production. Hunting and other recreational opportunities would likely be diminished as range conditions further deteriorate.

Preferred Alternative
The potential effects of the Preferred Alternative on social and economic values are the same as the potential effects described under the Full Treatment Alternative in areas outside wilderness. The potential effects of the Preferred Alternative on social and economic values within wilderness are the same as those described under the Continuation of Current Management.

4.3 Comments on Cumulative Effects

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." Use of information on the effects of past actions may be useful in two ways according to the CEQ guidance. One is for consideration of the proposed action's cumulative effects, and secondly as a basis for identifying the proposed action's effects.

The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Our information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis, than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination.

The second area in which the CEQ guidance states information on past actions may be useful is in "illuminating or predicting the direct and indirect effects of a proposed action." The usefulness of such information is limited by the fact that it is anecdotal only, and extrapolation of data from such singular experiences is not generally accepted as a reliable predictor of effects. However, "experience with and information about past direct and indirect effects of individual past actions" have been found useful in "illuminating or predicting the direct and indirect effects" of the proposed action in the following instances: The basis for predicting the effects of the proposed action and its alternatives is based on published empirical research and the general accumulated experience of the resource professionals in the agency with similar actions.

Minimal scoping comments on this project suggest analysis of effects of certain individual past actions have not been considered in this document as they are beyond the scope of the current analysis and would not be useful for illuminating or predicting the effects of the proposed action. However, much information is known about past and present actions in the Burns District and Project levels of analysis. To the extent research and data can be applied to assist in the understanding of this landscape in motion, BLM has described what is known about the factors and events that influence this dynamic landscape. The cataloging of past actions has been assisted by research conducted in and adjacent to the Project Area and the vast amount of information contained in GIS databases, which are maintained at the Burns District Office.

4.4 Compliance with the Interim Management Policy (IMP) and Guidelines for Lands under Wilderness Review

Preservation of wilderness values is the "overriding consideration" of WSA management. Wilderness values include roadlessness, naturalness, opportunities for solitude, primitive and unconfined recreation, and supplemental values. Any action proposed in a WSA needs to be compliant with the FLPMA and the WSA IMP.

Many plant communities in southeastern Oregon have been altered since human population increased in the area in the latter half of the 1800s. Western juniper density and cover have significantly increased over the past 140 years. These trends are readily apparent across Steens Mountain. Prior to 1870, juniper was primarily limited to rocky ridge tops or shallow soil areas with sparse vegetation (West 1984). As a result of many factors including past grazing practices, wildfire suppression and climatic influence, large areas of mountain big sagebrush and quaking aspen have shifted to dominance by juniper which can have dramatic implications on soil stability, wildlife habitat, forage resources, and overall ecosystem functionality.

The primary long-term (many years to decades) goal of the action alternatives is enhancement of wilderness values in the WSAs by removing juniper from areas in which it has not historically been present and restoring conditions necessary for return of a more natural fire regime. Additional benefits include lessening effects of potential severe wildfires by reducing fuels and curtailing juniper expansion and dominance in mountain big sagebrush, low sagebrush, quaking aspen, mountain mahogany, old-growth juniper, riparian plant communities, and limited acres of Wyoming big sagebrush.

The use of prescribe fire is provided for under Chapter III, Section 2 of the IMP which states, "Prescribed burning may be used where necessary to maintain fire-dependent natural ecosystems." Pre-treatments often needed for successful prescribed burning are not mentioned. However, these treatments can be addressed under the provisions of the nonimpairment criteria. The IMP nonimpairment criteria require any uses, facilities, or activities in a WSA be temporary, easily removed, cause no surface disturbance, are not permanent, and do not degrade wilderness values. Exceptions to the nonimpairment criteria are emergencies, reclamation activities for IMP violations, grandfathered or valid existing rights, uses that clearly protect or enhance wilderness values, and reclamation of pre-FLPMA impacts.

The alternatives being analyzed in the EIS are summarized below relative to meeting nonimpairment criteria and exceptions. More information about the specific effects to wilderness values in WSAs is described in Section 4.2.4.5 of this chapter:

No Treatment Alternative:
Under the No Treatment Alternative, wildfires would still occur and would be managed in a manner consistent with the RMP and FMP. No fuels reduction treatments as described in other action alternatives would occur in WSAs. Given no treatments would occur this alternative would comply with the nonimpairment criteria. However, wilderness values associated with ecological health and diversity would likely decline with continued expansion of juniper.

Partial Treatment Alternative:
Management of naturally-occurring fire would be the only juniper reduction treatment method used. No fuels reduction treatments as described in other action alternatives would occur in WSAs. No new facilities would be constructed and any off-way use of motorized vehicles or equipment would be the minimum necessary for safe management of fire. This alternative would meet the nonimpairment criteria exception for protecting and enhancing wilderness values by allowing naturally-ignited fire to resume its role in limiting juniper distribution. Treated areas where fire alone can effectively treat juniper would be expected to return to a more natural, healthy and diverse ecological community. The PDEs would be used to minimize any ground disturbing activities associated with managing naturally-ignited fires. Treated areas would be expected to have the appearance of a natural wildfire with visual effects directly associated with fire management actions not being easily recognized as human influenced. However, those areas where juniper

expansion has progressed to the point trees have become fire resistant may continue to decline as described under the No Treatment Alternative, and restoration of conditions needed for fire to resume its role of naturally limiting juniper distribution may be more difficult.

Limited Treatment Alternative:
Management of naturally-occurring fire would still occur. Use of prescribed fire (broadcast burning) for juniper management could also occur; however, no juniper cutting would take place in WSAs. No new facilities would be constructed and any off-way use of motorized vehicles or equipment would be the minimum necessary for safe management of fire. This alternative would meet the nonimpairment criteria exception for protecting and enhancing wilderness values. The PDEs would be used to minimize any ground disturbing activities associated with managing prescribed fires. Treated areas would be expected to have the appearance of a natural wildfire with visual effects directly associated with fire management actions not being easily recognized as human influenced. However, without pre-burning treatments such as juniper cutting, those areas where juniper expansion has progressed to the point trees have become fire resistant may continue to decline as described under the No Treatment Alternative, and restoration of conditions needed for fire to resume its role of naturally limiting juniper distribution may be more difficult.

Full Treatment Alternative:
All proposed treatment methods including juniper cutting and piling could occur within WSAs. No new facilities would be constructed and any off-way use of motorized vehicles or equipment would be the minimum necessary to meet project objectives for removal of juniper. This alternative would meet the nonimpairment criteria exception by protecting and enhancing wilderness values. Careful project implementation planning and site-specific mitigation measures would be needed to minimize observable ground disturbance, cross-country travel by equipment, and the appearance of juniper cutting treatments (stumps and tree boles) as being human caused. This alternative offers a better opportunity to successfully restore landscape-level ecological health and diversity to areas where juniper expansion has increased to the extent juniper is resistant to fire alone, and to restore conditions needed for fire to resume its role in naturally limiting juniper distribution.

Continuation of Current Management Alternative (No Action Alternative):
Types of treatments that could potentially take place are the same as those described under the Full Treatment Alternative; however, additional site-specific analysis would be needed on a project-by-project basis. No new facilities would be constructed and any off-way use of motorized vehicles or equipment would be the minimum necessary to meet project objectives for juniper removal. This alternative would meet the nonimpairment criteria exception by protecting and enhancing wilderness values. Careful project implementation planning and site-specific mitigation measures as described under the Full Treatment Alternative would still be needed. Meeting landscape-level objectives for restoring ecological health, diversity and a more natural fire regime may be more challenging given projects would likely occur at a smaller scale over a longer period of time.

4.5 Supplemental Monitoring Methods, Time Intervals and General Monitoring Priorities

4.5.1 Introduction

This section outlines a monitoring plan describing activities the Andrews RA staff and Burns Interagency Fire Zone (BIFZ) personnel would perform to ensure all prescribed burning treatments conform to project design criteria and meet objectives established in Chapter II of this EIS. The plan guides implementation and effectiveness monitoring for a period of up to 3 years after completion of yearly treatments described in the proposed action. Implementation monitoring assesses whether a project is implemented as designed. Effectiveness monitoring is employed to address questions about accomplishment of specific treatment objectives and effectiveness of project design elements. This monitoring plan would satisfy the prescribed fire monitoring requirement described in *Interagency Standards for Fire and Fire Aviation Operations 2003* (USDI – USDA).

4.5.2 Coordination

Since many different resources would be monitored, respective managers and specialists would be involved with various aspects of the monitoring program. Scheduled monitoring visits and data collection would be dependent on treatment objectives, timing of implementation activities, and responses of specific resources to fire and fire surrogates. For this reason, close and frequent coordination between resource specialists, implementation specialists, and management is essential.

4.5.3 Roles and Responsibilities

The following is a list of key personnel, and their responsibilities, involved in coordinating and implementing the North Steens Project Monitoring Program.

Andrews Resource Area Field Manager

1) Determines priorities for monitoring and other programs in the RA.

North Steens Project Lead:

1) Updates the District Fuels Planner and/or IDT of any significant issues raised by publics or stakeholders pertinent to monitoring program.
2) Coordinates project scheduling and proposes schedule and budget for monitoring of the project with RA staff lead, staff, and budget program lead.
3) Compiles completed monitoring results specific to project implementation, and reports to Field Manager.

Deputy Fire Staff
Serves as a liaison between the Burns BLM line officers, State Office, research personnel, and all other agency personnel.

District Fuels Planner

1) Tracks and manages budget for monitoring activities on an annual basis.
2) Works with specialists to develop data collection protocols.
3) Ensures information is forwarded to appropriate line officers, resource specialists, research personnel, and personnel from other agencies.
4) Work with IDT.
5) Work with burn supervisors.
6) Work within Fire/Fuels and District organizations to secure critical personnel and resources for monitoring program.

Resource Specialists (Archaeologist, Botanist, Fire Ecologist, Wildlife Biologist, Noxious Weeds, Livestock Grazing, Aquatics, Forestry, Wilderness)

1) Conduct resource specific implementation and effectiveness monitoring.
2) Maintain monitoring documentation and forward documentation to District Fuels Planner if necessary.

Project Rx Burn Supervisor

1) Conduct all implementation monitoring associated with prescribed burning not conducted by an on-site resource advisor.
2) Ensure monitoring is documented and forward results to District Fuels Planner if necessary.

Project Resource Advisor

1) Conduct all prescribed fire implementation and effectiveness monitoring not conducted by Project Rx Burn Supervisor or specific resource specialists.

2) Work with IDT.
3) Work with burn supervisors during burn plan development and prescribed fire implementation.
4) Work with burn supervisors during burn plan development and prescribed fire implementation if necessary.
5) Ensure monitoring is documented and forward results to District Fuels Planner if necessary.

Juniper Pre-treatment COR

1) Conduct all implementation monitoring associated with mechanical pre-treatments not conducted by an on-site resource advisor.
2) Ensure monitoring is documented and forwards results to District Fuels Planner if necessary.

Allotment Administrator (Range)

1) Conduct implementation monitoring to ensure the desired post-fire understory vegetation response is achieved.
2) Maintain monitoring documentation and forward documentation to District Fuels Planner if necessary.
3) Coordinate and communicate with allotment permittees and adjacent landowners when necessary.
4) Ensure pastures are rested for appropriate periods following prescribed fire treatments and alternative forage is secured.

4.5.4 Results and Documentation

Monitoring results would be utilized to: 1) document fire effects; 2) evaluate success or failure of treatments and project design elements; and 3) assess potential for future treatments and project design elements. Monitoring results and documentation would be maintained by individual resource specialists in paper files, electronic databases, and possibly in GIS. Results may also be kept in a prescribed fire project file or tracked with the FIREMON Fire Effects Monitoring and Inventory Protocol Database and Analysis Tools by the District Fuels Planner.

Table 4.1 North Steens Ecosystem Restoration Project Monitoring Program

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Noxious Weeds	Effectiveness	Determine if noxious weeds become established in areas of disturbance and control of invasions with herbicide.	Post-treatment surveys. Invasive species identified would be treated with herbicide as described in EA OR-020-98-05.	Noxious Weed Control Specialist	At 1-year intervals for a period of 3 years after implementation
Noxious Weeds	Implementation	Verify units are treated for noxious weeds.	Monitor underburn activities.	Rx Burn Supervisor	During implementation
Noxious Weeds	Implementation	Verify all vehicles and equipment are cleaned prior to and following operation as per Interagency Standards for Fire and Aviation Operations (Redbook) guidelines.	Apply Interagency Standards for Fire and Aviation Operations (Redbook) during equipment inspections.	Rx Burn Supervisor, Mechanical Pre-treatment COR	Immediately after implementation throughout the life of the project
Cultural Resources	Implementation	Verify appropriate project design elements designed to protect cultural resources are implemented.	Monitor implementation activities such as line construction, prescribed fire ignition, leave island designation, and mop-up with visual observation, photography, and written description.	Archaeologist	During implementation
Cultural Resources	Effectiveness	Evaluate effectiveness of project design elements at protecting cultural resources.	Conduct monitoring visits at a sample of cultural resources (no more than 10% of total sites in planning area) and compare post-burn conditions to conditions described in cultural resource databases. Possibly conduct pre-burn vs. post-burn artifact analyses.	Archaeologist	Within 1-year of treatment, with visits every 3 years if necessary
Rangeland	Implementation	Ensure pastures are rested for two growing seasons following prescribed burn.	Coordination and communication with allotment permittees.	Allotment Administrator	After implementation of prescribed fire
Rangeland – Post-fire understory response	Implementation	Ensure adequate understory seed source is available in prescribed fire treatment units.	Visual estimates, belt transects.	Allotment Administrator	Prior to implementation and/or immediately afterward

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Fuels Management	Effectiveness	Determine if fuels in previously cut treatment units are reduced sufficiently to meet treatment objective.	Visually estimated burned areas, delineation with GPS.	District Fuels Planner	After implementation
Fuels Management	Implementation	Determine if weather conditions and prescribed fire parameters are within the range of variability.	Would monitor any site or time specific weather and fire criteria as identified in the project burn plan.	Rx Burn Supervisor	During implementation
Smoke Plume (Air Quality)	Effectiveness	Determine trajectory and vertical dispersion of smoke plumes.	-Visual observation of smoke plume from ground level. -Assessment of wind speed and direction on day of implementation.	Rx Burn Supervisor	During and immediately after implementation
Hazardous Materials	Effectiveness	Ensure all fuel spills are contained without harm to personnel or the environment.	Immediately control and/or clean spill through use of hazmat spill kit. Report large spill (> 42 gallons) to hazmat coordinator.	Rx Burn Supervisor Mechanical Pre-treatment COR	During implementation
Wildlife Biology – Big Game Cover	Implementation	Determine if adequate big game cover remains in treatment units after implementation	Visual estimate.	Wildlife Biologist	During and immediately after implementation
Wildlife Biology – Special Status Species	Implementation	Ensure structures or areas with Special Status Species habitat values are protected in treatment units.	Monitor activities such as line construction, prescribed fire ignition, and mop-up with visual observation, photography, and written description.	Wildlife Biologist	During and after implementation
Aquatics	Effectiveness	Evaluate riparian response to thinning and/or burning.	Conduct greenline monitoring.	Aquatics Specialist	One year prior to treatment to gather baseline data and at 2 years following treatment
Vegetation-Special Status Species	Implementation	Determine if Special Status Species are avoided in treatment units as necessary.	Monitor over time with photo points.	Botanist	During implementation and 2 years after implementation

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Vegetation – Juniper Mortality	Effectiveness	Determine if juniper mortality in treatment units meets 70% objective.	Visual estimate.	Rx Burn Supervisor	During implementation and immediately after
Vegetation – Mountain Big Sagebrush Restoration Treatment	Effectiveness	Determine if acreage treatment targets are attained.	Visual estimate, possibly using GPS delineation or aerial observation.	Resource Advisor	During or immediately after implementation
Vegetation – Low Sagebrush Juniper Encroachment Treatment	Effectiveness	Determine if objective is attained.	Visual estimate, possibly using GPS delineation or aerial observation.	Resource Advisor	During or immediately after implementation
Vegetation – Big Game Browse / Hardwood Maintenance Treatment	Effectiveness	Identify blocks of mountain mahogany, bitterbrush, aspen, chokecherry and riparian woody species and determine if acreage treatment target is attained.	Visual estimate, possibly using GPS delineation or aerial observation.	Resource Advisor	During or immediately after implementation
Wilderness/ WSA	Effectiveness	Evaluate effectiveness of PDFs at protecting wildress values.	Visual estimate.	Wilderness Specialist	During or immediately after implementation

Chapter 5
List of Preparers

5 List of Preparers

5.1 Introduction

This DEIS was prepared by an ID Team of resource specialists from Burns District Office. This proposal has been discussed and developed within BLM for several years and many changes to the project design have occurred. The SMAC has been provided project updates, site tours, and opportunities to provide input and recommendations to BLM under their authority provided in the Steens Act (Section 131).

This project was originally called the Bridge Creek Project and encompassed 40,000 acres. Over the years project prototypes varied and the project grew into a proposal that now includes roughly 336,000 acres and is titled the North Steens Ecosystem Restoration Project.

The BLM initially considered this an EA-level project, but recognized the need to scope the project with the interested public.

5.2 Public Participation

A notice of public scoping was posted on the Burns District internet site on January 5, 2005, and published in the *Burns Times-Herald*. A mailing with project information and draft alternatives was sent to 238 organizations and individuals nationwide. The public scoping period occurred over 40 days and generated a wide variety of scoping comments. Twenty-two comment letters were received.

As a result of responses to scoping, the BLM determined, due to the enlarged scope and scale of the project, an EIS should be prepared. The Notice of Intent published in the *Federal Register* (July 21, 2005) provided for an additional 15-day public comment period on the DEIS, which was advertised through the news media and a newsletter to the North Steens mailing list. Four comment letters were received.

On February 10, 2007, the Environmental Protection Agency's Notice of Availability of the DEIS was published in the *Federal Register* which initiated a 45-day comment period. A news release was sent to media groups including the Burns Times-Herald, The Bulletin, The Oregonian, and KZZR Radio announcing availability of the DEIS. Approximately 118 hard copies of the DEIS and 125 compact discs were sent to individuals, agencies, and organizations. A newsletter was also distributed to about 72 names on the mailing list announcing the availability of the DEIS as well as announcing the public comment period and meeting dates. During the 45-day public comment period, two public meetings were held in the following cities on the dates listed and with the stated number of attendees.

Hines, Oregon	February 22, 2006	0 attended
Diamond, Oregon	February 23, 2006	13 attended

The BLM received approximately 21 public comment letters on the DEIS. Substantive comments are addressed in Appendix A of the FEIS. Although the comment period ended March 27, 2006, the BLM continued to involve the SMAC and cooperating agencies throughout the process.

5.3 Bureau of Land Management RMP/EIS Team

Karla Bird*	Management Representative – Andrews RA Field Manager
Gary Foulkes*	NEPA Support
Douglas Linn*	EIS Team Leader - Primary Author
Rhonda Karges*	Final EIS Co-lead

Interdisciplinary Team	**Resource(s)**
Elizabeth Coahran	Cultural, Paleontology, American Indian Traditional Practices
Steve Dowlan*	Fisheries, Redband Trout Reserve, Water Resources, Riparian Areas, Special Status Species - Fauna
Laura Dowlan*	Wilderness, WSAs, Recreation, WSRs, VRM
Gary Foulkes*	Social and Economic Values, NEPA
Joe Glascock*	Grazing Management
Rick Hall	ACECs, Soils
Kelly Hazen*	GIS
Douglas Linn*	Biological Soil Crusts, Special Status Species – Flora, Vegetation, Wild Horses
Mike McGee*	Fisheries, Redband Trout Reserve, Water Resources, Riparian Areas, Special Status Species – Fauna
John Neeling **	Wilderness, WSRs
Matt Obradovich*	Wildlife, Migratory Birds, Special Status Species - Fauna
Casey Pevey	Noxious Weeds
Jeff Rose*	Grazing Management, Woodlands, Fire Management, Vegetation, Air Quality
Mark Sherbourne	Transportation
Cam Swisher*	Grazing Management
Evelyn Treiman*	Recreation, OHVs, Visual Resources, WSAs

*Core Team Member
** John passed away before the publication of this document (John Neeling 1953 – 2006).

5.4 Cooperating Agencies

Burns Paiute Tribe
Harney County
Harney Soil and Water Conservation District
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
U.S. Department of Agriculture, Eastern Oregon Agricultural Research Center
U.S. Fish and Wildlife Service, Ecological Services
U.S. Fish and Wildlife Service, Malheur National Wildlife Refuge

Chapter 6
Glossary, Bibliography, and Index

6 Glossary, Bibliography, and Index

6.1 Glossary

A

Adaptive management - A type of natural resource management in which decisions are made as part of an ongoing process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management policy.

Advanced ecological status - A biotic community with a high similarity to a defined or perceived potential natural community (PNC) for an ecological site, usually late-seral or PNC ecological status.

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.

Allotment (grazing) - Area designated for the use of a certain number and kind of livestock for a prescribed period of time.

Allotment Management Plan (AMP) - A plan for managing livestock grazing on specified public land.

Animal unit - One cow, one cow/calf pair, one horse, or five sheep.

Animal Unit Month (AUM) - The forage needed to support one cow, one cow/calf pair, one horse, or five sheep for 1-month. Approximately 800 pounds of forage.

Appropriate management level - An established population range that represents the number of animals the designated HMA can sustain and results in a thriving natural ecological balance with other uses and resources common to the area and avoids deterioration of the public range.

Area of Critical Environmental Concern (ACEC) - Area where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect humans from natural hazards.

B

Basalt - A dark, heavy, fine-grained silica-poor igneous rock composed largely of iron and magnesium minerals and calcium-rich plagioclase feldspars.

Basin (river) - In general, the area of land that drains water, sediment, and dissolved materials to a common point along a stream channel. River basins are composed of large river systems. In this EIS, the term refers to the equivalent of a third field hydrologic unit code, an area of about nine million acres, such as the Salmon River basin. It also is used to refer in general to the Interior Columbia River Basin.
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 evaluation and represent the most effective and practical means to achieve management goals for a given site.

Biological soil crust - Lichens, mosses, green algae, fungi, cyanobacteria, and bacteria growing on or just below the surface of soils.

Broadcast burning - Prescribed fire is utilized through an entire area identified in the burn plan using a prescription designed to achieve specific habitat and fuel loading objectives.

Bureau of Land Management (BLM) (Bureau) - Government agency with the mandate to manage Federal lands under its jurisdiction for multiple uses.

BLM assessment species - Plant and animal species on List 2 of the Oregon Natural Heritage Database, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040) that are identified in BLM Instruction Memorandum OR-91-57 and are not included as Federal candidate, State listed, or BLM sensitive species.

BLM sensitive species - Plant or animal species eligible for Federal listed, Federal candidate, State listed, or State candidate (plant) status, or on List 1 in the Oregon Natural Heritage Database, or approved for this category by the BLM State Director.

BLM tracking species - Plant and animal species on List 3 and 4 of the Oregon Natural Heritage Database, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040) that are identified in BLM Instruction Memorandum OR-91-57 and are not included as Federal candidate, State listed, BLM sensitive, or BLM assessment species.

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.

Canopy - In a forest, the branches from the uppermost layer of trees; on rangeland, the vertical projection downward of the aerial portion of vegetation.

Colluvium - Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commodities - Goods and services produced by industries which include but are not limited to agriculture, livestock grazing, and mining.

Condition Class - A representation of the degree of departure from the historic/wildfire regime. Broken into three classes (see Table 3.6).

Consultation - (1) An active, affirmative process that (a) identifies issues and seeks input from appropriate American Indian governments, community groups, and individuals; and (b) considers their interests as a necessary and integral part of the BLM's and U.S. Forest Service's decision-making process. (2) The Federal Government has a legal obligation to consult with American Indian Tribes. This legal obligation is based in such laws as the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, and numerous other Executive Orders and statutes. This legal responsibility is, through consultation, to consider Indian interests and account for those interests in the decision. (3) The term also refers to a requirement under Section 7 of the ESA for Federal agencies to consult with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service with regard to Federal actions that may affect listed threatened and endangered species or critical habitat.

Corridor (landscape) - Landscape elements that connect similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

D

Deep soil - A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Developed recreation - Recreation that requires facilities which in turn result in concentrated use of an area; for example, a campground.

Dispersed recreation - Recreation that does not occur in a developed recreation site; for example, hunting or backpacking.

Disturbance - Refers to events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, insects, and pathogens. Human-caused disturbances include actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

E

Early Successional Stage - A successional stage, or collection of stages, that occur immediately following a disturbance.

Ecological Site Inventory (ESI) - The basic inventory of present and potential vegetation on BLM rangelands. Ecological sites are differentiated on the basis of the kind, proportion, or amount of plant species.

Ecological status - The present state of vegetation of a range site in relation to the potential natural community for that site. Four classes are used to express the degree to which the production or composition of the present plant community reflects that of the potential natural community (climax):

Ecological Status (Seral stage)

Percent of Community in Climax Condition:

Potential natural community	76-100
Late-seral	51-75
Mid-seral	26-50
Early-seral	0-25

Ecosystem - A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

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 (ESA) 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) which portrays the environmental consequences of proposed Federal actions which are not expected to have significant effects 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) which portrays the environmental consequences of proposed major Federal actions expected to have significant impacts on the human environment.

F

Federal Land Policy and Management Act of 1976 (FLPMA) - Law mandating that the BLM manage lands under its jurisdiction for multiple uses. Establishes guidelines for its administration; and provides for the management, protection, development, and enhancement of the public lands, among other provisions.

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.

Fire regime - The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire across a landscape.

Fire return interval - The number of years between fire events for a specified area.

Flood plain - A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial - produced by the action of a river or stream.

Forb - Any herbaceous plant that is not a grass or a grass like species. Broad-leafed plants; includes plants that commonly are called weeds or wildflowers.

Functional at Risk (FAR) - Riparian/wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

G

Geographic Information System (GIS) - An information processing technology to input, store, manipulate, analyze, and display data; a system of computer maps with corresponding site-specific information that can be combined electronically to provide reports and maps.

H

Herd Management Area (HMA) - A geographic area identified in a Management Framework Plan or Resource Management Plan for the long-term management of a wild horse herd.

Hiking trail - A pathway created and maintained by human foot traffic, saddle or pack stock, or constructed and maintained for these uses.

Hydrologic Unit Code (HUC) - A coding system developed by the U.S. Geological Service to map geographic boundaries of watersheds of various sizes.

I

Incident commander - Individual responsible for the management of all incident (fire) operations.

Interim Management Policy for Lands Under Wilderness Review (WSA IMP) - Policy for managing public lands under wilderness review. Section 603(c) of the FLPMA states: "During the period of review of such areas and until Congress has determined otherwise, the Secretary shall continue to manage such lands according to his authority under this Act and other applicable laws in a manner so as not to impair the suitability of such areas for preservation as wilderness, subject, however, to the continuation of existing mining and grazing uses and mineral leasing in the manner and degree in which the same was being conducted on the date of approval of this Act: Provided, that, in managing the public lands the Secretary shall by regulation or otherwise take any action required to prevent unnecessary or undue degradation of the lands and their resources or to afford environmental protection."

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.

J

Jackpot Burning – Accumulations of fuels are burned while other vegetation remains unburned. This method would be implemented in the late fall, winter, or early spring when the potential for fire spread is low. Fuels could be piled by hand or machine.

K

L

Landscape level - In each allotment or pasture in the project area, there are situations that individually would warrant action by the BLM. By considering a wider project area, the BLM ensures individual actions are considered, evaluated, and coordinated with other actions in the vicinity in the context of all activities addressing the wider problem of juniper expansion.

Landscape scale - For this EIS purpose the 336,000-acre project area as opposed to smaller individual projects.

Late Successional Stage - A successional stage, or collection of stages, that occur many years after disturbance. Often related to climax or a stable, self-perpetuating plant community.

M

Management direction - A statement of goals and objectives, management prescriptions, and associated standards and guidelines for attaining them.

Mechanized equipment - Any machine that uses or is activated by either a living or nonliving power source. This includes, but is not limited to, chain saws, power drills, aircraft, generators, motor vehicles, snow machines, etc. The term does not include shavers, wristwatches or clocks, flashlights, cameras, camp stoves, cell phones, radio transmitters/receivers, GPS units or other similar small hand held or portable equipment.

Mechanized vehicle (for OHV) - Any vehicle, device, or contrivance that has moving parts for moving people or material in or over land, water, snow, or air. This includes, but is not limited to, sailboats, sailboards, hang gliders, parachutes, bicycles, game carriers, carts, and wagons. It does not include wheelchairs, horses, or other pack stock, skis, snowshoes, nonmotorized river craft, sleds, travois, or similar devices without moving parts.

Mid-transitional juniper woodland – Juniper has become codominant in a specific plant community or site.

Mitigation - Measures designed to counteract environmental impacts or to make impacts less severe.

Monitoring - The periodic and systematic collection of resource data to measure progress toward achieving objectives.

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.

Motor vehicle - Any vehicle, device, or contrivance which is self-propelled and is used for moving people or materials in or over land, water, snow, or air and is powered by a motor or engine.

Motorized equipment - Any machine that uses or is activated by a motor, engine, or other power source. This includes, but is not limited to, chain saws, power drills, aircraft, generators, motor vehicles, snow machines, etc. The term does not include shavers, wristwatches or clocks, flashlights, cameras, camp stoves, cell phones, radio transmitters/receivers, GPS units or other similar small hand held or portable equipment.

Multiple use - 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 to assure the long-term health of the ecosystem.

N

National Environmental Policy Act of 1969 (NEPA) - Law requiring all Federal agencies to evaluate the impacts of proposed major Federal actions with respect to their significance on the human environment.

National Wildlife Refuge (NWR) - An area administered by the U.S. Fish and Wildlife Service for the purpose of managing certain fish or wildlife species.

Natural wildland fire – Lightning-ignited fire in natural vegetation.

Naturalness (a primary wilderness value) - An area that generally appears to have been affected primarily by the forces of nature with the imprint of people's work substantially unnoticeable.

Noxious weed - A plant specified by law as being especially undesirable, troublesome, and difficult to control. A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed is one that causes disease or has other adverse effects on man or his environment and, therefore, is detrimental to the agriculture and commerce of the United States and to the public health.

O

Objectives (management) - A description of a desired condition for a resource. Objectives can generally be quantified and measured and, where possible, have established timeframes for achievement.

Off-Highway Vehicle (OHV) - Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding the following: 1) any nonamphibious registered motorboat; 2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly permitted by the authorized officer, or otherwise officially approved; 4) vehicles in official use; and 5) any combat or combat support vehicle when used in times of national defense emergencies.

Old-growth juniper – Juniper that has certain morphological features or was growing prior to 1870. Old-growth juniper usually occurs in specific areas where wildland fires are less common (rocky areas with low fuels).

P

Perennial - A plant that lives for three or more years.

Perennial stream - A stream in which water is present during all seasons of the year.

Permeability - The quality of the soil that enables water to move downward through the profile, measured as the number of inches per hour that water moves downward through the saturated soil.

pH value - A numerical designation of acidity and alkalinity in soil.

Playa - A flat area at the bottom of a desert basin, sometimes temporarily covered with water.

Pocket – A "juniper pocket" is three or more juniper in close association.

Prescribed burning - Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow the fire to be confined to a predetermined area and at the same time to produce the fire line intensity and rate of spread required to attain planned resource management objectives.

Prescribed fire - Any fire ignited by management actions to meet specific objectives. A written and approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met prior to ignition. The introduction of fire to an area under regulated conditions for specific management purposes (usually vegetation manipulation).

Prescribed natural fire - A naturally-ignited fire that is managed for resource benefits. Currently called Wildland Fire Use.

Prescription - Written statement defining objectives to be attained, as well as measurable criteria which guide the selection of appropriate management actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations under which the fire will be allowed to burn.

Primary wilderness values - The primary or key wilderness values described in the Wilderness Act by which WSAs and wildernesses are managed to protect and enhance the wilderness resource. Values include roadlessness, naturalness, solitude, primitive and unconfined recreation, and size.

Primitive and unconfined recreation (a primary wilderness value) - nonmotorized and undeveloped types of outdoor recreation activities. Refers to wilderness recreation opportunities such as nature study, hiking, photography, backpacking, fishing, hunting, and other related activities. Does not include the use of motorized vehicles, bicycles, or other mechanized means of travel.

Project units – Identified subdivisions of the North Steens Ecosystem Restoration Project Area.

Proper Functioning Condition (PFC) - PFC is both a qualitative method for assessing the physical function of riparian-wetland areas, and a defined condition of a riparian-wetland area.

Public lands - Any land or interest in land owned by the citizens of the United States and administered by the Secretary of the Interior through the BLM as defined in FLPMA.

Q

R

Rangeland - Land on which the potential natural vegetation is predominantly grasses, grass like plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site - An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Record of Decision (ROD) - An official document in which a deciding official states the alternative that will be implemented from a prepared Final EIS.

Recreation site - An area where management actions are required to provide a specific recreation setting and activity opportunities, to protect resource values, provide public visitor safety and health, and/or to meet public recreational use demands and recreation partnership commitments. A site may or may not have permanent facilities.

Research Natural Area (RNA) - An area where natural processes predominate and which is preserved for research and education. Under current BLM policy, these areas must meet the relevance and importance criteria of ACECs and are designated as ACECs. An area of significant scientific interest that is designated to protect its resource values for scientific research and study.

Resilience – Ability of a site to recover to potential native vegetation following perturbation or disturbance.

Resource advisor - Resource specialist responsible to the incident commander for gathering and analyzing information concerning values-at-risk that may be impacted by fire or fire suppression activities.

Resource Area (RA) - The "on-the-ground" management unit of the BLM 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. Replaces the older generation Management Framework Plans. Provides long-term (up to 20 years) direction for the management of a particular area of land and its resources, usually corresponding to a BLM Resource Area.

Riparian area - Area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of flood plains and valley bottoms that support riparian vegetation.

Risk assessment - Assessing the chance of fire starting, naturally- or human-caused, and its potential risk to life, resources and property.

Road - Constructed or evolved transportation route that is normally maintained for regular use (except during periods of closure) that can be reasonably and prudently driven by motorized or mechanized vehicles.

Route - A linear ground transportation feature such as a way or road.

S

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.

Scoping - The process of identifying the range of consideration, issues, management concerns, preliminary alternatives, and other components of an environmental impact statement or land-use planning document. It involves both internal and external, or public, involvement.

Section 202 lands - Lands being considered for wilderness designation under Section 202 of the Federal Land Policy and Management Act of 1976.

Sensitive species - Species identified by a Forest Service regional forester, or BLM state director, for which population viability is a concern either (a) because of significant current or predicted downward trends in population numbers or density, or (b) because of significant current or predicted downward trends in habitat capability that will reduce a species' existing distribution.

Seral - Refers to the sequence of transitional plant communities during succession. Early-seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid-seral in a forest will refer to pole or medium sawtimber growth stages; late- or old-seral refers to plants present during a later stage of plant community succession (such as mature and old forest stages).

Seral stage - The developmental phase of a forest stand or rangeland with characteristic structure and plant species composition. The rated departure of a plant community from a described PNC for a specific ecological site.

Low-seral stage is an existing plant community which is defined as 0.0 to 25.0 percent comparability to the defined PNC; Mid-seral stage is an existing plant community which has 26.0 to 50.0 percent comparability to the PNC;

Late-seral stage is 51.0 to 75.0 percent comparable to the PNC; PNC is an existing plant community with 76.0 to 100.0 percent comparability to the defined PNC.

Slope - The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20.0 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soil association - A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single soil map unit.

Soil classification - The systematic arrangement of soils into groups or categories on the basis of their characteristics.

Soil compaction - An increase in soil bulk density of 15.0 percent or more from the undisturbed level.

Soil complex - A map unit of two or more kinds of soils in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping.

Soil Horizon - A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.

Soil profile - A vertical section of the soil extending through all its horizons and into the parent material.

Soil series - A nationally defined soil type set apart on distinct soil properties that affect use and management. In a soil survey, this includes a group of soils having profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Soil survey - A field investigation resulting in a soil map showing the geographic distribution of various kinds of soil and an accompanying report that describes the soil types and interprets the findings.

Soil texture - The relative proportions of sand, silt, and clay particles in a mass of soil.

Solitude (a primary wilderness value) - The state of being alone or remote from habitations; a lonely, unfrequented, or secluded place. The intent is to evaluate the opportunity for solitude in comparison to habitations of people.

Special Recreation Management Area (SRMA) - An area where recreation is the principal management objective, where intensive recreation management is needed, and where more than minimal recreation-related investments are required.

Special Status Species - Plant or animal species known or suspected to be limited in distribution, rare or uncommon within a specific area, and/or vulnerable to activities which may affect their survival. Lists of Special Status Species are prepared by knowledgeable specialists through the State of Oregon; the BLM prepares a list of State sensitive species predominantly based on the list prepared biennially by the Oregon Natural Heritage Program (ONHP).

Stand - A community of trees occupying a specific area and sufficiently uniform in species, age, spatial arrangement and condition as to be distinguishable from trees on surrounding lands.

State listed species - Any plant or animal species listed by the State of Oregon as threatened or endangered within the State under Oregon Revised Statue (ORS) 496.004, ORS 498.026, or ORS 564.040.

Stream channel - The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Subalpine - A terrestrial community generally found directly below treeline. Subalpine communities on Steens Mountain begin at approximately 7,500 feet and have shallow, underdeveloped soils. These areas support a unique set of plants and animals.

Subwatershed – A drainage area of approximately 20,000 acres, equivalent to a 6th-field HUC. Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

Succession - A predictable 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 the establishment of the next stage. The different stages in succession are often referred to as "seral stages" (see Seral).

Successional Stage - A collection of plants and animals that occupy a site at a specific time under a specific set of conditions.

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.

Supplemental wilderness values - Includes ecological (e.g., vegetation, wildlife, and overall biological/ botanical processes and values associated with the natural environment), geological, scientific, educational, scenic, and historic values. When present, they can enhance primary wilderness values, but are not mandated by Congress.

T

Threatened species - Any plant or animal species defined under the ESA 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*.

Trend - The direction of change in ecological status observed over time. Trend is described as toward or away from the PNC, or as not apparent.

U

Upland (geology) - Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Utilization - The proportion or degree of the current year's forage production that is consumed or destroyed by animals (including insects). Utilization may refer either to a single plant species, a group of species, or to the vegetation as a whole. Utilization is synonymous with use.

V

Visual Resource Management (VRM) Objectives

Class I - The objective of this classification is to preserve the existing character of the landscape. This class provides for natural ecological changes and limited management activity. The level of change should be very low and must not attract attention. Class I is assigned to those areas where a management decision has been made to preserve a natural landscape.

Class II - The objective of this classification is to retain the existing character of the landscape. The level of change to landscape characteristics should be low. Management activities may be seen but should not attract the attention of a casual observer. Any changes must conform to the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III - The objective of Class III is to partially retain the existing character of the landscape. Moderate levels of change are acceptable. Management activities may attract attention but should not dominate the view of a casual observer. Changes should conform to the basic elements of the predominant natural features of the characteristic landscape.

Class IV - The objective of Class IV is to provide for management activities that require major modification of the landscape. These management activities may dominate the view and become the focus of viewer attention; however, every effort should be made to minimize the impact of these projects by carefully locating activities, minimizing disturbance, and designing the projects to conform to the characteristic landscape.

W

Way - A travel route in a WSA maintained solely by the passage of vehicles which has not been improved and/or maintained by mechanical means to ensure relatively regular and continuous use.

Wild river - A river or section of a river that is free of impoundments and generally inaccessible except by trail, with watersheds and shorelines essentially primitive and waters unpolluted.

Wildfire – An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

Wildland fire – Any nonstructure fire that occurs in the wildland. Three distinct types of wildland fire have been defined and include wildfire, wildland fire use, and prescribed fire.

Wildland fire suppression – Extinguishment of a wildland fire utilizing the appropriate management response.

Wildland fire use – The application of the appropriate management response to naturally-ignited wildland fires to accomplish specific resource management objectives in predefined designated areas outlined in Fire Management Plans. Formally called Prescribed Natural Fire.

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6.3 Index

Appendix A

North Steens Ecosystem Restoration Project Responses to Public Comments

1. There are concerns regarding criteria BLM will utilize to select the order of cooperative treatments involving private lands.

Response: Coordination and timing of any implementation depends on many variables including consideration and application of PDEs and cooperators with outside funding sources. Other considerations will be related to climatic, budgetary, and staffing limitations. It is understood the single season of rest prior to a prescribed burn and two seasons minimum rest following treatment present challenges to private operations.

For any given treatment or burn unit, site-specific resource concerns would be addressed by the IDT through the recommendation of applicable PDEs to the Field Manager. The Field Manager has other factors to consider however, which include, but are not limited to, project cooperators with outside funding and recovery of adjacent treated lands. Once the Field Manager has considered the issues presented coordination with the on-the-ground Project Implementation Lead to initiate treatment will begin.

2. The order of treatment has potential to negatively impact private enterprise.

Response: See Response under comment number 1.

3. On page 43 of the DEIS there is a misleading statement regarding fishing opportunities on Bridge Creek. Please clarify.

Response: This information is summarized from the 1981 Wilderness Study Report for BLM Oregon. It does not mean there are outstanding fishing opportunities in Bridge Creek WSA, but the variety of activities (including fishing) is what makes recreation opportunities outstanding.

4. The EIS should address sprouting juniper following cutting treatments that lack follow-up fire treatments.

Response: Documented sprouting of western juniper (*Juniperus occidentalis* var. *occidentalis* Hook.) is rare (Miller et al. 2005). Lower branches attached to the stump following cutting are often mistakenly assumed to be sprouts. Some branches can assume apical dominance and form a new main stem. Removal of dominant tree overstory will release smaller trees in the stand. Removal of larger trees will allow smaller trees to acquire additional resources resulting in a rapid growth rate. This illustrates the importance of cutting all trees, large and small.

5. BLM should adjust the project boundary to include portions of Deep Creek, Little Kiger, and Home Creek.

Response: The project boundary has been modified to include logical additions around Home Creek. Other suggested additions have been included in adjacent Three Rivers RA projects.

6. Post-fire grazing is delayed a minimum of two growing seasons, not 2 years as is stated in the DEIS.

Response: The BLM agrees. The error has been corrected.

7. The South Steens Project Unit needs to be broken into more treatment units.

Response: South Steens Project Unit has been divided into 15 additional units. Additional subdivisions would occur prior to implementation to ensure appropriate application of treatments based on plant community type and juniper transitional stage.

8. Cooperative agreements encouraging and allowing natural fire use should be signed with private landowners.

Response: Cooperative agreements will be developed based on current agency policies and direction. Since management of natural fire involves utilization of unplanned, natural ignitions, development of these agreements will need to be done on a case-by-case basis.

9. There is disagreement regarding the appropriate size of greater sage-grouse lek buffers.

Response: Two-mile lek buffers were used as the 4-mile buffers would occupy almost half the Project Area eliminating some strategies proposed for effective treatment of juniper. Some females, up to half those tracked in studies, may range greater than 4 miles from a lek to find suitable nesting habitat. The study on Steens Mountain involved very few females (29) over several years and distance from nest site to nearest lek was not determined in the report. The average distance reported was from the lek where the female was captured to the nest site. While some females nested within 4 miles of a lek, it is possible many nesting areas within 4 miles of each lek site are already occupied by juniper. This probably also occurs within the 2-mile buffer as well. To treat juniper as aggressively as suggested by broadcast burning within the 2-mile lek buffer would destroy most big sagebrush and a majority of the available and preferred nest sites. By treating juniper within the 2-mile lek buffer by cutting alone or cutting and jackpot burning, big sagebrush will return to treated sites quicker than with broadcast burning and open up more sites for nesting. In the area between the 2-mile buffer and the 4-mile buffer, half or more of the existing suitable nesting habitat (no juniper encroachment to early transitional) would be retained while mid- to late transitional juniper areas would be treated more aggressively. This should provide a mosaic of burned/unburned areas in big sagebrush.

10. Individual project units should be evaluated on a site-specific basis in the EIS.

Response: The FEIS includes an example unit map illustrating how analyzed treatments would be site-specifically applied under the Preferred Alternative. This example unit includes wilderness and WSAs as well as other public and private lands; this approach allows the reader to see how treatments vary depending on vegetation and special management for a given portion of land. Appropriate treatments would be identified for application in specific plant communities; the juniper transitional stage (early, mid or late) greatly influences treatment type selected. On-the-ground situations are substantially similar across the Project Area; treatments would be applied site specifically after a careful review of the specific treatment unit by subject matter experts and application of appropriate PDEs to ensure resource protection and plan conformance.

11. Burning of early-transitional juniper sites should be deferred until adequate sagebrush cover is present consistent with cover guidelines in the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon*.

Response: The PDE numbers 15 and 16 (DEIS page 14) cover these concerns. Should any problems occur during the treatment process, such as overachievement of objectives in a particular unit, then adaptive management allows the BLM to postpone treatment of adjacent areas until the treated area has recovered to meet the PDEs.

12. Treatment unit objectives should be based on percent of a particular plant community treated. Treatments should vary over a given unit.

Response: The DEIS delineates project objectives based on plant community type and juniper transitional stage in Section 2.5.1; cutting and burn unit percentage objectives are also based on plant community type and juniper transitional stage. See Response under comment number 10.

13. The 12-15% cover should be attained in treated sagebrush before additional treatments occur in the same treatment unit.

Response: The North Steens DEIS stated post fire sagebrush cover attainment should be at 5-15%. It was written to match the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon* which uses the Class 3 vegetation cover as habitat for sage-grouse. The FEIS (PDE Number 15) has been written to state treated mountain big sagebrush communities should attain 10-15% sagebrush cover on average before any additional treatments would be considered.

14. The BLM should pre-identify lower elevation juniper "stringers" that would be retained for thermal cover.

Response: The BLM will design burns in Project Areas to retain juniper stringers that provide travel corridors and thermal cover for different species of wildlife such as mule deer. This will also help in retaining some stands of old growth juniper as well. The ODFW biologist will be involved in identifying these areas. Although the elevation limit was not in the text, PDE Number 7, which deals with old-growth juniper, addresses this.

15. A high priority should be placed on achieving PFC for streams in the Project Area.

Response: The proposed project will move riparian areas toward PFC. Riparian areas encroached by western juniper are progressing away from PFC, so just removing juniper from riparian areas is a step toward PFC. Fire would be introduced to riparian areas to remove decadent vegetation and stimulate new growth. Introducing fire when conditions are conducive to low fire intensity and low fire severity would move riparian areas toward PFC. While there may be some short-term impacts (3-5 years) from burning, impacts would be less than allowing riparian areas to proceed in a downward trend due to juniper encroachment.

16. Consider changing the season and time of use to preclude the necessity of fencing and seeding areas.

Response: Fencing is often required following treatment to keep all herbivores including livestock out of an area during initial recovery. Season and time of use are related to grazing management within specific allotments; allotment evaluations and Allotment Management Plans are prepared for each allotment. Changes to grazing management would be suggested within these aforementioned documents.

17. The wording in Section 2.3 is confusing regarding where wildfire would be managed. Please clarify.

Response: The wording has been clarified. Managed wildfire (natural starts) could be utilized in all areas under the EIS.

18. Wilderness should be treated differently than WSA. Create wilderness PDEs and reference the Wilderness Act.

Response: The text has been modified. Wilderness has a specific PDE referencing the Wilderness Act. All actions in wilderness will follow the MRDG process. WSAs also have their own PDEs. Actions within WSAs are not subject to the MRDG process.

19. The debate about wilderness fire management seems slanted. Additional perspectives could be cited.

Response: Additional quotes were added along with general clarifications in the text.

20. The terminology on page 24 is confusing. Please clarify the meaning to match the Wilderness Act.

Response: The language has been clarified.

21. The BLM should require an additional EA for any treatment in wilderness.

Response: The Preferred Alternative is to continue current fire management in Steens Mountain Wilderness. Any future proposals in wilderness will be in conformance with the Steens Act and Wilderness Act. Appropriate environmental documentation will be completed when actions in wilderness are proposed.

22. Allow cooperators and volunteers to participate directly in fire operations.

Response: Opportunity does exist for cooperators and volunteers to participate directly in fire operations. However, cooperators and volunteers must meet all agency training and physical standards for the appropriate position (NWCG 2006). See discussion under the Preferred Alternative in the FEIS.

23. Little is known about the Native American use of fire in the area.

Response: Twenty-four (24) references are provided in the DEIS Bibliography documenting indigenous occupation and/or use of fire by indigenous populations of the Pacific Northwest prior to contact, including Paiute people (the indigenous population of the area in question).

Admittedly this is not an exhaustive list, but it is a thorough temporal distribution of writings touching on the topic in question over the last century.

24. Livestock grazing is the primary cause of juniper expansion.

Response: Three factors have been identified as the dominant reasons in western juniper increase since the late 1800s.

- **Fire/Fire Suppression** – Fire is considered to be the most influential factor limiting western juniper encroachment (Miller et al. 2005). Western juniper is actively encroaching into mountain big sagebrush plant communities. Fires burned these plant communities once every 25 to 35 years prior to 1900. Following the beginning of the 20th century, Federal land management agencies began a policy of actively suppressing fires on Federally administered lands. The suppression of fires limited the size and influence of these fires and allowed western juniper to establish and grow. The continuation of this policy through the latter part of the 20th century allowed western juniper to attain a cover and density that further limits fires spread because of the reduction in understory plants.
- **Livestock** – Initial introduction of domestic livestock occurred in the 1860s and larger increases in numbers occurred beginning in the early 1870s. Numbers peaked in the early 1900s. The increase in domestic livestock coincides with the beginning of expansion of western juniper (Burkhardt and Tisdale 1976; Miller and Rose 1999). The main impact of domestic livestock was reduction in fine fuels, a major carrier of fires in much of the area. Decrease in fire size and plant competition worked to increase shrub density and provided a greater number of safe sites for western juniper establishment (Miller and Rose 1999).
- **Climate Change and Atmospheric CO_2 Increase** – Yearly temperatures and precipitation vary from year, but long-term trends can be identified. Change in western juniper's range has occurred all the way back to the late Pleistocene and through the Holocene (15,000-present). Historic expansions have occurred during cooler, wetter periods, often accompanied by an increase in grasses. The range of western juniper would then retreat during warmer, drier periods. The last cool, wet period was from 700 to 150 years ago. This period is often called the Little Ice Age. Grasses were found to increase during this period, but western juniper populations were believed to be held in check by an increased occurrence of fires. Since the end of the Little Ice age, annual temperatures have been slowly increasing and precipitation has been slowly declining. However, western juniper numbers have been increasing rapidly during this period. A number of researchers believe the current increase is uncharacteristic and can be largely attributed to anthropogenic (human caused) factors (Miller and

Wigand 1994; Knapp et al. 2001; Miller and Tausch 2001). Rising levels of CO_2 seem to have increased woody plants throughout the west. Increases in atmospheric CO_2 do not coincide with the initial peak periods of western juniper establishment. Elevated CO_2 levels during the latter part of the 20th century may be an important factor accelerating tree canopy expansion and establishment in some areas.

Climate and Fire Interaction - precipitation was increasing to levels above the long-term average in the late 1800s. At the same time, livestock numbers were also increasing. Without the increase in livestock there would have been a greater accumulation of fine fuel and potential for large fires (Miller et. al 2005). The combination of climate, fire, and livestock grazing form a complex suite of effects and their combination is probably greater than any one factor. There are also many other factors that have not been documented that have impacts. Impacts from recent (last 100 years) and historic (>1,000 years) disturbances can persist and direct current plant and animal community response to natural and cultural disturbances (Foster et al.2003).

25. Maps distinguishing the age class of juniper should be prepared.

Response: The level of information available in the GIS database is not at a fine enough scale to map the western juniper woodlands within the Project Area based on the successional classes proposed by Miller and others (2005). Trees greater than 120 years old are generally found on rocky ridgetops and shallow soil areas. Fires historically did not burn through these areas and would have allowed establishment of western juniper. Younger woodlands (<120 years old) are found throughout the Project Area. Encroachment of western juniper into mountain big sagebrush and low sagebrush plant communities has effectively homogenized the structure of the landscape. Attempts have been made to map age classes of juniper based on soil type and existing GIS/Ecological Site Inventory data. However, not all areas fitting the soils criteria contain older western juniper trees. Most old woodlands would be between 5 and 25 acres intermixed with younger woodlands. A map showing general soil types is included with the FEIS (Map CD-1).

Areas with old-growth juniper will be identified as different units are prepared for treatment.

26. Old-growth juniper should be protected with designations such as ACECs.

Response: It would be impractical to designate all old-growth juniper sites in the planning area as ACECs. Protection for old-growth juniper stands would be provided by methods used to control younger trees described in the EIS.

27. The goal of the project should be a full return to a natural functioning system.

Response: A goal of the project is to manage fuels thereby promoting a more functional ecosystem that reflects natural variability while still allowing for other lawful uses of public lands.

28. Acknowledge effect of grazing on fire cycles and juniper encroachment. The grazing analysis was not adequate.

Response: See Response to comment number 24.

29. Two seasons of rest from grazing following fire has never been tested scientifically. The BLM must discuss this in greater detail in the FEIS.

Response: Two growing seasons of rest are BLM policy. There is no set prescription for reintroduction of grazing following burning or seeding (Miller et al. 2005). Variability in site characteristics, weather, and type of control methods means no single prescription can be applied with expectation of successful site restoration. Management must remain flexible, be adaptable to change and require constant reassessment to achieve restoration goals. The primary goal when grazing treated areas is to permit rehabilitation of the site's ecological function. Miller and others (2005) state deferment of grazing to the fall period during the first several growing seasons following treatment is probably a minimum management requirement if natural recruitment is prescribed. They also state burned areas should be treated as a new seeding, requiring a minimum of 2 years of rest during the growing season.

Stevens (2004) states the primary management objective, post-treatment, should be to provide for maximum establishment of seeded and desirable indigenous species. Managers must control influences human activities and grazing animals have on the project. Factors can positively or negatively affect the success of a project. Project objectives and management plans should be based on site potential, expected rate of establishment, plant community makeup and climatic factors. Managers and planning documents have to be flexible enough to compensate for any changes from those expected when the decision is made to graze or not to graze and how much grazing should occur. As a basic rule, treated areas should not be grazed until the end of the second growing season (Plummer et al. 1968, Reynolds and Martin 1968, Valentine 1980). When grazing is allowed, it should be lighter than would normally occur with a fully mature community even if forage production suggests heavier use might be permitted. To ensure a healthy vigorous plant community it is essential grasses and forbs be given the opportunity to produce seed the first few years after seeding (Stevens 2004).

The primary goal remains the same when grazing treated areas, and this is to permit recover of ecologic function - hydrologic, energy, and resource capture - of a site (Miller et al. 2005, Stevens 2004).

30. Livestock should be removed from a site before and after treatment.

Response: Livestock grazing is deferred for the year prior to and at least two growing seasons following a prescribed fire treatment. Areas where natural unplanned ignitions are managed for resource benefits (Wildland Fire Use), livestock grazing will be deferred for at least two growing seasons following the burn. Areas requiring additional protection from grazing, i.e., quaking aspen stands, will be fenced to limit livestock and large wild herbivore grazing.

31. Use volunteers to perform single-tree hand cutting and burning activities.

Response: There is an opportunity to utilize volunteers for hand cutting. However, volunteers must meet current agency safety and proficiency requirements to perform these activities. See also Response to comment number 22.

32. Backpack or ATV mounted flamethrowers should be considered in the EIS.

Response: The DEIS allows for potential use of flamethrowers (page 19). Techniques described are included in all action alternatives, except the No Treatment Alternative, by reference. Use of listed techniques in some areas is limited based on which action alternative is being evaluated. Currently these tools are not permitted to be used on Federal lands because of short-term and long-term health and safety concerns.

33. The EIS is confusing in general and should include more graphs, pictures, and charts to assist the reader.

Response: Changes and clarifications have been made throughout the document in response to public comments and to enhance reader friendliness. Additional graphics and other visual aids have also been added in response to public comments on the DEIS.

34. The EIS contains no discussion of the impacts of livestock on the ecosystem and resulting modifications.

Response: See Response to comment number 24 and the Andrews/Steens PRMP/FEIS (page 4-183).

35. The EIS should describe how the WJMA fits in the overall plan for managing juniper on Steens Mountain.

Response: In response to a request by the SMAC and an increase in cooperator interest in the WJMA, the WJMA Project Unit was removed from the North Steens EIS. The WJMA proposal is covered under a separate process which allowed for implementation of an initial demonstration area in 2006.

36. It appears the FMP is the driving force in having wildfire managed in the area. The FMP should allow broad windows of opportunity for utilizing fire.

Response: The Andrews/Steens RMP analyzed potential impacts of wildland fire use across the planning area. The FMP is the operational plan for implementation of wildland fire use. Management of natural ignitions will occur to meet resource objectives outlined in the Andrews/Steens RMP and the North Steens Ecosystem Restoration Project EIS. Many factors are included in the decision process. The primary question to be addressed is - can this fire be safely managed to meet resource objectives? Other factors include availability of local, regional, and national resources to manage the fire and weather conditions (past, present, and future).

37. The EIS should aggressively treat areas of sagebrush in early stages of transition to juniper woodlands.

Response: To treat areas of sagebrush with early stages of transition juniper aggressively, as suggested by broadcast burning, would destroy most big sagebrush and a majority of available and preferred nest sites. By treating juniper within the 2-mile lek buffer by cutting alone or cutting and jackpot burning, big sagebrush will return to treated sites quicker than with broadcast burning and open up more sites for nesting. Outside the 2-mile buffer, half or more of the existing suitable nesting habitat (no juniper encroachment to early transitional) would be retained while mid- to late transitional juniper areas would be treated more aggressively. This should provide a mosaic of burnt and unburned areas in big sagebrush which should still provide good nesting habitat with travel corridors. By treating these areas too aggressively, habitat for sage-grouse and other sagebrush dependent species would be lost. Large voids would be created in the habitat for these species that would not reach sagebrush canopy cover of 10% for many years due to lack of available seed sources. Continuing this across the landscape would not be in conformance with the State of Oregon sage-grouse conservation plan. Areas not treated during early stages of this project could be treated once adjacent treatment areas have reached the 10% sagebrush canopy cover level.

38. Administrative access for permittees and landowners during and after treatment is important and should be addressed in the EIS.

Response: Administrative access for permittees and landowners would not be affected by the proposed action except for possible temporary road closures during burning operations.

39. Under this EIS the BLM plans to maintain current grazing levels. This ignores mechanisms BLM has to retire grazing on public lands.

Response: The North Steens Project is a landscape level proposal to reduce juniper-related fuel loading, thereby, improving the ecological health within the Project Area while maintaining appropriate land uses. While a no grazing component was considered, restructuring of grazing management throughout the Project Area does not address project objectives, and is not proposed, analyzed or within the scope of this EIS. See Section 2.10 - Alternatives Considered but Eliminated from Further Analysis.

40. The BLM must determine if the lands in the planning area are “chiefly valuable” for grazing.

Response: See Response to comment number 39.

41. The EIS fails to make any determinations as to suitability under the Taylor Grazing Act.

Response: The Taylor Grazing Act in Section 7 discusses suitability in the context of lands being more suitable for growing agricultural crops than for production of native grasses and forage plants. The BLM has no suitability requirements per se as does the USFS. The BLM did undertake extensive range surveys in the 1950s and 1960s to determine production and forage capacities of all rangelands. These determinations were brought forward in the RMPs. The BLM continues to monitor and refine these capacities. The purpose of this EIS was not to make these types of determinations.

42. There are no rivers identified as suitable for designation as WSRs in the EIS.

Response: The analysis was completed in the Andrews/Steens PRMP/FEIS, and no eligible rivers were found to be suitable.

43. The BLM should adopt the Steens-Alvord Citizens' Alternative.

Response: Adoption of the "Steens-Alvord Citizen's Alternative" was proposed by some members of the public during the process formulating the AMU and CMPA RMPs and RODs. The BLM determined the proposal was not a fully-developed alternative, and all facets of it were addressed in the alternatives analyzed. The "Steens-Alvord Citizen's Alternative" was not proposed for this document.

44. The BLM fails to satisfy NEPA by failing to sufficiently discuss the impacts of grazing on microbiotic crusts.

Response: Biological soil crusts (also referred to as microbiotic crusts) descriptions and impacts are discussed in the DEIS (see DEIS at 46-48, 75-76, 93-94,110, 121, 135, 141, 146-147, 154, and 162.). Additional discussions regarding biological soil crusts are found in the Andrews/Steens PRMP/FEIS and were incorporated by reference in the DEIS.

45. BLM should recognize microbiotic crusts play a role in a functioning ecosystem and are one indicator of rangeland health.

Response: The BLM recognizes microbiotic crusts play a role in a functioning ecosystem and are one indicator of rangeland health (see the Andrews/Steens PRMP/FEIS).

46. The BLM should recognize literature and research relevant to biological soil crusts in the Project Area.

Response: The BLM recognizes literature and research relevant to biological soil crusts in the Project Area (see the Andrews/Steens PRMP/FEIS).

47. The BLM will contribute to the listing of the greater sage-grouse under the ESA by implementing this proposal.

Response: The USFWS, Ecological Services, comment letter did not indicate implementation of this proposal would increase the likelihood of the greater sage-grouse being listed under the ESA.

48. The EIS relies heavily on the planting of exotic grasses to recover lost range conditions; this will prevent reestablishment of native species of plants.

Response: In some cases, exotic grasses, such as crested wheatgrass, are planted to keep exotic annual and biennial species from taking over land where native perennial grasses have been eliminated or drastically reduced. Crested wheatgrass is perennial, germinates very well, protects the soil and fills spaces where exotic annual grasses and mustards would become established after landscape-altering events, such as wildfires. Perennial grass cover reduces the danger of frequent wildfire by staying green longer and not growing as dense as cheatgrass and mustards. Eventually, native species could be reestablished on the site if exotic annual species are controlled and crested wheatgrass could be removed. Other exotic species used for the purpose of limiting cheatgrass establishment are listed in the Andrews/Steens PRMP/FEIS on page 3-16.

49. The BLM should pursue implied reserved in-stream flow water right for fish, recreation, channel maintenance, and wildlife purposes.

Response: There are no areas within the Project Area that streams on public lands do not have sufficient water to maintain channels, fish habitat, wildlife, and recreation.

50. The BLM should follow the BLM Prineville District example for acquiring in-stream water rights in the John Day River.

Response: See Response to comment number 49.

51. Why are some portions of the Steens Act cited in the EIS and not those that invoke other uses such as recreation?

Response: Recreation is an authorized and an acceptable use of public lands that would continue under the project proposal. Benefits to recreation are possible under the proposal.

The Steens Act is available in its entirety in the Andrews/Steens PRMP/FEIS (Appendix A) or on-line at http://www.blm.gov/or/districts/burns/files/PL106-399.pdf.

52. The BLM blames past grazing practices as one factor contributing to the current situation. What evidence supports the claim current grazing practices are different from past ones?

Response: Current grazing practices are designed to take into account growth and reproduction needs of key forage plant species including native grasses and shrubs. Pastures are grazed in rotations where forage species can grow and reproduce at least 1 year in 3 to keep root reserves replenished and plants healthy and vigorous. Many past grazing practices did not take into account the importance of growing season rest, and perennial plants died from weakened conditions caused by yearlong grazing use compounded by occasional drought conditions. There has been research done on both riparian and uplands indicating how timing and duration of grazing affects certain forage plant species (Vavra 1994).

53. The restoration plan is flawed and cannot completely restore the Project Area without removing stressors contributing to the situation.

Response: The BLM manages public lands for multiple uses. Complete restoration is not possible where other continuing uses such as recreation and commodity production occur. The BLM proposes to restore a more functional ecosystem that also allows for other authorized uses of public lands.

54. The EIS must include alternatives that propose reductions in and elimination of grazing in the Project Area.

Response: See Response to comment number 39.

55. Grazing must end in the Project Area to properly restore the ecosystem.

Response: See Responses to comment numbers 24, 29, 30, and 52.

56. The current range of alternatives is inadequate in serving NEPA's primary purpose of fully informed decision making.

Response: For purposes of comparison and analysis six alternatives have been formulated and offered for public consideration. The alternatives consider a panorama of levels of resource treatment ranging from no treatment to intense management. All "action alternatives" except the No Treatment Alternative meet the purpose and need driving the proposal. The BLM considers the range of alternatives adequate, and meets requirements of NEPA.

57. The EIS proposes to increase forage in the area, but does not say if the same numbers of livestock would be permitted to graze in the area.

Response: See Response to comment number 39.

58. The EIS suggests season of use might increase in the Project Area.

Response: Season of use may be shifted based on key forage species. Length of time may increase or may be reduced based on utilization of these species. The key factor is utilization, or the amount of plant material removed. Livestock numbers and utilization will not be changed under this EIS. Alteration of those numbers will need to be addressed under a separate NEPA document.

59. The EIS does not indicate if the lands proposed for treatment are meeting the Standards of Rangeland Health regulations, 43 CFR Part 4180.

Response: Five of the ten allotments in the area proposed for treatment have been inventoried for Rangeland Health Standards. All of these allotments are currently meeting the Oregon and Washington Standards for Rangeland Health.

60. Why are proposed treatments not tested solely in the WJMA first?

Response: The proposed treatments have been subjected to considerable scientific scrutiny. Much of the applicable research was conducted within the North Steens Project Area. The BLM has utilized these juniper management methods in past projects. The WJMA would serve as an educational tool for informing interested members of the public about more common juniper management methods.

Other juniper management techniques and philosophies have not been as equally tested or may not have been developed yet. For these techniques and other unknown ones, the WJMA will serve as an experimental as well as an educational project.

61. In the FEIS the BLM should address the role of the WJMA in the larger planning effort.

Response: See Response to comment number 60. An explanation of the WJMA project has been added to the text.

62. Why is the WJMA relegated to a project unit in the EIS?

Response: The WJMA is no longer relegated to a project unit in the EIS (see Response to comment number 35).

63. The science of juniper management is rapidly evolving and has significant knowledge gaps.

Response: On the last page of *Biology, Ecology and Management of Western Juniper*, Miller and associates (2005) state, "A great deal has been learned about the ecology, biology, history, and management of western juniper over the past several decades. However, not all questions have been answered in some areas somewhat limiting our ability to manage western juniper on an ecosystem basis." The authors then list eight main areas of ecology and biology and five areas related to management that information is limiting in some manner.

A review by Belsky (1996) outlined areas where there were some gaps in information and where management decisions had been based on anecdotal evidence. However, Miller and associates (2005) have illustrated that recent, ongoing research has and is continuing to address many concerns raised about western juniper control. Main areas where knowledge gaps still occur are nutrient cycling and hydrologic processes. In the recent publication, *Biology, Ecology and Management of Western Juniper*, there are 128 publications cited that directly tie to western juniper management. Sixteen of those publications are Master of Science thesis or PhD dissertations. Forty-seven publications directly tie to Steens Mountain. Several studies now provide information from treatments over 10 years old.

The Burns District of the BLM works closely with the EOARC. Many current management practices employed by the District are based on research results conducted locally by the EOARC scientists. In addition, some research projects related to western juniper are based on questions raised by Burns District staff.

64. Minimum tool analysis must occur for any proposal in wilderness.

Response: A PDE has been added.

65. The BLM must rest lands for at least 5 years following treatment.

Response: See Response to comment numbers 29 and 71.

66. Based on the primary purpose of the Steens Act, the EIS should set aside significant portions of the Project Area to provide for trend evaluation of treated vs. untreated lands.

Response: The BLM believes the proposal is in conformance with the Steens Act. Under the Preferred Alternative, the entire Steens Mountain Wilderness Area would potentially serve as a landscape level control plot.

67. Juniper treatments should be limited in wilderness, WSAs and areas with documented wilderness values until BLM has developed and evaluated such treatments in the WJMA.

Response: See Response to comment number 70 with regard to "areas with documented wilderness values."

68. The road maintenance PDE is unlawful because the BLM has not completed the comprehensive transportation plan.

Response: The Steens Mountain CMPA RMP (August 2005) included a Transportation Plan assigning maintenance levels for roads within the CMPA. Maintenance levels include a description of standards and conditions of roads within each level. These maintenance standards would not be exceeded while implementing selected actions identified in the North Steens EIS. Refer to page 62 of the CMPA RMP/ROD for assigned maintenance levels and page 2 of Appendix M for a description of each maintenance level.

69. BLM does not discuss impacts of the road maintenance PDE on wilderness values.

Response: Roads would be maintained in accordance with standards identified in the CMPA RMP. Wilderness values of solitude and primitive and unconfined recreation could be temporarily affected by presence and sounds of vehicles using roads. Additional language has been added concerning road maintenance along WSA boundaries.

70. The EIS does not consider impacts to wilderness values documented in WSA proposals submitted to BLM. The impacts of any proposed action on these documented values must be evaluated.

Response: The BLM evaluated all WSA proposals submitted during the Andrews/Steens RMP process. Five proposals were within the North Steens Project Area. Proposals included lands inventoried in the late 1970s as part of the Bridge Creek (2-87), Moon Hill (2-88), Blitzen River (2-86), and South Steens (2-85) Inventory Units. The BLM's Intensive Inventory (1981) found none of the specific proposal areas had wilderness character. A BLM IDT reviewed the WSA proposals and reached the same conclusion as the previous BLM inventories - "the areas lack wilderness characteristics."

Because none of the WSA proposals within the North Steens Project Area were found to have wilderness characteristics, there is no requirement to further analyze or protect values the BLM has found not to be present.

Additional text has been added to Section 3.2.4.6

71. Recent research that looked at a Steens Mountain case study concluded the site in that study required several seasons of rest prior to treatment to establish maximum elements of site recovery.

Response: Miller and associates (2005) point out grazing management following western juniper control requires thorough consideration of when to reintroduce livestock after treatment. They state there are no

set prescriptions for reintroduction of grazing after western juniper control. Variability in climate and inherent site characteristics limits the ability of managers to use a standard grazing prescription. Grazing management must remain flexible and require constant assessment to achieve restoration goals. In the short term, plants must be permitted to grow and produce seed. The amount of time grazing must be deferred will largely depend upon conditions of the understory plants prior to treatment, resilience of the site and recent climatic trends.

In the study cited in Miller et al. (2005), plant cover, biomass and density were not different between cut-grazed and cut-ungrazed treatments. This study has since been published in the journal *Rangeland Ecology and Management*. Bates (2005) found grazing cut areas did reduce perennial grass seed production when compared to the cut-ungrazed treatment. Reduction in seed production did not appear to affect the post-treatment density. Apart from affecting perennial grass seed production, cattle grazing after cutting did not limit herbaceous recovery during relatively dry years of the study (Bates 2005). The author points out timing of grazing is important. Grazing can occur during the growing season if plants have adequate soil moisture and time to complete their growth cycle (produce seed) after grazing has ended. Grazing during the active growth phase removes tillers (stems) that must be replaced by the plant from auxiliary buds. Replacement of these tillers delays growth and reduces plant productivity in the following growing season (Ganskopp 1988). Grazing in the fall may not present the same reduction in following growing seasons (Miller and Rose 1992).

In the short term, treated sites require rest or deferment for the first several growing seasons if the objective is to maximize perennial grass seed crop. Longer-term considerations require treated sites be managed to permit germination and establishment of new and desired individuals from seed crops produced during early succession (Bates 2005). Grazing during restoration may slow recovery of perennial grasses (Svejcar 2006). The manager must be cognizant of potential effects and monitor plant community responses closely following reintroduction of livestock. The primary goal remains the same when grazing treated areas, permit recover of the ecologic function (hydrologic and energy) following treatment (Eddleman 1999).

72. BLM does not say how it will determine if a treated area must rest beyond the two season minimum requirement.

Response: The BLM Burns District will utilize a standard of at least two desirable perennial plants per $10ft^2$.

73. The WJMA will be critical for establishing effects of treatments on grazed vs. ungrazed areas.

Response: The initial plots in the WJMA would be excluded from grazing following treatment. Other plots established in the future may be grazed or could use grazing as a post-treatment management tool.

74. The Steens Act prohibits the possibility of reseeding existing crested wheatgrass seedings in the CMPA.

Response: The possibility of reseeding existing crested wheatgrass seedings is not prohibited within the Steens Act. The majority of the existing crested wheatgrass seedings in the CMPA are not within the North Steens Project Area, therefore, not considered within this document.

75. The DEIS states there are very few acres of crested wheatgrass seedings in the Project Area, but other information says there are 24,768 acres of seedings in the CMPA. Please explain this discrepancy.

Response: The North Steens Project Area does not include all portions of the CMPA. Most crested wheatgrass seedings are within lower elevation portions of the CMPA and are not included in this analysis. These lower elevation areas are ecologically different from the vast majority of the North Steens Project Area. Areas of lower elevation in the CMPA tend to be dominated by Wyoming big sagebrush communities or potential communities where the proposed treatments in the EIS are severely restricted due to resource concerns.

A map with existing seedings in the Project Area is included on the CD (CD-2).

76. The BLM does not have sufficient site-specific information regarding eligible sites for inclusion in the National Registry of Historic Places.

Response: This information has been acquired and is documented within the EIS (Section 3.2.4.1). The information acquired prior to plan implementation is what is required. The BLM (or any other agency) is not required to define whether or not each and every archaeological site within a planning area is eligible for inclusion in the National Register of Historic Places. They are required to initiate the Section 106 process early enough in the NEPA process.

77. The project falls within the broad meaning of undertaking in the NHPA.

Response: As shown within the DEIS, Section 106 work for this project was implemented because "…This broad-scale, significantly ground-disturbing, project falls well within the broad meaning of "undertaking" in the NHPA."

78. The BLM was asked to discuss direct, indirect, and cumulative effects of the proposal on sage-grouse. The BLM failed to do this adequately and did not provide the requested maps.

Response: Detailed analysis of direct and indirect effects to sage-grouse can be found in the DEIS on the following pages: 68, 82, 89, 102-103, and 115. Cumulative effects analysis relies on direct and indirect effects and looks at past and future treatments in the area of this project to determine scale of these effects. Discussions of cumulative effects for different alternatives can be found in the DEIS on pages 132, 139, 145, 151, and 159. A map with sage-grouse lek locations was included on the CD sent out with the DEIS. A map showing sage-grouse habitat was not included since it was described in the Affected Environment on page 31 of the DEIS as being yearlong habitat in the Project Area. This has been a collaborative effort between the ODFW and the BLM over several years to define these areas. An additional map showing wildlife range for deer, elk, spotted frog, bighorn sheep, and greater sage-grouse lek buffers is included with the FEIS (Map CD-3).

79. The BLM must complete TMDLs for the Project Area.

Response: The DEQ is the agency responsible for completing TMDLs. The DEQ is scheduled to complete a TMDL for the Donner und Blitzen watershed in 2010. The BLM is planning to complete a WQRP for the Donner und Blitzen watershed before or shortly after DEQ develops the TMDL for the watershed. It is highly likely BLM would propose the same or similar actions through the WQRP to restore watershed health as it is currently proposing with the North Steens Project.

80. BLM must comply with water quality mandates under FLPMA and the Clean Water Act.

Response: Riparian and water quality are expected to improve over current conditions after juniper is removed from the riparian areas. Any action improving watershed conditions complies with FLPMA and the CWA.

81. The BLM fails to identify primary causes of watershed degradation in Chapter 3 of the EIS.

Response: Please see Response to comment number 24.

82. The BLM must have a baseline for sedimentation rates.

Response: Any baseline measurement of sediment within a stream or river system must have meaningful context under which it can be interpreted. Presently, there is no DEQ standard against which to measure turbidity (which is a consequence of elevated sediment production from uplands and riparian areas). Therefore, baseline data for (presumably instream) sediment rates would not have much meaningful application to assessing effects from the proposed juniper treatments. For streams in the Project Area, critical effects of excessive sediment are interrelated elements of riparian functioning condition and spawning fish (primarily salmonids). Riparian PFC Assessments specifically examine whether a "stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)." The IDT also examines qualitative aspects of flood plain and channel characteristics, presence and status of point bars, lateral stream movement in relation to potential natural sinuosity, and vertical stream stability, all of which are influenced by sediment inputs and sediment movement through stream

systems. If these indicators continue to support a determination of riparian PFC or an upward trend while functioning at-risk, sediment is unlikely to be contributing to degradation of aquatic habitats. Therefore, BLM considers continued monitoring and reassessment of riparian functioning condition and upland rangeland health standards as part of rangeland health assessments to be an adequate surrogate for direct sediment monitoring.

83. Under each alternative there is a risk of sedimentation and temperature effects on water quality limited streams.

Response: There is always some level of risk associated with land management activities and there is risk from doing nothing. The DEIS does state there is a risk of elevated levels of sediment and temperature to the streams within the Project Area. The DEIS also identifies the risk associated with the No Action Alternatives. The key concerning risk is, "What level of risk?" The level of risk for measurable impacts on the aquatic ecosystem from sediment input and increases of temperatures as a result of the proposed action is low. The next question is, "Why is the overall risk of negative impacts from sediment and raised water temperatures low?" The answer is PDEs and results or experience from similar activities. As described in the EIS, each unit will be analyzed before implementation of fuels reduction. Riparian areas will be evaluated by a fisheries biologist or hydrologist prior to implementation of fuels reduction activities. Site-specific protection and recommendations will be made for sensitive or degraded areas. Riparian areas with heavy fuel loads would be pre-treated by hand removal of fuels, spreading them through the uplands so the fire will not burn too hot in riparian areas. Large juniper trees in riparian areas will be cut and then burned during winter or early spring months to reduce impacts.

The risk from no action is also present and may be higher than for the proposed action. Under the No Treatment Alternative, juniper would continue to encroach into riparian areas and desirable riparian vegetation would diminish. This would likely lead to increased long-term sediment inputs and lower levels of nutrients in the streams for years. Bank stabilizing plants would be lost as juniper move into riparian areas and stream stability would be reduced. Channels would likely become wider and shallower, more homogenous, leading to increased temperatures, and loss of habitat complexity.

84. The BLM will violate the CWA unless one or more TMDLs are completed.

Response: The DEQ has reviewed our proposed action and has agreed with the BLM's conclusion that long-term beneficial effects to aquatic ecosystem health of the action outweigh potential risks and short-term impacts. They support the project as described in the EIS and support the action going forward before completion of the TMDL. As mentioned in Response to comment number 79, the BLM would most likely propose the same treatment in a WQRP in order to improve riparian and aquatic conditions within the Project Area.

85. Areas where soils have been disturbed before or during implementation should be closed to grazing until recovery occurs.

Response: The BLM currently has no policy for limiting grazing in areas where soils have been disturbed by mechanized equipment. If the disturbance is large enough to warrant rehabilitation, those areas would be reshaped and seeded using native species if possible. Areas burned are currently rested from grazing by BLM policy for a minimum of two full growing seasons.

86. The BLM must minimize effects of the proposal on biological soil crusts.

Response: The BMPs have been developed for this project and are included in the EIS as PDEs. These BMPs are designed to minimize potential negative effects on biological soil crusts.

87. The EIS should commit to gathering biological soil crust data as part of the adaptive management process. This also applies to the WJMA.

Response: The EIS proposes to monitor biological soil crusts in the Project Area through implementation of the Steens Mountain CMPA Monitoring Plan. Additional plots may be established in the WJMA in the future. These plots could include monitoring response of biological soil crusts.

88. The failure of BLM to prepare a transportation plan may impact proposed WSAs. BLM has not analyzed these impacts to documented wilderness values.

Response: Parcels with wilderness characteristics are not provided special management status and are managed in accordance with the RMP. See Response to comment number 70.

89. The BLM relies of GIS database information. Any and all data or analysis must be contained in the EIS.

Response: Impact analysis is based in part on information contained in GIS databases, as well as, but not limited to, a wide range of reference material, and knowledge derived from experience of BLM personnel and specialists from participating cooperating agencies. Relevant GIS information is not independent of information utilized in the EIS, but is an integral basis of current and past knowledge of resource conditions upon which the analyses depend. Information contained in GIS databases is exhibited throughout the document. Data used to facilitate and support management decisions are contained within the document.

90. The EIS does not contain any references in support or opposition of its conclusions.

Response: References are used throughout the document and a list of references can also be found in Chapter 6, Bibliography.

91. The DEIS does not adequately discuss cumulative impacts to the wilderness resource.

Response: Cumulative effects to wilderness from the alternatives are discussed in Sections 4.12.12, 4.14.12, 4.16.12, 4.18.12, and 4.20.12 of the DEIS. Cumulative effects to WSAs are discussed in Sections 4.12.13, 4.14.13, 4.16.13, 4.18.13, and 4.20.13 of the DEIS. Also, see Response to comment number 69.

92. The FEIS should contain proposed WSA inventory maps submitted to BLM, but never considered.

Response: See Response to comment number 70.

93. Large blocks of continuous sagebrush must be retained during the life of the project.

Response: Continuity of sagebrush cover would be determined when treatment units are established. Large continuous areas of sagebrush would be left within the 2-mile lek buffers since treatment would consist of only cutting and jackpot burning of juniper within these areas. Outside the 2-mile lek buffer, low sagebrush and half or more of big sagebrush with no juniper or early transitional juniper would be left.

94. Please provide acre estimates of habitat where cutting, jackpot burning, individual tree burning, and broadcast burning in early, mid- and late transition to juniper woodlands could occur over the life of the project.

Response: Table 1 in the FEIS estimates the amount of acres of habitat potentially treated under each alternative including the Preferred Alternative. This table has been expanded and clarified in response to public comments on the DEIS.

95. Identify how impacts to Special Status Species would be avoided. Where it is not possible to avoid impacts to a Special Status Species, identify specific mitigation measures (i.e., surveys, nest buffers for raptor nests).

Response: The PDEs for Special Status Species were designed to protect or minimize effects of treatments on certain habitats upon which those species depend. The PDE Number 12 deals directly with preserving low sagebrush areas by only cutting and jackpot burning or burning standing juniper instead of trying to broadcast burn in low sagebrush which can take 100+ years to recover. The PDE Number 4 deals with

treatments within the 2-mile lek buffer which preserves both big and low sagebrush habitats within that buffer. This will retain not only sage-grouse habitat but habitat for sage-dependent migratory birds and other wildlife. A map showing wildlife range for deer, elk, spotted frog, bighorn sheep, and greater sage-grouse lek buffers is included with the FEIS (Map CD-3).

Some surveys for raptors have already been completed in the Project Area but more will be completed as the project progresses. If nest trees are identified for Northern goshawks, those trees will be avoided as is stated on page 90 in the DEIS. Project work will only be completed when the goshawks are not present and the nest tree will be retained. Burning around the nest tree would probably continue to reduce the number of juniper trees. Most of these trees would be cut prior to burning. A specific buffer has not been designated to allow for the treatment of juniper in aspen stands. For Swainson's hawks, nest trees will be retained as is described in PDE Number 8.

96. The analysis in the EIS must consider pages 77-78 of the "sage-grouse plan."

Response: Many of these disadvantages are currently discussed in the analysis but are discussed in terms of proposed treatments and their effects on different habitat for different species whether it is migratory birds, Special Status Species or wildlife in general. As an example, on page 89 of the DEIS, the discussion of treatments around leks analyzes advantages of cutting while the general discussion of treatments outside lek buffers analyzes disadvantages to sage-grouse habitat from cutting and broadcast burning.

97. Identify how treatments would be applied in each transitional stage of juniper establishment and in each major affected plant community type.

Response: See Responses to comment numbers 10 and 12.

98. More detail is needed to understand impacts of the proposal to watersheds and how disturbances would be spread over time.

Response: Affects to individual watersheds were not described because treatment areas (units) are not based on watershed boundaries, rather on vegetation types. There may be units encompassing a majority of a watershed. Where this is the case, adjoining units or remaining units within the same watershed will not be treated until a desired level of recovery has been achieved in the previously treated unit. This will reduce the level of impacts to individual watersheds.

In addition, each unit would be evaluated by an IDT to determine treatment priorities and resource concerns. By doing this, each unit would be treated in a manner that would meet management objectives, with a focus on riparian area conservation and enhancement. Assessments would be completed during and after treatment to better control management actions and results.

99. BLM should analyze impacts to watershed function at the 6th field HUC scale.

Response: Project objectives are the same across all 6th field watersheds. Therefore, impacts are expected to be relatively similar across the Project Area watersheds. Treatments within 6th field HUCs will be spread out over time to reduce likelihood of cumulative affects.

100. The agency used very old references for justification in the document.

Response: Although some historical references are quite dated, summarized research in many publications will often quote pivotal research from the past as well as modern research. The EIS presents appropriate citations where resource specialists wanted to highlight relevant literature. The BLM often uses professional opinions of resource specialists on staff to guide the decision making process.

101. The EIS historical discussion begins with cattle ranchers and is not sufficient.

Response: The EIS presents a summarized version of many influences, practices and events contributing to the current juniper expansion (see DEIS at 123-130). This discussion includes an interesting comparison

of the ebb and flow of juniper populations over the last 10,000 years compared to recent (post-1870) expansion.

102. The EPA BMPs for drinking water sources and drinking water protection should be incorporated into the FEIS.

Response: Water from the Project Area is not used for municipal drinking water.

103. The use of a model such as WEPP may help to address the relative importance of roads, wildfire, prescribed fire, and other treatments in impacting watershed stability and function across the scales of size you propose.

Response: The WEPP is a process-oriented, continuous simulation, erosion prediction model. It is applicable to small watersheds (field-sized or up to 640 acres). The best use of WEPP (and other erosion models in general) is as a comparative tool for estimating the potential for sheet and rill detachment and deposition, and channel detachment and deposition between different land disturbances, not as an absolute predictor of the amount of erosion that will occur. The WEPP does not include fields for permanent disturbances such as roads in its simulation. The WEPP, as well as other erosion models, has an inherent error of plus or minus 50%, and does not apply to watersheds having incised, permanent channels such as classical gullies and stream channels. In terms of measured erosion, the type of ground cover as input to WEPP is not nearly as important as the percent of ground cover, which does address the fundamental problem that occurs when juniper intercepts precipitation that in turn never infiltrates into the ground. Also, WEPP does not route sediment into streams and cannot predict the actual amount of sediment delivered to streams.

Given the limitations constraining the use of WEPP (large treatment areas, poor application to problems associated with cover by juniper, and watersheds with permanent stream channels), the BLM has chosen to rely on peer-reviewed, published literature and evidence observed after fire has occurred on Steens Mountain to document anticipated effects from the proposed alternatives. The EIS references a study completed on Steens Mountain (Miller et al. 2005) that clearly demonstrates sediment yield and erosion are higher in a juniper-dominated plant community than in communities in which juniper remains absent or is a minor component. Simulated rainfall from a large thunderstorm (equal to a 50-year event) produced 275 pounds/acre of sediment from a Stage III western juniper woodland. The same intensity of simulated rainfall produced 0 pound/acre of sediment from a cut unit (Pierson et al. 2003). During large thunderstorms, rill erosion on a western juniper hill slope was over 15 times greater than on the hill slope where western juniper was previously cut.

104. Table 1 in the EIS must be expanded to include estimates and comparisons of effects to other resources across the alternatives.

Response: Changes have been made to Table 1 and other portions of the document to increase clarity and to facilitate comparison of alternatives.

105. The BLM should develop a smoke management plan with the State of Oregon.

Response: The areas in the proposed Project Area are currently outside the Oregon Smoke Management Plan. The Burns District voluntarily reports smoke from prescribed burn projects. The Burns District will comply with the new Oregon Smoke Management Plan when the draft is finalized.

106. The EIS did not discuss any source water areas in the Project Area which raises concerns about impacts to source water.

Response: The Project Area does not contain source water areas. Water for domestic use for local landowners comes from individual wells. The proposed project will not impact wells in the area.

107. Include a list of 303(d) listed streams in the Project Area.

Response: Streams on the 303(d) list are identified in Chapter 3 of the DEIS.

108. The EIS should discuss fire retardants and their impacts to resources.

Response: The BLM will follow all laws and agency policies regarding use of fire retardants.

109. Under the Limited and Full Treatment Alternatives the environmental consequences section identifies areas treated next to seedings on the north and west sides of the Project Area would create "greater voids of nonsuitable habitat for sage-grouse." Please analyze the effect of these voids and possible measures to minimize impacts to sage-grouse.

Response: The effect of these voids would be a greater area of unsuitable habitat for sage-grouse within the Project Area. Since the crested wheatgrass seedings are in lower elevation Wyoming sagebrush habitat, possibility of these areas returning to a usable sagebrush canopy cover during the life of the project is small. It would take more than 40 years for reestablishment of sagebrush since there would be very little seed source left. Also, many areas with big sagebrush around the seedings have cheatgrass in the understory which would increase in these sites after treatment. This would require restoration activities to try to return these areas to a perennial plant community. While sage-grouse have been observed in some crested wheatgrass seedings using early green forage, these areas usually have some sagebrush canopy cover. The text has been changed.

A map showing wildlife range for deer, elk, spotted frog, bighorn sheep, and greater sage-grouse lek buffers is included with the FEIS (Map CD-3).

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