2008 Juniper Disposal EA
(FTZ 95-71, Dog Hollow, Copeland)

Environmental Assessment
EA #OR-014-08-06

USDI Bureau of Land Management
Klamath Falls Field Office
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Klamath Falls, Oregon 97601

Clean Juniper Chips

Dog Hollow – Cut & Piled Juniper

East Fork Western Juniper Pile Burning (2008)

ABSTRACT: The primary method of treating encroaching western juniper in the KFRA has been to cut, pile, and burn the material. There is an increasing demand from the public and forest industry sector to utilize western juniper for various products. This Environmental Assessment (EA) will analyze the environmental effects associated burning, leaving, or removing and utilizing the existing piles of western juniper from fuel treatment units: FTZ 95-71, Dog Hollow and Copeland. A total of approximately 2,300 acres will be analyzed. A subsequent EA will be prepared in 2009 to analyze disposal effects to the remaining cut and piled areas.

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FREEDOM OF INFORMATION ACT AND RESPONDENT'S PERSONAL PRIVACY INTERESTS: The Bureau of Land Management is soliciting comments on this Environmental Assessment. Comments, including names and street addresses of respondents, will be available for public review at the above address during regular business hours. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

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CHAPTER 1 - INTRODUCTION

This 2008 Juniper Disposal Environmental Assessment (EA) will analyze the effects of potential treatments of previously cut and piled western juniper in fuel treatment units on approximately 2,300 acres in three units: 95-71, Dog Hollow, and Copeland. The location of the project areas are shown in Table 1 and the General Location Map. The previously accomplished cutting and piling treatments were discussed and disclosed in documents prepared earlier in compliance with the National Environmental Policy Act (See Appendix C for a complete list). There is an increasing demand from the public and forest industry sector to utilize western juniper for various products. Therefore the Bureau of Land Management (BLM) is considering utilization of the juniper and the potential effects of yarding the piles. If not appropriate to yard and utilize the material then the possible treatments would include burning the piles or leaving them lay.

This EA will specifically address the effects and impacts of:

1. Removing the western juniper either by burning or yarding and utilizing the material for various products.
2. Different yarding and removal methods including using full suspension or one-end suspension yarding techniques.
3. Different mitigation measures designed to reduce impacts associated with the different removal methods.
4. Leaving the cut and piled juniper on the treatment units.

This EA will analyze the effects and impacts to air quality, vegetation, rangeland health, grazing, soils, wildlife, socio-economics, hydrology, and fisheries.

The 2008 Klamath Falls Resource Management Plan (2008 RMP) provide direction for managing lands on the BLM, Lakeview District. At the time that the planning and analysis of these juniper treatments was being completed, management of BLM lands was based on direction in the 1995 Klamath Falls Resource Area Resource Management Plan (1995 RMP). On December 30, 2008 the Record of Decision and Resource Management Plan (2008 ROD) was signed for the Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (October, 2008) including the Klamath Falls Resource Area. The analysis in the FEIS was in support of the process for Revision of the 1995 Klamath Falls Resource Area Resource Management Plan (1995 RMP).

Revision of a resource management plan necessarily involves a transition from the application of the old resource management plan to the application of the new resource management plan. A transition period from the old resource management plan to the new resource management plan avoids disruption of the management of BLM-administered lands and allows the BLM to utilize work already begun on the planning and analysis of projects. Since the planning and design for this project was initiated prior to the 2008 ROD, this environmental assessment contains certain project elements that are not the same as the management direction contained in the 2008 RMP.

The aspects of this project that are based on the 1995 RMP but are different from the 2008 RMP include:

- The juniper woodland treatments involved with this project are in the “Other East Side”” land use allocation defined in the 1995 RMP. “Other East Side” as defined on page R-10 of the 1995 RMP included “all woodlands, commercial forest land outside matrix and Late Successional/District Designated Reserves, and non-forest lands”. The primary direction for these lands was to provide connectivity between biological communities, provide habitat for a variety of organisms, and provide for important ecological functions. Specific management direction included, “Manage range and

riparian-wetland areas in the Gerber Block for a mosaic of native plant communities. This mosaic will allow for migration and dispersal of organisms between BLM-administered lands and adjacent U.S. Forest Service lands. Reintroduce fire as a natural disturbance factor through prescribed burning."

The 2008 RMP now allocates most of the Gerber Block including the lands with the proposed project area to Administratively Withdrawn Areas. This land use allocation includes lands that have been withdrawn from the timber base and include areas identified as not capable of growing timber on a sustainable basis, or non-forest areas such as grasslands and shrub-lands. The management direction for these lands under the 2008 RMP as it pertains to this project proposal is almost identical. This analysis and the proposed action is to manage the areas as outlined in the 1995 RMP.

- Riparian Reserves - The 1995 RMP included designation and management of riparian reserves. These reserves were designed to manage lands along streams and water bodies (designated with specific "buffer" widths around each water feature) to limit bank erosion, ensure an adequate and continuous supply of coarse woody debris to channels, and provide shade and microclimate protection. The 2008 RMP established Riparian Management Areas with similar objectives, although the 2008 RMP the buffer widths are generally narrower. This proposed action maintains the wider buffer widths of Riparian Reserves as identified in the 1995 RMP.

The 2008 ROD anticipated these differences and projected they would not alter the analysis of effects at the scale of the associated final environmental impact statement. This project meets the requirements in the 2008 ROD for RMP transition projects because:

1. Preparation of National Environmental Policy Act documentation began prior to the effective date of the 2008 ROD.
2. A decision on the project will be signed within two years of the effective date of the 2008 ROD.
3. There would be no destruction or adverse modification of critical habitat designated for species listed as endangered or threatened under the Endangered Species Act.
4. A decision was not signed prior to the effective date of the 2008 ROD.

Note also that ROD or RMP page numbers referenced in this environmental assessment refer to the 1995 ROD/RMP.

Location

The Proposed Project Areas are located in various locations on Public Domain lands east of Klamath Falls, Oregon (See Table 1 and the General Location Map). All treatments proposed in this environmental assessment would occur exclusively on BLM-administered lands within the Klamath Falls Resource Area.

Table 1 – Location of BLM-administered Lands within the Analysis Area

Unit Name	Total Acres	Township	Range	Sections
FTZ 95/71	**840**	39S 39S 40S	13E 14E 14.5E	25,30,36 30 & 31 & 32, 6
Dog Hollow	**852**	40S 40S	14.5E 14E	5,6,7,8,17,18 1,12
Copeland	**610**	40S 40S	14E 14.5E	11,12,13,14,24 19
Totals	**2302**			

The units within the project area have differing densities of juniper piles. The potential soil and vegetation disturbance from either yarding or burning will vary according to the density of the piles. The amount of ground potentially affected by burning the piles at East Fork was found to be between 3% and 10%. At Dog Hollow, one of the denser areas was found to have a pile density (area covering ground) of 20%. For the sake of the analysis, ground covered by piles will be considered to be somewhere between 3% and 20%.

Purpose and Need for Action

Reduce Fuel Loading

In areas of juniper encroachment, much of it has been cut and piled to reduce competition and increase water availability for other more ecologically appropriate species of native vegetation. There is a need to reduce the density of these piles as they increase the fuel load and the wildfire hazard. Removal of the piled juniper, either by yarding or burning, would help accomplish these objectives.

Address an Increased Public Demand for Commercial Use

Within the KFRA, a need has been identified to analyze the effects and impacts of different disposal methods of western juniper once it has been cut and piled, including the yarding of the western juniper using standard ground based logging equipment. There is an increasing demand from the local public, forest industry sector, and biomass energy producers for western juniper and biomass. These products have historically been considered non-commercial forest products with minimal demand other than firewood. There is an increasing emphasis within the BLM locally and nationally to utilize residual vegetative materials that are generated from an assortment of vegetative treatments for biomass and energy production. Within a 100 mile radius of Klamath Falls, western juniper use includes:

- Sawlogs for dimensional lumber production and other products.
- Finely ground particles for door skins
- Clean chips for hardboard production
- Hog fuel for biomass energy production
- Organic post and poles for fencing
- Commercial and personal firewood
- An assortment of additional products such as furniture, flooring, absorbent, etc…

Need to Assess Ecological and Socio-Economic Impacts

In addition to the need to assess the increased public demand for western juniper for commercial use, the KFRA has identified the need to analyze the ecological impacts of disposing of western juniper in a variety of ways once it is cut. Most of the units that are presently cut and piled are located on juniper woodlands and rangelands. Along with the KFRA RMP, the BLM's Rangeland Health Standards provide guidance for managing these lands. There is a need to analyze where and how the KFRA can dispose of western juniper as well as meet the Rangeland Health Standards along with other management direction defined in the KFRA RMP pertaining to juniper woodlands and rangelands. In addition, air quality restrictions on open burning are becoming increasingly constraining.

Environmental Analysis and Decision Process

An interdisciplinary evaluation of the resources in the analysis area including range, wildlife, recreation, soils, fisheries, timber, cultural, hydrology, air quality, and hazardous fuels is documented in this environmental assessment. The analysis is accomplished by examining the different resources in the analysis area and recommending a course of action that best meets the objectives outlined in the Klamath Falls Resource Area Resource Management Plan. The analysis area can vary in size depending on the different resources.

This Environmental Assessment is tiered to the Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (2008) including the Klamath Falls Resource Area. The purpose of this EA is to assess the effects of the proposed treatments and to determine if the environmental effects associated with the proposed site-specific treatments are significant and/or greater than those already analyzed in the previous KFRA RMP EIS. If the effects are not significant or greater than analyzed in the KFRA RMP EIS, a Finding of No Significant Impact (FONSI) will be documented upon the completion of the analysis. In addition to providing analysis to determine whether or not an environmental impact statement is necessary, this EA will provide the public with information about the proposed treatments, describe the alternatives and the associated effects of each alternative, and assist the decision maker in selecting an alternative.

The KFRA Field Manager, as the responsible official, will determine whether or not the proposed action is consistent with the RMP as well as other laws and regulations (i.e., the Endangered Species Act and Clean Water Act, Rangeland Health Standards, etc.) and will decide whether or not to implement the proposed action. The proposed treatments or projects would span a 3-5 year period. Information obtained from biological surveys and consultation is included in the EA and will also be incorporated in the final Decision Record to this EA.

Public Input Summary and Issue Development

A public scoping letter on the proposed project and EA was sent out on March 26, 2008. Two written responses were received and one verbal response was received. The issues pertaining to this EA listed below were raised by members of the public and/or the Klamath Falls Resource Area's interdisciplinary team members. The issues and concerns raised were considered in formulation of alternatives (Chapter 2), the Affected Environment, Environmental Consequences sections and development of mitigation measures (Chapter 3).

Issue: Full and Complete Impact Analysis Are Needed on Proposed Juniper Projects.
A concern was expressed with the lack of up-front analysis of juniper cutting projects. The CXs for the projects which resulted in the existing piles of juniper were premised on the assumption that there would be no utilization, and thus no yarding impacts (road management, off-road equipment, soil and water disturbance, invasive weed spread, etc). Instead of a narrow CX for each cutting project, a comprehensive EA that looks at the impacts and options for both cutting and disposing of the cut material should be done.
Response: Although some of the individual CX's did address different methods for disposing of the western juniper including utilization or burning, the decision maker felt a more in-depth analysis (EA) was needed to assure adequate assessment of the environmental impacts associated with the different disposal methods, particularly the impacts of yarding the juniper for commercial purposes. This EA is a comprehensive analysis of different alternatives on the impacts of disposing of large concentrations of cut western juniper using different methods.

Issue: Connected Actions of Multiple Treatments
The commenter stated that the need for this juniper disposal EA proves that the numerous projects done under CXs are connected actions and should be analyzed under an EA in the first place. A complete EA for any juniper cutting action that addresses impacts and options for cutting *and disposal* should be done in the future. Due to the increase in categorically excluded projects, especially large fuels reduction and juniper cutting projects, the agency needs to consider these CXs as connected actions, and the agency should be considering the cumulative effects of these projects. CX projects, though limited in scope, do not take place in a vacuum and must be considered in context in the same way that EAs and EISs are.
Response: The individual units being considered under this EA, for which CXs were prepared, met the Departments of Interior and Agriculture definition of categorically excluded projects as defined in the Federal Register 67-77038. Cumulative effects are one of the criteria that are reviewed when preparing a CX determination.

Issue: No Opportunity To Comment on BLM CXs
The CX procedure the Klamath Falls Resource Area uses for projects like juniper cutting is insufficient to allow for public scrutiny. The projects are only briefly described in the project updates publication, with no timeline for public involvement. No information is sent to the public. The CXs are not put out to the public for a comment period as required by NEPA. On numerous occasions, requests to receive information on CXs have been made so public comment could be made.
Response: Although the KFRA uses the Quarterly Planning Update to notify the public of upcoming projects including CXs, the BLM is not required to perform public scoping on CXs because the treatments meet the definition of categorically excluded actions (67 Federal Register 77038). Healthy Forest Restoration Act CXs require a thirty (30) day review prior to implementation. The Public will have thirty (30) days to review and comment on this EA.

Other Issues Raised: Analyze a full range of alternatives including: Cumulative Impacts, Impact from roads & public accessibility, impacts to vegetation, soils, grazing, air quality, socioeconomics, and hydrology.
Response: Chapters 3 & 4 provide a detailed discussion on these issues and associated impact analysis. The alternatives developed and analyzed are design to address these issues.

Conformance with Existing Plans

This Environmental Assessment is tiered to the Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (2008) including the Klamath Falls Resource Area. As mentioned earlier, at the time the planning and analysis of these juniper treatments was being completed, management direction was based on the 1995 Klamath Falls Resource Area Resource Management Plan. The project design and recommendations for implementation are contained in the 1995 ROD/RMP. The proposed actions are also consistent with the management direction and guidance in the 2008 Record of Decision and Resource Management Plan (ROD/RMP) for the Klamath Falls Resource Area. This analysis is also tiered to a number of other supporting documents including:

- Klamath Falls Resource Area Integrated Weed Control Plan EA (July 21, 1993).
- Range Reform FEIS (August 1995).
- Final Environmental Impact Statement, Vegetation Treatment on BLM Lands in Thirteen Western States (1991).
- 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 (1997)
- Standards for Land Health for Lands Administered by the Bureau of Land Management in the States of Oregon and Washington (1998)
- Migratory Bird Policy
- Sage Grouse Management Policy

Specific Management Direction from the 1995 Klamath Falls Resource Area RMP pertaining to the different resources that are being analyzed:

The following management objectives are from the KFRA RMP and provide direction, guidance, and purpose for managing different resources on this project area of the KFRA:

1. Grazing - Provide for rangeland improvement projects and management practices, consistent with other objectives and land use allocations (Page 62 RMP).
2. Air Quality – Continue efforts to meet National Ambient Air Quality Standards, Prevention of Significant Deterioration goals, and the visibility protection plan (Page 27 RMP)

3. Air Quality – Maintain and enhance air quality and visibility in a manner consistent with the Clean Air Act and the State Implementation Plan (Page 27 RMP)
4. Wildlife - Enhance and maintain biological diversity and ecosystem health in order to contribute to healthy wildlife populations (RMP pg. 30)
5. Fire/Fuels Management - Use prescribed fire to meet resource management objectives. This will include but not be limited to fuels management for wildlife hazard reduction, restoration of desired vegetation conditions, management of habitat, management of fire dependent/adapted species, and silvicultural treatments (Page 75 RMP).
6. Noxious Weeds - Avoid introducing or spreading noxious weed infestations in any areas (Page 73 RMP).
7. Noxious Weeds - Contain and/or reduce noxious weed infestations on BLM-administered land using an integrated pest management approach (Page 73 RMP).
8. Special Forest/Natural Products - Manage for the production and sale of special forest/natural products when demand is present and where actions are consistent with primary objectives of the land use allocation (Page 57 RMP).
9. Timber - Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability (Page 26 RMP).
10. "Plan unscheduled harvest to manipulate stand density, composition, fuel loads or other features where the resulting stand will improve forest ecological condition, wildlife habitat, or other resource values. Specifically, plan harvest of marketable western juniper woodlands for improvement of forest or range land ecosystem or watershed conditions. Up to 1,000 acres per year of juniper woodland could be harvested for commercial forest products". BLM KFRA RMP 1995, pg 56.
11. Exclude fragile non-suitable sites from timber production base to minimize soil erosion and the effects of land management activities on surface waters (RMP pg. 30).
12. Manage uplands to maintain the following functions within site capabilities consistent with appendix D and consistent with other management direction… Plant cover and litter protect the soil surface from the evaporative effects of sun and wind. Plants are vigorous and productive and consist of desirable species (RMP pgs. 30-31.)
13. Conduct thinning of encroaching juniper to protect and improve forage areas for big game (RMP pg. 34).

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

Common to All Alternatives:

1. Fire wood cutting would not be allowed on the three units until after the BLM has first offered them for commercial utilization. If no commercial demand exists, the area would be opened to firewood cutters.
2. Subject to Item 1 above, firewood could be removed from accessible areas using standard pickup trucks subject to normal BLM seasonal restrictions on firewood cutting for wet soil conditions.
3. In some locations where firewood cutting is allowed, it may be necessary, to re-pile the limbs once the firewood cutters have removed the main bole of tree. The BLM would use a small machine like a bobcat to re-pile the material (mostly limbs) to facilitate burning.
4. All cultural and sensitive sites would be protected. No yarding or burning would occur on identified cultural sites or other sensitive areas that were protected during cutting operations.

Proposed Action – Utilize Juniper – Mechanically Yard – One-End Suspension

- Mechanically yard western juniper currently lying on the ground or in piles, suspending one end of the trees during yarding.

- Approximately 2,300 acres would be yarded from units listed in Table 1.
- Juniper would be yarded using standard logging equipment; rubber tired grapple skidder to transport the cut and piled wood to permanent and temporary haul roads.
- Construct approximately three miles of temporary roads to access piles and facilitate access for chip vans and grinders (See Table 2).
- Obliterate all new temporary roads upon completion of the yarding and hauling.
- Improve and maintain approximately 20 miles of existing haul roads including; grading, rocking, culvert cleaning, brushing, and water barring.
- Seed and/or plant with native vegetation all disturbed areas and/or where native plants occur at low densities.
- Some planted vegetation would also be fitted with protective plastic mesh tubes to protect the young plants from being browsed. (Assumption: Approximately 5-20% of the yarded areas would be tubed.)
- Residual landing material and piles in inaccessible areas would be burned after utilization operations are complete.
- In Riparian Reserves including around Meadows, western juniper piles would be removed by using only full suspension yarding.
- Individual landing sizes would be limited to less than one acre and no more than 3% of the yarded area would be in landings.

Alternative One – Utilize Juniper - Mechanically Yard - Full Suspension

- Mechanically yard western juniper currently lying on the ground or in piles, fully suspending trees during yarding.
- Approximately 2,300 acres would be yarded from units listed in Table 1.
- Juniper would be yarded using standard logging equipment; rubber tired grapple skidder or rubber tired forwarder to transport the cut and piled wood to permanent and temporary haul roads.
- Construct approximately three miles of temporary roads to access piles and facilitate access for chip vans and grinders (See Table 2).
- Obliterate all new temporary roads upon completion of the yarding and hauling.
- Improve and maintain approximately 20 miles of existing haul roads including; grading, rocking, culvert cleaning, brushing, and water barring.
- Seed and/or plant with native vegetation all disturbed areas and/or where native plants occur at low densities.
- Some planted vegetation would also be fitted with protective plastic mesh tubes to protect the young plants from being browsed. (Assumption: Approximately 5-20% of the yarded areas would be tubed.)
- Residual landing material and piles in inaccessible areas would be burned after utilization operations are complete.
- In Riparian Reserves and around Meadows, western juniper piles would be removed by using only full suspension yarding.
- Individual landing sizes would be limited to less than one acre and no more than 3% of the yarded area would be in landings.

Alternative Two – Burn Only

- When feasible, burn all existing piles. All burning would be in accordance with approved burn plans after firewood cutters have been give the opportunity (1-2 seasons) to remove accessible wood.
- Seed and/or plant with native vegetation all disturbed areas and/or where native plants occur in low densities. Some planted vegetation would also be fitted with protective plastic mesh tubes

to protect the young plants from browsing… (Assumption: Approximately 5-20% of the burned areas would be seeded and/or planted and tubed.)

- No temporary roads would be constructed.
- Some piles in sensitive riparian areas or near cultural sites would be left unburned or relocated prior to burning using low impact transporting methods or manual transport to reduce ground disturbance.

No Action Alternative

This alternative proposes no new management activities in the project area.

The No Action Alternative would:

- Leave all existing piles – no burning or yarding would occur.
- Allow firewood to be removed from accessible areas using standard pickups.
- No temporary road construction.
- Some seeding and planting and tubing would occur under existing CX's.

Table 2 – Comparison of differences between the Proposed Action and No Action

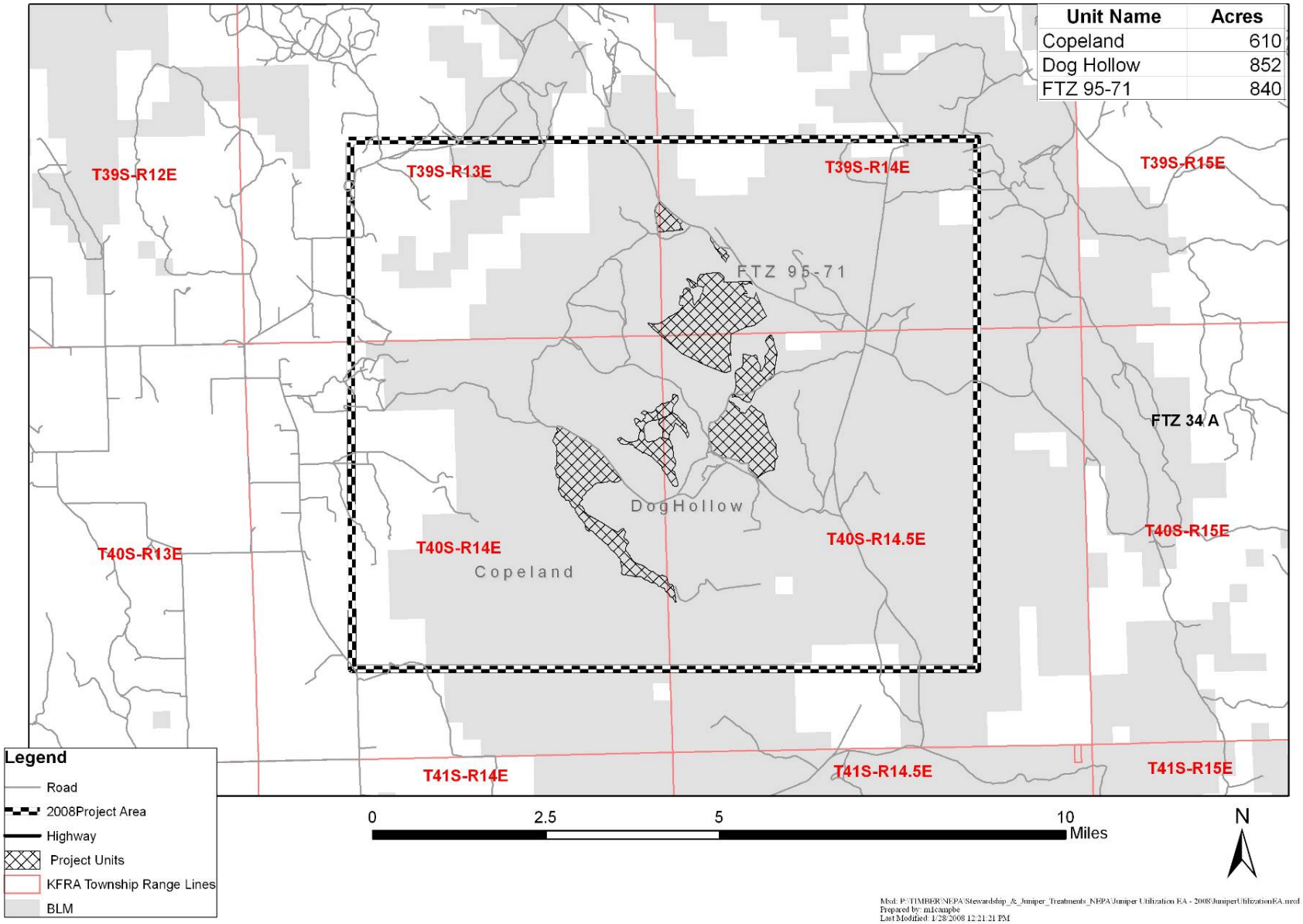
Treatment	Proposed Action (Mechanically Yard – One End Suspension)	Alternative One (Mechanically Yard – Full Suspension)	Alternative Two (Juniper Disposal through Burning Only)	No Action (No Burning or Yarding)
Yarding (Acres)	2,000 - 2,300 acres	2,000 - 2,300 acres	None	None
Burning (Acres)	100 - 300 acres	100 - 300 acres	2,000 – 2,300 acres	None
***Firewood Cutting (Where Accessible)**	* Up to 2,300 acres	* Up to 2,300 acres	* Up to 2,300 acres	* Up to 2,300 acres
Estimated Miles of Temporary Road Construction	Up to 3.0 Miles	Up to 3.0 Miles	None	None
Planting (Acres)**	Up to 1,000 acres	Up to 1,000 acres	Up to 1,000 acres	0
Seeding (Acres)**	Up to 2,300 acres	Up to 2,300 acres	Up to 1,000 acres	0
Piles In Riparian Reserves	No Yarding	No Yarding	Some burning allowed	No burning or yarding
Fence Construction / Repair	Up to 3 Miles	Up to 3 Miles	None	None
Riparian Reserves and Dry Meadows	Full suspension only	Full suspension only	No removal in Riparian Reserves	No removal in Riparian Reserves

* Firewood cutting would be allowed under all alternatives & where Public Access is Available

** Under the existing categorical exclusions, some seeding and/or plant would be done to restore native vegetation

Map 1 – Project Area Map Showing Location of Proposed Treatments

2008 Juniper Disposal EA
Willamette Meridian
T.39S.-T.40S., R.13E.-R.14.5E.



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CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter describes the physical, biological, and socioeconomic environment of the Juniper Disposal EA area and the consequences of the proposed action and alternatives, and addresses the issues raised both through public scoping and internally.

The affected environment reflects the existing condition that has developed from all past natural events and management actions within the project area. It is a combination of natural and human caused fires, fire suppression, road building, grazing, fuel reduction treatments, and the effects of recreational use. The current condition assessed for each affected resource is a result of all past natural events and management actions. It is therefore unnecessary to individually catalog all past actions in this EA. Such detail would be irrelevant to making a rational decision among alternatives. The important value of this EA is to assess and display, for the deciding official, the impacts of the alternatives on resources as they exist today, to allow a determination if the resulting project effects and/or cumulative effects are either significant or are greater than those analyzed in the RMP EIS.

Resource values that are either not present in the project area, or would not be affected by any of the proposed alternatives are: floodplains, wilderness study areas (WSAs), areas of critical environmental concern (ACECs), research natural areas (RNAs), paleontological resources, prime or unique farmlands, wild and scenic rivers, lands, and minerals. There are no known hazardous waste sites in the analysis area. Minority and low income populations would not be affected. The RMP does not identify any mineral energy sources in the vicinity.

Design of This Chapter

This Chapter is designed to first describe the affected environment of a particular resource in its existing condition. There is then a discussion on the Environmental Consequences of each alternative. For the No Action alternative, the discussion includes an analysis of cumulative impacts anticipated regardless of implementing the proposed juniper disposal project(s).

Rangeland Vegetation - Affected Environment

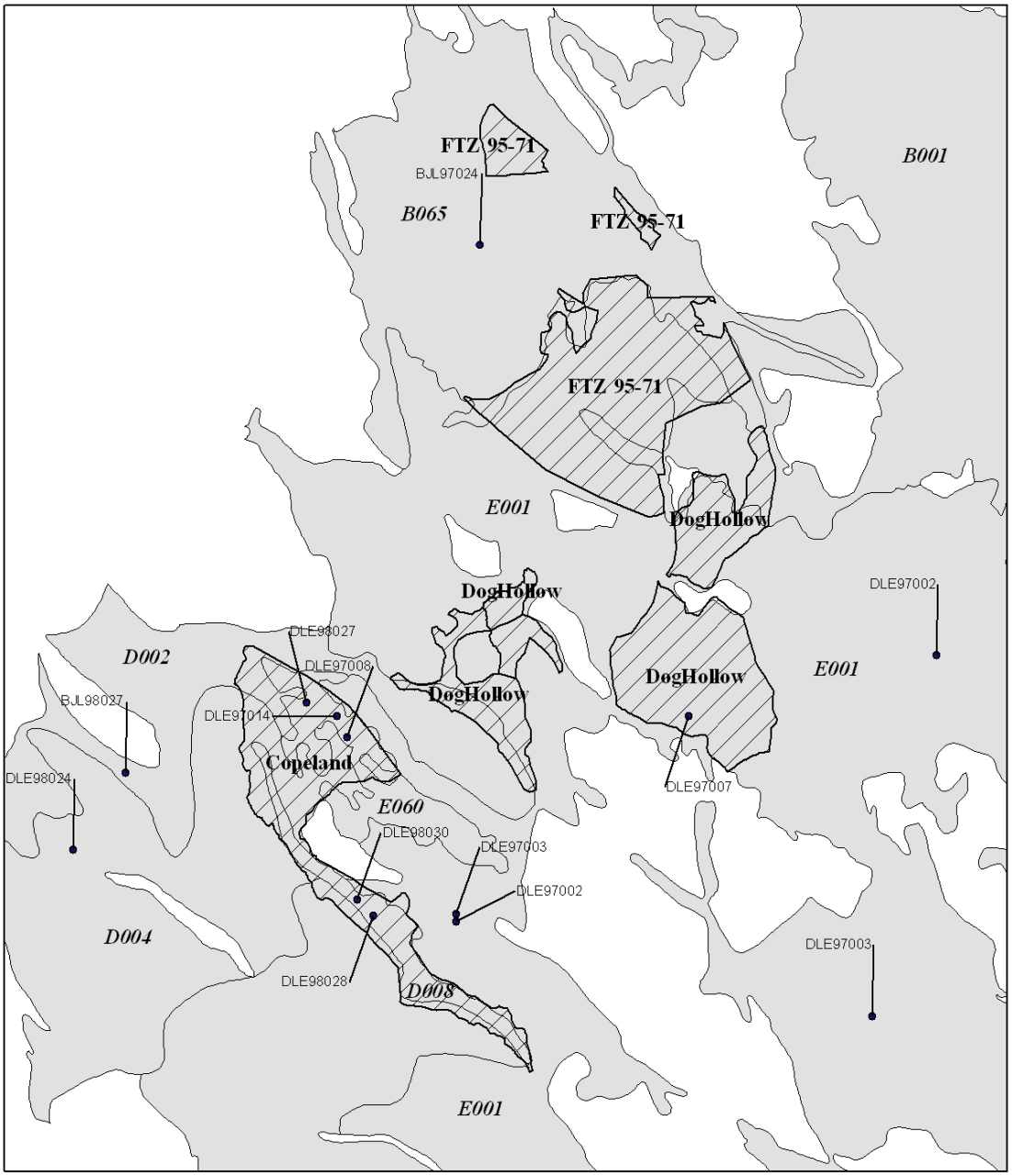
An Ecological Site Inventory (ESI) was completed during 1997 and 1998 for areas within the Gerber Block which classified all of the BLM lands into an array of ecologically distinct vegetation communities. The following edited excerpts from the *Gerber – Willow Valley Watershed Analysis, July 2003* provide a brief description of the ESI process.

> A major aspect of the ESI survey, in addition to an Order 3 soils survey, was a vegetation survey and mapping that compares the current vegetation against the potential vegetation by ecological site. A rangeland ecological site is, according to the *National Range and Pasture Handbook* (USDA 1997), "…*a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation*". The potential vegetation for a given ecological site is described in an ecological site description.
>
> The ESI vegetation information is based on an estimate of current year's growth by plant species and results in an ecological condition, or "seral stage", rating. The more the current vegetation resembles the potential vegetation from the ecological site description the higher the condition rating, and vice versa. The rating system is based on a scale of 0% to 100% similarity to the ecological site description. The seral stages are classified into four different

levels, as follows: 0-25% similarity is early seral (or “poor”) condition, 25-50% is mid seral (or “fair”) condition, 51-75% is late seral (or “good”) condition, and 76-100% is the Potential Natural Community (PNC or “excellent” condition).

Data from the ESI will be used to help describe the rangeland vegetation conditions for the different proposed treatment units in this document. Map 2 shows the delineated ecological sites and write-up locations from the 1997-1998 ESI surveys. Qualitative observations from recent field visits to the units will also be used as many of the areas have had recent mechanical juniper cutting treatments that were not completed at the time of the ESI survey.

Map 2 – Ecological Sites Inventory Data



Ecological Site Inventory Data
2008 Juniper Disposal EA
Willamette Meridian
T.39S.-T.40S., R.13E.-R.14.5E.

ESI Write-up#
Project Units
ESI Polygons

0 0.5 1 2 Miles

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Prepared by: mlimb
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FTZ 95-71

The ESI data shows that this unit is mainly within two different ecological sites: Juniper Claypan 16-20" and Stony Claypan 14-20". Some of the data that is pertinent to this analysis is given below from the field write-up sheets that were done within these ecological sites.

Juniper Claypan 16-20"

Write-up #DLE97007 – This write-up rated this ecological site as PNC ecological status with an excellent condition rating, although total vegetation production was a little lower than the expected range for this site. Small amounts of the invasive exotic grasses medusahead (*Taeniatherum caput-medusae*), cheatgrass (*Bromus tectorum*), and Japanese brome (*Bromus japonicus*) were recorded.

Write-up #DLE97002 - This write-up rated this ecological site as PNC ecological status with an excellent condition rating. A small amount of cheatgrass was recorded.

Write-up #BJL97024 - This write-up rated this ecological site as PNC ecological status with a lowered condition rating of Good due to a low vegetation production level and a moderate level of soil erosion in the area.

Stony Claypan 14-20"

Write-up #DLE97003 – This write-up rated this ecological site as Late ecological status with a Good condition rating. A small amount of Japanese brome was recorded.

Dog Hollow

The ESI data shows that this unit is mainly within two different ecological sites: Juniper Claypan 16-20" and Stony Claypan 14-20". Some of the data that is pertinent to this analysis is given below from the field write-up sheets that were done within these ecological sites.

Juniper Claypan 16-20"

Write-up #DLE97007 – This write-up rated this ecological site as PNC ecological status with an excellent condition rating. Total vegetation production was a little low for this site, though. Small amounts of the invasive exotic grasses medusahead (*Taeniatherum caput-medusae*), cheatgrass (*Bromus tectorum*), and Japanese brome (*Bromus japonicus*) were recorded.

Write-up #DLE97002 - This write-up rated this ecological site as PNC ecological status with an excellent condition rating. A small amount of cheatgrass was recorded.

Stony Claypan 14-20"

Write-up #DLE97003 – This write-up rated this ecological site as Late ecological status with a Good condition rating. A small amount of Japanese brome was recorded.

Copeland

The ESI data shows that this unit is within several different ecological sites: Juniper Claypan 16-20", Claypan Bottom 12-18", Dry Meadow 14-30", Claypan 14-20", Shrubby Loam 12-16", and Juniper Mahogany Fescue 16-20". Some of the data that is pertinent to this analysis is given below from the field write-up sheets that were done within these ecological sites.

Juniper Claypan 16-20"

BJL98027 – This write-up rated this ecological site as Late ecological status but the condition was rated as Fair due to low vegetation production, a downward trend, and a high weed presence. There were high levels of cheatgrass, medusahead, and Japanese brome recorded. The notes section described the site as "A deteriorated Juniper Claypan that looks like a Shallow Stony with old junipers".

DLE98024 – This write-up rated this ecological site as PNC ecological status with a lowered condition rating of Good due to lower production and moderate soil erosion factors. Low levels of cheatgrass and Japanese brome were recorded.

Claypan 14-20”
DLE98027 – This write-up rated this ecological site as Late ecological status with a lowered condition rating of Fair due to low production and moderate erosion factors. Cheatgrass and Japanese brome were both recorded for the site.

Claypan Bottom 12-18”
DLE97014 - This write-up rated this ecological site as Late ecological status with a Good condition rating. Only small junipers, less than 3 feet tall, were recorded for this site.

Dry Meadow 14-30”
DLE97008 - This write-up rated this ecological site as Late ecological status with a Good condition rating. No junipers were recorded for this site.

Shrubby Loam 12-16”
DLE98030 - This write-up rated this ecological site as Late ecological status with a Good condition rating. A variety of shrub species were recorded for the site. Junipers in all size classes were also recorded.

Juniper Mahogany Fescue 16-20”
DLE98028 – This write-up rated this ecological site as Mid seral ecological status with a Fair condition rating. Notes on the form indicated heavy grazing pressure from livestock along with lots of deer sign. A variety of shrub species were also recorded.

All of the proposed treatment units had mechanical juniper cutting and piling treatments applied following the ESI survey. These initial treatments on the Copeland and Dog Hollow units were done 1-3 years ago and the FTZ 95-71 unit was done 6-7 years ago. Research studies have shown an increase in the productivity of forage species following juniper removal (Young et al. 1985; Vaitkus and Eddleman 1987; Bates et al 2000). No studies have been established on any of these units to monitor the changes in the vegetation following these initial treatments. Qualitative observations have shown an increase in desired perennial grass species in many areas of these treatment units that have been mechanically cut and piled. Qualitative observations have also shown that an increase in the exotic annual grasses cheatgrass and medusahead has occurred in some areas following these initial mechanical cutting and piling treatments.

Rangeland Vegetation – Environmental Consequences

Proposed Action and Alternative One

An environmental impact of juniper utilization through yarding, either by full suspension or partial suspension, is the mechanical disturbance to vegetation from heavy machinery. This can result in the crushing and/or uprooting of grasses, forbs, shrubs and small conifer species. The highest level of vegetation disturbance would occur on the main skid trails and landings. Controlled research designs assessing plant response to western juniper removal by heavy machinery are limited to two studies which looked at the use of bulldozers and chaining (Miller et al. 2005). Normal chaining operations entail dragging a large chain across the landscape between two bulldozers. The intent is to uproot the western juniper and leave the other vegetation intact. Neither of these studies can offer much data for the impacts of the proposed actions that involve the mechanical yarding of juniper (Proposed

Action and Alternative One). However, both study sites did experience a high level of exotic annual grass response after the treatment.

In areas where exotic annual grasses are present, the soil disturbance caused by heavy machinery provides a substrate that may favor the establishment of these species. Past work suggests that weed response following treatment projects will be site specific and will depend heavily on the composition of the pretreatment plant community (Everett and Ward 1984, Koniak 1985). The composition and speed of plant community response depends on several integrated factors, including site characteristics, pretreatment floristics, post treatment management, and weather (Bates et al. 2005)

Most of the juniper control research studies have been done on ecological sites with big sagebrush and associated grasses in the understory. The sites being evaluated for this proposed action and alternatives are predominately low sagebrush and associated bunchgrass dominated sites. Qualitative observations from mechanical juniper cutting on these types of sites have shown variable responses, but there has been a large initial increase in cheatgrass on sites where it was a component prior to the treatments. A subsequent decrease in cheatgrass, as noted in some studies, has been observed on sites where a high level of perennial grasses was present before treatment. On sites with low levels of perennial grasses present before treatment, there has not been a subsequent decrease in cheatgrass levels observed. Most of these treatments are 2-8 years old.

In areas where medusahead was a component before treatment there have been qualitative observations of an increase in both the amount and distribution of this grass, especially where mechanical shearing methods were used. Medusahead is a rapidly spreading exotic annual grass that exhibits characteristics that allow it to suppress native perennial species. It germinates in late winter and begins growth before the perennial species, thus using available moisture in the upper soil layers. Medusahead litter is also high in silica and has a slow decomposition rate that allows it to build up over time and suppress native plants (Bovey et al. 1961). This buildup of litter also increases the potential fire frequency to the detriment of native perennials (Torell et al. 1961; Young 1992). The result is often a dense monoculture of medusahead (George 1992). A study by Davies (2008) found that medusahead has a relatively long period of seed dispersal, from July to October. He suggested that livestock, humans, and vehicles should be kept out of medusahead infested areas during this time period to limit the spread of medusahead seeds.

The environmental impacts to rangeland vegetation from yarding the existing juniper piles can likely be inferred from a thorough inventory of the vegetation conditions currently present. Some studies done in big sagebrush ecological sites have shown that 1-2 perennial grasses per 10ft² (Eddlemann 2002) and 2-3 perennial bunchgrasses per m² (Bates et al 2005) was sufficient to permit natural recovery after juniper cutting using chainsaws. Areas that are in Late or PNC seral status and in Good or Excellent condition will likely have the resiliency to respond positively over time to the juniper removal by yarding. The recovery time of the vegetation after yarding with partial suspension (Proposed Action) would likely be longer than the recovery time after yarding by full suspension (Alternative One). This would be due to the higher levels of soil and vegetation disturbance from the dragging of the cut junipers across the ground with partial suspension. The recovery period would be dependent upon additional factors including weather and post treatment management. Areas that are in Mid or Early seral ecological status and/or Fair or Poor condition could improve, but positive results are less likely, especially if there is a component of exotic annual grasses or forbs present pretreatment. Areas that have medusahead as a pretreatment component, regardless of the seral stage or condition level would likely have an increased amount and distribution of this grass after treatment. The partial suspension yarding alternative (Proposed Action) could likely cause a greater increase due to the soil disturbance from the dragging of the junipers. The dragging would also likely spread the medusahead seeds throughout the yarding area. The full suspension yarding alternative (Alternative One) would result in less soil surface disturbance than the Proposed Action because the juniper is not being dragged across the soil surface. This would result in a lower chance of spreading

the medusahead seeds throughout the treatment unit. However, both alternatives could result in the spreading of the medusahead from the soil surface disturbance and potential seed transport associated with the operation of the yarding equipment. Firewood cutting activities could also result in the spreading of medusahead from soil surface disturbance and seed transport by vehicles. Any increase in medusahead could lead to reduced ecological conditions over time.

The foregoing discussion would apply mainly to the area where the piled juniper would be mechanically yarded. The areas in skid trails, landings, and temporary roads would be subjected to a proportionately higher level of impact due to repeated travel by the heavy machinery. Qualitative observations of skid trails, landings, and temporary roads from previous juniper yarding operations indicate that very little vegetation remains after treatment. Natural vegetation recovery on these areas would likely take much longer and would be influenced by the surrounding vegetation conditions, post treatment management, and weather conditions. As noted above, any areas that have medusahead as a component of the plant community would likely have increased amounts following yarding treatments. The skid trails, landings, and temporary roads would be susceptible to invasion by medusahead due to the high levels of soil surface disturbance and the low levels of competing vegetation found on these areas following treatment. The potential for increased levels of medusahead from each alternative is discussed in the preceding paragraph.

Alternative Two – Burn Only

Little research has been done on the effects to vegetation from juniper pile burning. Qualitative observations of previous small juniper piles that have been burned on low sagebrush ecological sites in the Gerber Block have shown that most of the piles burned hot enough to eliminate almost all of the existing vegetation directly under the piles. Observations of burn sites after several years have shown the growth of only a few early seral forb species within the burn pile scar. A small percentage of the burn pile sites have been planted with bitterbrush seedlings and these have responded well due to the lack of competition.

The environmental conditions present at the time of burning could influence the vegetation response after the burn. One study suggested that to minimize the negative effects of fire to herbaceous plants under scattered juniper debris, soils and juniper needle litter contacting the ground should be wet and preferably frozen (Bates and Svejcar, unpublished data). Other work by these researchers has shown that burning when soils are dry and ground litter water content is low will result in a near 100% loss of herbaceous perennials, especially bunchgrasses (EOARC unpublished data). These studies involved burning of scattered juniper debris, not piles like those being analyzed in this document. The total acreage of burned vegetation would be lower from the burning of scattered piles versus the broadcast burning done in the study. The potential higher heat levels generated by the amount of fuels in the piles could be expected to have a greater detrimental effect to any vegetation under the piles.

The burn pile scars would re-vegetate at some point in the future with a vegetation composition likely composed of species from the surrounding area. Areas with a component of cheatgrass and/or medusahead could experience an increase in these species.

In most of the proposed treatment area, burning the existing juniper piles would likely result in less vegetation disturbance, lower levels of exotic annual grass increases and potentially a shorter vegetation recovery time when compared to juniper removal by yarding. The total amount of soil and vegetation disturbance from burning the existing piles on most areas would likely be lower than the disturbance from yarding the juniper. The yarding treatment results in soil surface disturbance when the heavy machinery travels to each juniper pile and then transports the juniper to a landing. The yarding alternatives would also require the construction of up to three miles of temporary roads along with skid trails and landings. As noted above, these areas typically have very little vegetation

remaining on them following treatment but like the burn scars would re-vegetate at some point in the future with a vegetation composition likely composed of species from the surrounding area.

No Action Alternative

The No Action Alternative would leave the majority of the existing piles of juniper on the ground. A small percentage could be utilized by wood cutters. Most of the piles are of an individual density that would likely result in the smothering of any vegetation that is under them. Studies have also shown that debris left on the ground can smother perennial grasses and cheatgrass cover can increase and persist compared to burned piles (Bates and Svejcar, unpublished data). These studies also involved scattered juniper debris, not large piles like those being analyzed in this document. The density of the individual juniper piles would also likely result in the smothering of any vegetation beneath them.

Cumulative Impacts

Proposed Action and Alternative One

The existing piles of juniper were created by juniper treatments involving mechanized cutting and piling of standing juniper. These initial treatments on the Copeland and Dog Hollow units were done 1-3 years ago and the FTZ 95-71 unit was done 6-7 years ago. Research studies have shown an increase in the productivity of forage species following juniper removal (Young et al. 1985; Vaitkus and Eddleman 1987; Bates et al 2000). No studies have been established on any of these units to monitor the changes in the vegetation following these initial treatments. Qualitative observations have shown an increase in desired perennial grass species in many areas of these treatment units that have been mechanically cut and piled. Qualitative observations have also shown that an increase in the exotic annual grasses cheatgrass and medusahead has occurred in some areas following these initial mechanically cutting and piling treatments. Additional mechanical disturbance from the Proposed Action and Alternative One could result in a compounded increase in these exotic species due to their present population levels. The increase would likely be lower using full suspension yarding (Alternative One) due to the lower levels of soil surface disturbance.

Livestock grazing would continue on these areas following any of the treatment alternatives. The combined treatment units total approximately 2,350 acres. The approximate percentage of each pasture affected by the treatments is as follows:

Round Valley pasture – 26%
Copeland pasture – 16%
Schnipps pasture – 3%
North pasture – 3%

Negative impacts from continued livestock grazing in the Schnipps and North pastures should be minimal due to the small percentage impacted. In addition, the Schnipps pasture is utilized for a 2-3 week period in April and May which would limit the amount of utilization and allow for regrowth of any grazed plants. Grazing studies done within the Schnipps pasture from 1996 through 2007 have shown forage utilization levels in the 15-49% range with the majority of the readings in the 15-25% range. The North pasture is utilized for a four week period in a two pasture rotation system with use being alternately in May or June. Utilization readings in this pasture have been in the 15-45% range.

The Copeland pasture is included in a rest rotation system with use being made in late April or early May for 2-3 weeks. The pasture is rested every fourth year. Utilization readings from this pasture during the 1996-2007 periods showed use levels between 10-30%. The early use and low utilization levels in this pasture should result in minimal negative impacts to the post treatment vegetation. In addition, with 79% of the pasture rated as late seral or PNC condition, there should be good perennial vegetation recovery following the treatments.

The Round Valley pasture will have the highest amount of treated acres. It is included in a rest rotation system with use being made in early May for 2-3 weeks. The pasture is rested every fourth year. Utilization readings from this pasture for the 1996-2007 period show use levels between 13-46% with the majority being in the 13-30% range. This pasture was rated by the ESI as being about 98% late seral or PNC condition. The low utilization levels combined with the early use period and the high condition levels should provide for good vegetation recovery.

If there is a component of exotic annual grasses present in the treatment areas, livestock grazing after the treatments may result in an increase in these species and a subsequent extended time period for perennial grass recovery.

Alternative Two – Burn Only
The effects of livestock grazing after burning of juniper piles would depend upon several factors including pre-burn vegetation conditions, timing and intensity of the livestock use, and weather. As noted above, the amount of land acreage affected by the treatments varies by pasture. The actual amount of land affected by burning would likely be less due to the scattered nature of the piles. Timing of the burning may influence the response of the vegetation as noted above under the Environmental Impacts – Alternative 2. Under drier conditions the fire may spread to the interspaces between piles with possible detrimental effects to this vegetation.

Typically two years of grazing rest is prescribed following broadcast burning and wildfires although this requirement has never been tested experimentally (Miller et al. 2005). In the Schnipps and North pastures the lower acreage of disturbance from grazing after the burning should not result in detrimental impacts to the recovery of the vegetation community. In the Copeland and Round Valley pastures the acreage burned would be a higher percentage of the total pasture. Immediate reintroduction of livestock after burning could result in negative impacts to the vegetation, especially where annual exotic grasses and weedy forbs are present. Burned areas should probably be treated like a new seeding with a minimum two years of rest during the growing season (Miller et al. 2005).

Mitigation

Proposed Action and Alternative One
The proposed utilization areas should be inventoried for the presence of medusahead prior to yarding. Areas where it is found in “concentrated patches” or where it is present throughout the understory should be avoided for yarding. In addition, all equipment and vehicles should avoid these areas, including the closing of these areas to public firewood cutting.

The areas in skid trails and landings will likely have little vegetation remaining following yarding. The Proposed Action and Alternative One would seed all disturbed areas with native grass seed following treatment. This would help accelerate recovery and inhibit the establishment of invasive annual species. These areas should be monitored following the seedings to determine their success. Any areas where seedlings fail to establish should be replanted. The design of the seeding process and the monitoring program should be based upon established methods.

The Copeland and Round Valley pastures should be rested from livestock grazing for one to two years following treatment to allow for recovery of the native perennial grasses and to allow seedling establishment in the seeded areas. This rest could occur within the existing pasture rotation schedule.

Alternative Two – Burn Only
Burning of the juniper piles should be done when soils and juniper needle litter contacting the ground are wet and preferably frozen to lessen the affects to the vegetation below and surrounding the piles and to lessen the spread of fire to the interspaces.

The Copeland and Round Valley pastures should be rested from livestock grazing for one to two years following treatment to allow for recovery of the native perennial grasses. This rest could occur within the existing pasture rotation schedule.

Livestock Grazing - Affected Environment

FTZ 95-71

This proposed yarding unit is within the Schnipps (3874 acres) and Round Valley (5098 acres) pastures of the Horsefly Allotment (#00882). These pastures are utilized by livestock for 2-3 weeks each in a rest rotation management system with the season of use for these pastures being in mid April through the end of May. The current authorized use for the Horsefly allotment is 2656 AUMs.

A Rangeland Health Standards Assessment was completed for this allotment in 1999 and found that the overall current grazing use was within the sustained yield capacity of the allotment and appropriate for maintaining the current overall good vegetation conditions (USDI BLM et al. 2003). ESI information for the Schnipps and Round Valley pastures reflect the following vegetation conditions:

Schnipps Pasture

Condition Class	% of total classified
Potential Natural Community	26.0%
Late Seral	71.9%
Mid Seral	2.1%
Early Seral	0.0%

Round Valley Pasture

Condition Class	% of total classified
Potential Natural Community	51.8%
Late Seral	46.9%
Mid Seral	0.2%
Early Seral	0.0%

The grazing use for the Horsefly Allotment is managed to meet the requirements of a Biological Opinion from the U. S. Fish and Wildlife Service for the endangered shortnose sucker. This management includes a multi-pasture rest rotation grazing system designed to meet vegetation utilization objectives that maintain or improve upland vegetation conditions. Grazing in riparian areas is limited to provide for maintenance or improvement of stream bank conditions, riparian vegetation, and water quality. Scheduled monitoring of upland and riparian vegetation and the physical impacts of livestock use on the stream corridors is completed as agreed to in the Biological Opinion.

Dog Hollow Unit

This proposed yarding unit is within the Copeland (5155 acres) and Round Valley (5098 acres) pastures of the Horsefly Allotment. These pastures are utilized by livestock for 2-3 weeks each in a rest rotation management system with the season of use for these pastures being in mid April through the end of May. The current authorized use for the Horsefly allotment is 2656 AUMs.

A Rangeland Health Standards Assessment was completed for this allotment in 1999 and found that the overall current grazing use was within the sustained yield capacity of the allotment and appropriate for maintaining the current overall good vegetation conditions (Gerber-Willow Valley Watershed Analysis, 2003). ESI information for the Copeland and Round Valley pastures reflect the following vegetation conditions:

Copeland Pasture

Condition Class	% of total classified
Potential Natural Community	30.1%
Late Seral	48.8%
Mid Seral	21.1%
Early Seral	0.0%

Round Valley Pasture

Condition Class	% of total classified
Potential Natural Community	51.8%
Late Seral	46.9%
Mid Seral	0.2%
Early Seral	0.0%

The grazing use for the Horsefly Allotment is managed to meet the requirements of a Biological Opinion from the U. S. Fish and Wildlife Service for the endangered shortnose sucker. This management includes a multi-pasture rest rotation grazing system designed to meet vegetation utilization objectives that maintain or improve upland vegetation conditions. Grazing in riparian areas is limited to provide for maintenance or improvement of streambank conditions, riparian vegetation, and water quality. Scheduled monitoring of upland and riparian vegetation and the physical impacts of livestock use on the stream corridors is completed as agreed to in the Biological Opinion.

Copeland Unit

This proposed yarding unit is within the Copeland pasture (5155 acres) of the Horsefly Allotment and the North pasture (4015 acres) of the Bumpheads Allotment. The Copeland pasture is utilized by livestock for 2-3 weeks in a rest rotation management system with a season of use in mid April through the end of May. The current authorized use for the Horsefly allotment is 2656 AUMs.

A Rangeland Health Standards Assessment was completed for this allotment in 1999 and found that the overall current grazing use was within the sustained yield capacity of the allotment and appropriate for maintaining the current overall good vegetation conditions (Gerber- Willow Valley Watershed Analysis, 2003). ESI information for the Copeland pasture reflects the following vegetation conditions:

Copeland Pasture

Condition Class	% of total classified
Potential Natural Community	30.1%
Late Seral	48.8%
Mid Seral	21.1%
Early Seral	0.0%

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The grazing use for the Horsefly Allotment is managed to meet the requirements of a Biological Opinion from the U. S. Fish and Wildlife Service for the endangered shortnose sucker. This management includes a multi-pasture rest rotation grazing system designed to meet vegetation utilization objectives that maintain or improve upland vegetation conditions. Grazing in riparian areas is limited to provide for maintenance or improvement of streambank conditions, riparian vegetation, and water quality. Scheduled monitoring of upland and riparian vegetation and the physical impacts of livestock use on the stream corridors is completed as agreed to in the Biological Opinion.

The North pasture of the Bumpheads Allotment is utilized by livestock for 30 days on a rotation basis with the season of use being in either May or June. The current authorized use for the Bumpheads Allotment is 420 AUMs.

A Rangeland Health Standards Assessment was completed for the Bumpheads allotment in conjunction with the Gerber-Willow Valley Watershed Analysis in June, 2003. It was determined that Standards 1, 3, and 5 were being fully met, but Standards 2 (Riparian/Wetland) and 4 (Water Quality) were not met and livestock grazing was a contributing factor for Standard 2. Appropriate management changes have been implemented in the allotment to allow for progress in meeting the Standard.

ESI information for the North pasture reflects the following vegetation conditions:

North Pasture

Condition Class	% of total classified
Potential Natural Community	14.6%
Late Seral	56.1%
Mid Seral	29.3%
Early Seral	0.0%

Livestock Grazing – Environmental Consequences

Proposed Action and Alternative One

The determination of effects of the proposed action and alternatives to livestock grazing will be mainly based upon the effects to palatable livestock forage species. The baseline comparison point will be the vegetation conditions present after the initial juniper cutting treatments occurred. These cutting treatments occurred after the ESI survey. As noted under the Rangeland Vegetation section above, qualitative observations of the vegetation conditions will be used to supplement the ESI survey data. No formal monitoring studies to analyze vegetation response to the juniper cutting have been established in any of the treatment units

The FTZ 95-71 proposed unit is approximately 874 acres in size. Approximately 130 acres are within the Schnipps pasture and approximately 744 acres are in the Round Valley pasture. This represents about 3 % of the Schnipps pasture and 15% of the Round Valley pasture.

The Dog Hollow proposed unit is approximately 867 acres in size. Approximately 289 acres are within the Copeland pasture and approximately 578 acres are in the Round Valley pasture. This represents about 6 % of the Copeland pasture and 11% of the Round Valley pasture.

The Copeland unit is approximately 610 acres in size. Approximately 493 acres are within the Copeland pasture and approximately 117 acres are in the North pasture. This represents about 10% of the Copeland pasture and about 3% of the North pasture.

The following table shows the units acres that are within the individual pastures.

Table 3 – Treatment Unit acres by Pasture

Treatment Units	Pastures			
	Schnipps	**Round Valley**	**Copeland**	**North**
FTZ 95-71	130 acres	744 acres		
Dog Hollow		578 acres	289 acres	
Copeland			493 acres	117 acres
Total treatment unit acres in pasture	130 acres	1322 acres	782 acres	117 acres
Percent of total pasture acres within treatment units	3%	26%	15%	3%

Effects to livestock grazing in the Schnipps pasture and the North pasture would be minimal due to the small size of the treatment areas within the pastures (130 acres and 117 acres). Short term impacts could include a decrease in the amount of palatable forage available at the treatment sites due to surface disturbance and possible exotic annual grass increases. In the long term there should be an increase in the amount of palatable forage available due to the decreased competition for moisture and nutrients from the juniper.

Effects to livestock grazing in the Copeland and Round Valley pastures would be negative in the short term due to the larger size of the treatment areas in these pastures (782 acres and 1322 acres). The Proposed Action and Alternative One would likely both result in decreased amounts of palatable forage in the short term (2-5 years) as described in the Rangeland Vegetation section above.

The long term impacts would be dependent upon several factors including the site specific pre-treatment vegetation conditions, post treatment management (including livestock grazing), and weather conditions. The ecological sites within the treatment areas in these pastures were in Late Seral or PNC ecological status at the time of the ESI survey (1997-98) which should result in a long term (5-10 years) increase in palatable forage. As noted in the Rangeland Vegetation section above, past monitoring of the effected grazing allotments have shown that the seasons of livestock use along with low to moderate levels of forage utilization should not have a negative long term effect on the available forage species. However, if yarding occurs in areas of the units where medusahead is present in patches or scattered throughout the vegetation community there could be a long term decrease in palatable livestock forage. This is also discussed below under Cumulative Impacts.

Alternative Two – Burn Only

As noted above, the amount of land acreage affected by the treatments varies by pasture. The actual amount of land affected by burning would likely consist of less disturbed acres due to the scattered nature of the piles. Timing of the burning may influence the response of the vegetation as noted above under Rangeland Vegetation, Environmental Impacts – Alternative 2. Under drier conditions the fire may spread to the interspaces between piles with possible detrimental effects to this vegetation.

Typically two years of grazing rest is prescribed following wildfires and broadcast burning although this requirement has never been tested experimentally (Miller et al. 2005). Wildfires and broadcast burning also typically result in greater disturbance to the soil and vegetation than pile burning. In the Schnipps and North pastures the low proportion of total land acres disturbed by burning piles should not result in detrimental impacts to the recovery of the vegetation community due to livestock grazing. In the Copeland and Round Valley pastures the acreage burned would be a higher percentage of the total pasture due to the higher levels of juniper piles. Immediate reintroduction of livestock after burning could result in negative impacts to the vegetation, especially where annual exotic grasses

and weedy forbs are present. Burned areas should be treated like a new seeding, with a minimum two years of rest during the growing season (Miller et al. 2005). Resting these pastures would have a short term negative effect to livestock grazing as the forage in these pastures would not be available for use. There should be an increase in palatable forage in the long term (5-10 years) due to the removal of the juniper and the piles of cut juniper.

No Action Alternative

The No Action Alternative would leave the majority of the existing piles of juniper on the ground. A small percentage could be utilized by wood cutters. Most of the piles are of an individual density that would likely result in the smothering of any vegetation that is under them. Studies have also shown that debris left on the ground can smother perennial grasses and cheatgrass cover can increase and persist compared to burned piles (Bates and Svejcar, unpublished data). These studies also involved scattered juniper debris, not large piles like those being analyzed in this document. The density of the individual juniper piles would also likely result in the smothering of any vegetation beneath them. This would result in a minor negative impact to livestock grazing in both the short and long terms as the vegetation beneath the piles would be unavailable as forage and a possible increase in cheatgrass could displace native perennial grasses.

Cumulative Impacts

The existing piles of juniper were created by juniper treatments involving mechanized cutting and piling of standing juniper. These initial treatments on the Copeland and Dog Hollow units were done 1-3 years ago and the FTZ 95-71 unit was done 6-7 years ago. Research studies have shown an increase in the productivity of forage species following juniper removal (Young et al. 1985; Vaitkus and Eddleman 1987; Bates et al 2000). Qualitative observations of these areas following the initial mechanized cutting treatments have shown an increase in perennial forage species. Qualitative observations have also shown that an increase in the exotic annual grasses cheatgrass and medusahead has occurred in some areas following these initial mechanical cutting and piling treatments. Additional mechanical disturbance from the Proposed Action and Alternative One could likely result in a further increase in these exotic species. This could result in a short term and possible long term negative impact to the amount of palatable forage species present for livestock use. It could also increase the time period required for recovery of the vegetation community to a late or PNC ecological condition.

Mitigation

<u>Proposed Action and Alternative One</u>

The proposed treatment areas should be inventoried for the presence of medusahead prior to yarding. Areas where it is found in “patches” or where it is present throughout the understory should be avoided for treatment. In addition, all equipment and vehicles should avoid these areas and they should not be included as areas open to firewood cutting.

The areas in skid trails and landings will likely have little vegetation remaining following yarding. The Proposed Action and Alternative One would seed all disturbed areas with native grass seed following yarding. This would help accelerate recovery and inhibit the establishment of invasive annual species. These areas should be monitored following seeding to determine their success. Any areas where seedlings fail to establish should be replanted. The design of the seeding process and the monitoring program will be based upon established methods.

The Copeland and Round Valley pastures should be rested from livestock grazing for one to two years following yarding to allow for recovery of the native perennial grasses and to allow for the establishment of grass seedlings in areas that are seeded after yarding. This rest could occur within the existing pasture rotation schedule.

Alternative 2 – Burn Only
Burning of the juniper piles should be done when soils and juniper needle litter contacting the ground are wet and preferably frozen to lessen the affects to the vegetation below and surrounding the piles and to lessen the spread of fire to the interspaces.

The Copeland and Round Valley pastures should be rested for one to two years following treatment to allow for recovery of the native perennial grasses in the burned areas. This rest could occur within the existing pasture rotation schedule.

Terrestrial Wildlife Species - Affected Environment

This section focuses on the wildlife species that are considered special status species and/or special emphasis species that would potentially be affected by the proposed management activities. Included are those species listed under the Endangered Species Act (ESA - listed, proposed and candidate species), those listed under the BLM special status species policy and considered to be Bureau Sensitive species, and land birds listed on the U.S. Fish and Wildlife Service's "Birds of Conservation Concern 2002" list for the Columbia Basin (BCR9 list). Mule deer (A special emphasis species) will also be addressed. The habitat within the proposed units is non-forest and consists of shrublands and grasslands with scattered live junipers and ponderosa pine (Dog Hollow) which were left during the cutting operations, and scattered piles of previously cut juniper trees at variable densities. Some of the units are adjacent to ponderosa pine forest areas but burning or yarding the juniper piles does not have the potential to affect the adjacent forested habitats or forest associated wildlife with the exception of disturbance sensitive, forest-using, species such as eagles. For a list of other species (those not addressed below) and a description of their habitats that may occur in the proposed project area, refer to the Klamath Falls Resource Area FEIS of 1994 (pages 3-37 to 3-41).

Threatened, Endangered, and Candidate Species

Table 4 – Listed, Proposed and Candidate Terrestrial Wildlife Species considered for this Analysis

Species	Scientific Name	Status	Designated Critical Habitat within project area	Species or habitat occur within the project area	May be affected by project
Canada Lynx	*Lynx canadensis*	Threatened	NO	NO	NO
Northern Spotted Owl	*Strix occidenatlis caurina*	Threatened	NO	NO	NO
Pacific Fisher	*Martes pennanti pacifica*	Candidate	NO	NO	NO
Yellow-Billed Cuckoo	*Coccyzus americanus*	Candidate	NO	NO	NO
Oregon Spotted Frog	*Rana pretiosa*	Candidate	NO	NO	NO
Mardon Skipper Butterfly	*Polites mardon*	Candidate	NO	NO	NO
Species list derived from list issued by the U.S. Fish and Wildlife Service to the Klamath Falls BLM Office.					

Non-Listed Special Status Species (Bureau Sensitive and Bureau Assessment)

The BLM national Special Status Species Policy (BLM Manual 6840) describes a process by which species are designated as Bureau Sensitive, Bureau Assessment, or Bureau Tracking, and delegates the authority to manage the sensitive species program to the various BLM State Directors. The BLM Oregon State Director issued IM # OR-2007-072 to BLM units in Oregon. This direction eliminated the Bureau Assessment and Bureau Tracking categories, changed the criteria for listing species as Bureau Sensitive, and added a new category ("Strategic") to the special status species program for Oregon BLM lands. Of the 2 currently valid categories within Oregon BLM (Bureau Sensitive, and Strategic), only Bureau Sensitive species are addressed in project level NEPA documents. Strategic species are generally to be managed at the regional level and are the subject of conservation assessments and conservation strategies that are in the process of being drafted at the time of this writing.

It is the policy of BLM to protect, manage, and conserve species and their habitats such that any Bureau action will not contribute to the need to list any species under the auspices of the Endangered Species Act.

Other Wildlife Species with Special Emphasis

Golden Eagle

This species is protected by the Bald Eagle Protection Act of 1940, and is afforded some special protection measures in the Klamath Falls Resource Management Plan of 1995. There are no known golden eagle nests within or adjacent to the project area.

Table 5 – Bureau Sensitive Vertebrate and Invertebrate Wildlife and Fish Species documented or suspected to occur on the Klamath Falls Resource Area.

Species	Scientific Name	Species or habitat occur within the project area	Project may affect the species
Aleutian Canada Goose	*Branta canadensis leucoparia*	No	No
Trumpeter Swan	*Cygnus buccinator*	No	No
White-tailed Kite	*Elanus leucurus*	No	No
Horned Grebe	*Podiceps auritus*	No	No
Red-necked Grebe	*Podiceps grisegena*	No	No
Inland Tailed Frog	*Ascaphus montanus*	No	No
Foot Hill Yellow-legged Frog	*Rana boylii*	No	No
Pygmy Rabbit *	*Brachylagus idahoensis*	No	No
Spotted Bat	*Euderma maculatum*	No	No
Fisher **	*Martes Pennanti*	No	No
Tricolored Blackbird	*Agelaius tricolor*	No	No
Bufflehead	*Bucephala albeola*	No	No
Greater Sage-grouse	*Centrocercus urophasianus*	No	No
Yellow Rail	*Coturnicops noveboracensis*	No	No
Snowy Egret	*Egretta thula*	No	No
American Peregrine Falcon	*Falco peregrinus anatum*	Winter foraging only	No
Bald eagle	*Haliaeetus leucocephalus*	Yes	Yes
Franklin's Gull	*Larus pipixcan*	No	No
Lewis Woodpecker	*Melanerpes lewis*	Yes	No
American White Pelican	*Pelecanus erythrorhynchos*	No	No
White-headed Woodpecker	*Picoides albolarvatus*	No	No
Oregon Vesper Sparrow	*Pooecetes gramineus affinis*	Yes	Yes
Oregon Spotted Frog	*Rana pretiosa*	No	No
Northwestern Pond Turtle	*Actinemys marmorata marmorata*	No	No
Pallid Bat	*Antrozous pallidus*	Yes	No
Townsend's Big-eared bat	*Corynorhinus townsendii*	No	No
Fringed Myotis (bat)	*Myotis thysanodes*	No	No
Miller Lake Lamprey (fish) (all populations)	*Lampetra minima*	No	No
Inland Redband Trout (All stocks)	*Oncorhynchus mykiss*	No	No
Nerite Pebble Snail	*Fluminicola Sp. Nov. 11*	No	No
Great Basin Ramshorn (snail)	*Helisoma newberryi newberryi*	No	No
Crater Lake Tight coil (snail)	*Pristiloma acticum Crateris*	No	No
Franklin's Bumblebee	*Bombus franklini*	No	No
Johnson's Hairstreak (butterfly)	*Callophrys johnsoni*	No	No
Yuma Skipper (butterfly)	*Ochlodes yuma*	No	No
Mardon Skipper (butterfly)	*Polites mardon*	No	No
Coronis Fritillary (butterfly)	*Speyeria coronis coronis*	No	No
Siskiyou Short-horned Grasshopper	*Chloealtis aspasma*	No	No
Evening Field Slug	*Deroceras hesperium*	No	No
Klamath Rim Pebblesnail	*Fluminicola Sp. Nov. 3*	No	No
Scale Lanx (snail)	*Lanx klamathensis*	No	No
Chase Sideband (snail)	*Monadenia chaceana*	No	No
Modoc Rim Sideband	*Monadenia fidelis Sp. Nov.*	No	No

Source: IM# IM-OR-2007-072.

Mule Deer
All of the project units are within summer, winter, or transitional range for mule deer.

Migratory birds
The BLM has responsibilities to take actions to conserve migratory bird species under the Migratory Bird Treaty act of 1918 as amended (MBTA). Pursuant to meeting these responsibilities the BLM is currently engaged at the national level with the US Fish and Wildlife Service (the agency with primary responsibility for enforcement and administration of the MBTA) in efforts to develop a memorandum of understanding (MOU) as to how BLM will contribute to conservation of migratory birds. In the interim, guidance has been issued from the BLM Washington DC office to the field instructing field units to address the effects of BLM projects on specific sets of migratory birds in the NEPA documents associated with those projects. Table 6 below displays the migratory birds that must be addressed in NEPA documents on the eastern portion of the Klamath Falls Resource Area.

Table 6 – Birds of Conservation Concern in Great Basin Portion of Klamath Falls Resource Area.

Species	Scientific Name	Species or habitat occur within the project area	Project may affect the species
Swainson's Hawk	*Buteo swainsoni*	No	No
Ferruginous Hawk	*Buteo regalis*	Yes	Yes
Golden Eagle	*Aquila chrysaetos*	Yes	Yes
Peregrine Falcon	*Falco peregrinus*	Winter foraging only	No
Prairie Falcon	*Falco mexicanus*	Winter foraging only	No
Flammulated Owl	*Otus flammeolus*	No	No
Lewis's Woodpecker	*Melanerpes lewis*	Yes	Yes
Williamson's Sapsucker	*Sphyrapicus thyroideus*	No	No
White-headed woodpecker	*Picoides albolarvatus*	No	No
Loggerhead Shrike	*Lanius ludovicianus*	Yes	Yes
Brewer's Sparrow	*Spizella breweri*	Yes	Yes
Sage Sparrow	*Amphispiza belli*	No	No
Gray Vireo	*Vireo vicinior*	No	No
Greater Sage Grouse (Columbia Basin population)	*Centrocercus urophasianus*	No	No
Yellow Rail	*Coturnicops noveboracensis*	No	No
American Golden-Plover	*Pluvialis dominica*	No	No
Snowy Plover	*Charadrius alexandrinus*	No	No
American Avocet	*Recurvirostra americana*	No	No
Solitary Sandpiper	*Tringa solitaria*	No	No
Whimbrel	*Numenius phaeopus*	No	No
Long-billed Curlew	*Numenius americanus*	No	No
Marbled Godwit	*Limosa fedoa*	No	No
Sanderling	*Calidris alba*	No	No
Wilson's Phalarope	*Phalaropus tricolor*	No	No
Yellow Billed Cuckoo	*Coccyzus americanus*	No	No
Burrowing Owl	*Athene cunicularia*	No	No
Black Swift	*Cypseloides niger*	No	No
Virginia's Warbler	*Vermivora virginiae*	No	No
Tricolored Blackbird	*Agelaius tricolor*	No	No
BCR9 (Great Basin) BCC 2002 List Source = Report by the USFWS- "Birds of Conservation Concern 2002"			

Terrestrial Wildlife Species – Environmental Consequences

The effects of juniper yarding and pile burning on wildlife can be categorized as either direct effects or habitat alteration effects. Direct effects include noise disturbance which results in displacement of wildlife from occupied habitat or home ranges, and crushing and or killing of individuals by equipment

or by the juniper trees being carried or dragged by the equipment. Burning piles of juniper can also have direct effects. Animals can be killed if they are sheltering in piles that are burned. However, on numerous occasions, wildlife has been seen exiting piles as the piles are lit. Pile burn operations move fast and can result in juniper piles being removed from several hundred acres per day. Yarding operations take much longer and thus the period of sound and visual disturbance associated with yarding operations is longer than for pile burning for any given treatment.

Indirect effects include changes in the physical attributes of the vegetative structure resulting from crushing, uprooting, burning or killing of desirable vegetation important for forage or cover, increase in bare and/or disturbed soil which facilitates invasion and spread of non-native and/or undesirable vegetation (weeds).

The discussion of the effects on wildlife of juniper yarding and pile burning on rangeland sites below is limited to effects on designated special status species, certain migratory birds of conservation concern, and big game (deer, elk, pronghorn) species which are special emphasis species. Tables 5 and 6 (above) list Oregon BLM special status species and birds of conservation concern and indicate their documented or suspected presence in the proposed juniper disposal units. Tables 5 and 6 also indicate whether or not the proposed project has the potential to affect the population of each of the affected species. For each potentially affected species of concern a species by species discussion of the effects of each alternative can be found below.

The main impact to wildlife of the action alternatives is the physical disturbance of the existing herbaceous and shrub vegetation. This disturbance not only changes the physical structure of these habitat layers but also changes their floristic composition over time. Yarding juniper either by full or partial suspension results in disturbance and damage by crushing and uprooting of the plants. Burning piles of juniper damages and kills vegetation immediately under the piles and in a zone around each pile. The zone of damage around an individual burned pile varies according to several factors related to how hot the pile burns, and if the fire creeps around in the grass and shrubs adjacent to the pile.

Killing and damaging plants whether by burning or yarding creates open growing sites for invasion by, or increases in existing populations of, early seral species and undesirable plants including noxious weeds which negatively affect wildlife habitat quality in several ways. Based on observations of various juniper disposal projects (FTZ 9571-full suspension yarding, Norcross partial suspension yarding, East fork, Norcross, 21, Seven Little Stukels pile burning) using a variety of methods including all those being analyzed in this EA it is clear that the action alternatives vary in the amount of disturbance they cause.

Threatened and Endangered Species

Proposed Action, Alternative 1, Alternative 2, and No Action

There would be no effect on any Endangered, Threatened, Proposed, or Candidate species.

Cumulative Effects

There would be no cumulative effects to Threatened, Endangered, Proposed, or Candidate species under any of the alternatives.

Non-Listed Special Status Species (Bureau Sensitive)

Alternatives 1 and 2

Bald Eagle

The bald eagle was removed from the endangered species list in July 2007. However, it is still protected by the Bald and Golden Eagle protection act of 1940, and nest sites are afforded special protection measures in the Klamath Falls Resource Management Plan of 1995. Bald eagles may

occasionally be seen in the project area. There are no known nests in or near the proposed treatment units. No affect to this species is anticipated under any of the alternatives.

American Peregrine Falcon
The peregrine falcon was removed from the Endangered Species list in 1999. However, it is still considered a sensitive species by Oregon BLM. Individuals of this species may occasionally be seen in or around the proposed project area, especially during winter. There is no suitable nesting habitat for this species in the proposed project area. Neither the proposed action nor any of the alternatives is likely to affect this species.

Lewis Woodpecker
This species occurs in variable densities throughout the open forest and woodland habitats in the Klamath Basin provided that those habitats contain medium to large snags. Although not documented to occur within the proposed project area, this species almost certainly occurs there. Lewis Woodpecker is a cavity nester, associated with medium to large snags in relatively open forest stands or savannahs for nesting and foraging. The pine stands adjacent to the project area are considered suitable nesting habitat and it is possible that this species could nest in large, decadent junipers with a significant component of dead wood in the bole. Neither the proposed action nor any of the alternatives would affect snag habitat. Thus, there would likely be no affect to this species. However, burning piles near the scattered pines in portions of the Dog Hollow unit could result in some snag creation. Killing these pines would be counter to the objectives of the pile burn operation. Killing large pines is one of the factors that results in termination of ignitions on pile burns.

White-headed Woodpecker
This species occurs in variable densities throughout the Ponderosa pine and mixed conifer forest habitats in the Klamath Basin provided that those habitats contain medium to large snags. Neither the proposed action nor any of the alternatives would affect snag habitat within pine or mixed conifer stands. Thus there would likely be no affect to this species.

Fringed Myotis (bat) and Pallid Bat
These species have not been documented in the proposed project area, but they undoubtedly occur there for at least the warmer parts of the year. These two species are common in undeveloped habitats in the Klamath Basin provided those habitats contain medium to large snags or other suitable roosting substrates. The proposed project's potential impact to these species is limited to the project's potential to kill or injure individual bats that may be sheltering in juniper piles that are either burned or yarded. Juniper piles are most likely to be used as day roosts, or night roosts during the late spring, summer and early fall. Use of juniper piles by bats during this warmer time of the year would potentially place individual bats in piles at risk from yarding operations which are usually conducted during dry and warm months. Bat use of juniper piles for over-wintering hibernacula is unknown but considered unlikely due to the lack of thermal mass. Individual bats of unknown species have occasionally been seen exiting piles being ignited in late spring. These bats are probably day roosting in the piles. Bats observed exiting piles usually do so as the pile is being approached by personnel and either just before or just after the pile has been lit, and well before the whole pile is involved. Occasionally, individual bats have been seen exiting as yet unburned piles many yards from flames in a pile burn operation as smoke from burning piles impacts the unburned piles (M. Broyles, personal observation). The climatic window for pile burning falls generally in the late spring when bats have come out of their deep winter torpor. Pile roosting bats not in deep torpor should be able to escape pile burn operations, and some have been seen doing so. Presumably, pile roosting bats would be able to escape from piles being yarded, having being warned by the approach of heavy equipment.

Oregon Vesper Sparrow
This species has not been documented in the proposed project area, but it undoubtedly occurs there. It is common in shrub and grassland habitats in the Klamath Basin. The proposed project's potential

impact on this species is limited to the project's potential to change the density of shrubs and grasses in the treated units. Disposal of juniper piles by yarding with only partial suspension (proposed action) would be the most impacting disposal option for this species due to the higher levels of shrub and grass layer disturbance. Burning the piles would probably be the least impacting because shrub and grass layer disturbance is minimized, (compared to yarding) and the juniper debris is removed (as opposed to being left in place) freeing up growing space for shrubs and grass.

Leaving the juniper piles on site (No Action alternative) would slightly impact this species by reducing the growing space available for shrubs within the units, and might increase predation on this species by retaining elevated raptor perches (piles) above the shrub layer.

Cumulative Effects
The cumulative effects of the alternatives on wildlife habitat would be the same as described in the rangeland vegetation section.

Mitigation
Proposed mitigation would be the same as proposed in the rangeland vegetation section.
It should be noted that the likelihood of success for mitigation measures applied for rehabilitation of rangeland vegetation damaged by disposal activities under any of the action alternatives would be expected to vary based on the degree of disturbance. As a general rule, sites with more disturbed ground and where the disturbance is more intense are generally more difficult to rehabilitate. This translates into greater costs of rehabilitation, longer recovery periods, and greater risk of rehabilitation failures.

Other Terrestrial Wildlife Species Including USFWS BCR 9 Species

Golden Eagle
Pine stands adjacent to the proposed units are suitable nesting habitat for this species and the non forested lands are suitable for foraging. There are no known nests within or adjacent to the proposed units. Neither the proposed action nor any of the alternatives is expected to affect this species.

Flammulated Owl
Pine stands adjacent to the proposed units are suitable nesting habitat for this species. Because this species is not known to use juniper piles for nesting or foraging, neither the proposed action nor any of the alternatives is expected to affect this species.

Williamson's Sapsucker
This species has not been documented in the proposed project area, but it may occur there. This species is closely associated with ponderosa pine trees and snags. Pine stands adjacent to the proposed units are suitable nesting habitat for this species. Because this species is not known to use juniper piles for nesting or foraging, neither the proposed action nor any of the alternatives is expected to affect this species.

Loggerhead Shrike
This species is associated with open, non-forested, shrub habitats. This species has not been documented in the proposed project area, but it likely occurs there. Leaving the juniper piles on site could potentially benefit this species because it hunts from elevated perches and piles provide perches above the shrub layer. Conversely, removing the piles either by burning or yarding would free up growing space for shrubs and grasses. Yarding juniper piles using one-end suspension would impact the treatment area the most, due to the high level of shrub and grass layer disturbance. In areas of average pile densities, burning the piles would generally have less impact on this species because shrub and grass layer disturbance in the treatment area is minimized.

Brewer's Sparrow
This species has not been documented in the proposed project area, but it undoubtedly occurs there. It is common in shrub and grassland habitats in the Klamath Basin. The proposed project's potential impact on this species is limited to the project's potential to change the density of shrubs and grasses in the treated units. Yarding juniper piles using one-end suspension would impact the treatment area the most, due to the high level of shrub and grass layer disturbance. In areas of average pile densities, burning the piles could have less impact on the treatment area because shrub and grass layer disturbance is minimized, and the juniper debris is removed freeing up growing space for shrubs and grass. Leaving the juniper piles on site would impact this species by reducing the growing space available for shrubs within the units, and might increase predation on this species by providing additional elevated raptor perches above the shrub layer.

Mule Deer
All of the project units are within winter, or transitional range for mule deer. Mule deer are primarily browsers, but their diet shifts seasonally to include more grasses and forbs when those plants are in succulent growth stages in the spring and early summer. Native shrubs such as bitterbrush, mountain mahogany species, Klamath plum and other *Prunus* species and sage species are key forages. The majority of the junipers have already been cut and piled on units proposed for treatment by either pile burning or juniper yarding. The cutting of the junipers has set these units on a trajectory for increased shrub survival and establishment, and a flush of both desirable perennial grasses and undesirable annual grasses. Under all the alternatives (including the No Action) the open growing space, nutrients, and water made available by cutting the junipers will be used by increases in the size of the residual shrubs and grasses as well as recruitment of new plants, mostly of the same species occupying the units prior to juniper cutting. Where the alternatives differ with regards to effects on mule deer habitat is in the degree, amount and pattern of disturbance of the residual desirable vegetation and soils that will result from each alternative. The range management/ vegetation response discussion elsewhere in this document describes each alternative's likely effects on vegetation within the treated units. For mule deer, the alternatives that result in less vegetative and soil disturbance are more beneficial that those that result in more vegetation and soil disturbance. The alternatives that result in lower likelihood of invasion by weedy annual grasses such as cheatgrass are more beneficial than those that result in a higher likelihood of invasion. The No Action Alternative would be the most beneficial for mule deer because the existing piles provide visual screening from hunters and predators, and provide shady spots for bedding and thermal regulation. The piles occupy approximately 3-20% of the ground surface of the units so the reduction in shrub and herbaceous growth due to piles occupying growing space would be low.

Pile burning on winter range during the seasonal restriction period would be compatible with deer winter range objectives because pile burn operations are limited in duration, usually one to five days per unit, and often the burn days are not consecutive. Thus any disturbance/displacement to wintering deer would be minimal.

Cumulative Effects
The cumulative effects of the alternatives on wildlife habitat would be the same as described in the rangeland vegetation section.

Mitigation
Proposed mitigation would be the same as proposed in the rangeland vegetation section.
It should be noted that the likelihood of success for mitigation measures applied for rehabilitation of rangeland vegetation damaged by disposal activities under any of the action alternatives would be expected to vary based on the degree of disturbance. As a general rule, sites with more disturbed ground and where the disturbance is more intense are generally more difficult to rehabilitate. This

translates into greater costs of rehabilitation, longer recovery periods, and greater risk of rehabilitation failures.

Hydrology and Water Quality– Affected Environment

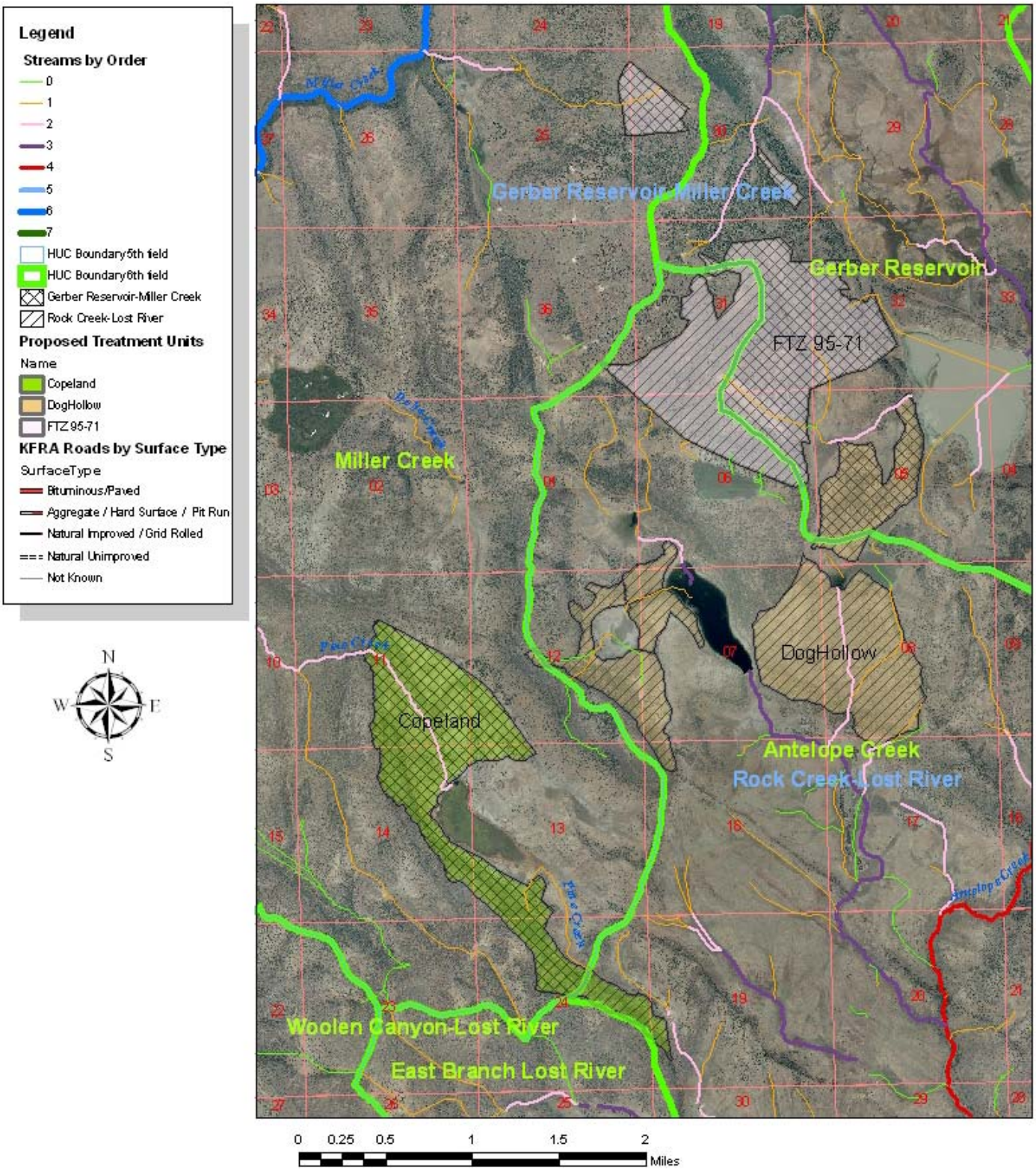
The project area contains juniper cutting units in two 5th field watersheds: 1,084 acres in the Rock Creek-Lost River watershed and 1,267 acres in the Gerber Reservoir-Miller Creek watershed. These treatment acres comprise 2.2% and 0.71% of the 5th field watershed areas respectively. Within the Rock Creek-Lost River watershed, 99% of the treatment acres are within the Antelope Creek subwatershed with only 0.5 acres in the East Branch Lost River subwatershed. Within the Gerber Reservoir-Miller Creek watershed, 636 acres are within the Gerber Reservoir subwatershed, primarily draining into Round Valley Reservoir and 631 acres are within the Miller Creek subwatershed draining directly into Miller Creek below Gerber Dam. At the 6th field watershed scale 3.3% of the Gerber Reservoir subwatershed and 2.4% of the Miller Creek subwatershed are proposed for treatment. All streams in and adjacent to the proposed treatment units are first or second order streams.

Slopes in the project area are low to moderate, mostly ranging from 0 to 15%. The Copeland unit has the some of the steepest slopes (up to 20%) but the unit as a whole averages only about 5%. Although soils in the area are generally classified as well-drained, much of the area has shallow soils underlain with duripan which is highly impermeable. Once these soils become saturated during wet conditions and or frozen, surface runoff becomes extensive. If soils are in a highly disturbed state, surface runoff is likely to transport soil particles which contain nutrients (nitrogen and phosphorus bound to the soil particle. These nutrients can become dissolved in the water column and impact water quality conditions in downstream stream and reservoirs.

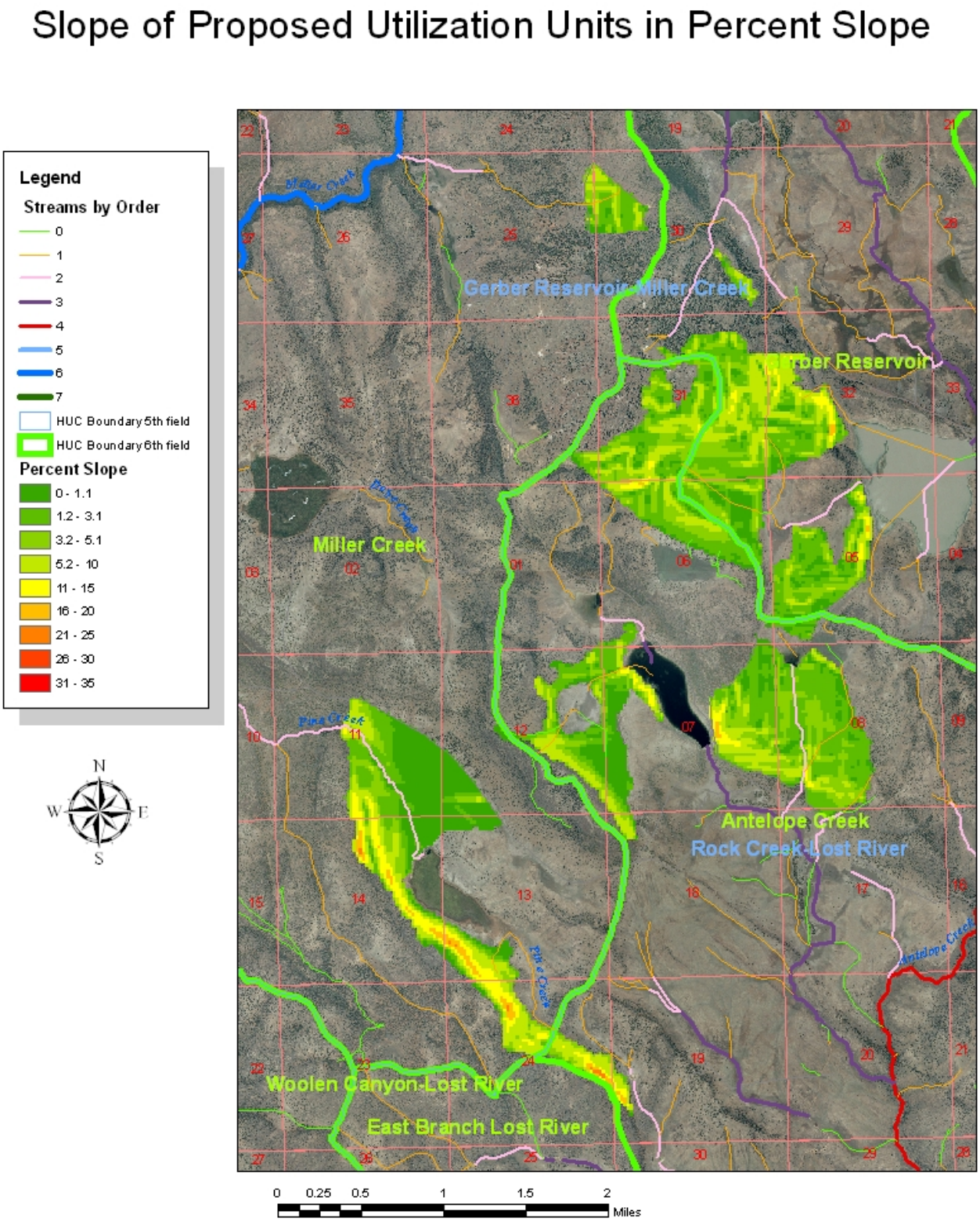
Perennial shrubs and grasses have the capacity to induce higher rates of water infiltration and reduce erosion potential relative to areas with dense juniper or annual grass and forbs. Management actions that induce the spread and colonization of annual plants such as invasive grasses increase erosion potential. Increased runoff due to compaction and soil disturbance could lead to localized erosion and increases in peak flows at project local scales.

Map 3 – Hydrology of the Proposed Utilization Units

Hydrology of Proposed Utilization Units



Map 4 – Percent Slope of the Proposed Utilization Units



Hydrology and Water Quality– Environmental Consequences

Direct and Indirect Effects of Proposed Action – One end suspension mechanical yarding.

The direct effects of yarding on hydrologic function include the potential to increase surface runoff and erosion due to compaction and disturbance especially if rutting and compaction result in the formation of new surface drainage networks within the skid trail network.

The dragging of juniper may result in the removal of grass and forb cover thus increasing erosion potential. If the disturbance and removal results in spread and colonization of invasive grasses and forbs, this will further increase erosion potential. Any effects of increases in peak flows or sedimentation would likely only occur at the project unit scale and would not be apparent at the watershed or subwatershed scale (5th or 6th field watersheds). There are no perennial streams or streams higher than 2nd order intermittent near treatment units such that sediment impacts would be expected to reach nearby water bodies with fisheries resources.

The flatness (0-15%) of most of the areas within cutting units suggests that erosion and surface runoff potential is low. However, rutting that is not addressed by thorough water barring and other mitigations could result in substantial surface runoff erosion regardless of slope. The short-term increase in exposed soil conditions in combination with increases in compaction, rutting or other disturbances that increase surface run-off will lead to temporary increases in transport of soil based nutrients. Smaller areas of disturbance and compaction are less likely to produce surface runoff and erosion than larger areas.

Mitigation

Seeding, planting temporary road and skid trails to improve infiltration and create ground cover; loosening compacted soil of skid trails and landings (if present) to reduce erosion potential and increase seeding success; water barring and spreading slash to prevent increase in drainage network; obliteration of temporary roads to limit OHV use and reduce compaction; limit skidding to horizontal or angled skidding to reduce erosion and sediment transport potential, limit operations to when soils are dry (See BMP & Project Design Features in Appendix A for Soil Resources), and minimize size of landings to less than one acre.

Direct and Indirect Effects of Alternative 1 – Mechanical Yarding, Full Suspension

Full suspension yarding would be expected to have the similar effects as one end suspension with the exception that there would be relatively less soil disturbance and compaction from not dragging junipers. According to the project description, approximately 7-15 % of the area would be disturbed by skid trails and landings if full suspension is applied. The potential for spread and colonization of invasive annual plants would be less and thus the potential for reduced hydrologic function due to poor ground cover conditions.

Mitigation

Seeding, planting temporary road and skid trails to improve infiltration and create ground cover; loosening compacted soil of skid trails and landings (if present) to reduce erosion potential and increase seeding success; water barring and spreading slash to prevent increase in drainage network; obliteration of temporary roads to limit OHV use and reduce compaction; limit skidding to horizontal or angled skidding to reduce erosion and sediment transport potential, limit operations to when soils are dry (See BMP & Project Design Features in Appendix A for Soil Resources), and minimize size of individual landings to less than one acre.

Direct and Indirect Effects of Alternative 2 – Burn Only

Burning the juniper to remove juniper piles has little potential to influence hydrologic processes since the potential to increase surface erosion is low. In the long-term, the area currently covered with juniper trees is likely to colonize with shrubs and grasses which will aid in the interception and infiltration on rain and snow fall.

Mitigation
Planting/seeding burn piles to restore ground cover. Burning when soil conditions and heat intensity minimizes soil damage (wet or frozen soils).

Direct and Indirect Effects of No Action Alternative

The no action would have no ground disturbance other than the mulching effects of decomposing piles and therefore would be the least likely alternative to have hydrologic impacts. A potential indirect effect of the no action alternative could occur if piles accidentally burned due to wildfire. In the event of a wildfire, it is anticipated that the impacts to hydrologic processes would be similar in nature to the Burn only alternative.

Mitigation
No mitigation is proposed for the no-action alternative

Cumulative Effects

Previous and ongoing impacts that may be affecting hydrology in the analysis area include soil compaction and soil disturbance from grazing, extensive areas of invasive annual grasses, and the disturbance and compaction resulting from the mechanical ground based treatments used to cut the juniper proposed for treatment. Most hydrologic alteration due to changes in canopy cover occurred when the juniper was cut. There is expected to be a short-term effect of decreasing rain and snow interception from the juniper canopy removal however, conversion of juniper woodlands to predominantly shrub and grass communities is not expected to increase runoff or erosion in the long-term. Rather, juniper removal should increase infiltration and reduce erosion due to effects of expected increased shrub/grass ground cover (Pierson et al 2007; Peterson and Stringham 2008. Compaction and soil disturbance, the potential causal mechanisms for increased surface runoff and erosion, increase in potential impact in proportion to the level of ground disturbance. Due to the position in the watershed, low percent of watershed areas, relatively low slopes, and proposed mitigation measures, it is not anticipated that the any of the alternatives would have measurable impacts to water resources including effect on peak or base flows, groundwater infiltration, or water quality. The mitigation measures incorporated into the action alternatives would minimize these impacts to short-term and will likely be confined to the project area.

Aquatic Species – Affected Environment and Environmental Consequences

Round Valley Reservoir-
When full, Round Valley Reservoir has about 310 surface acres and a maximum depth of about 6 feet (Gerber Watershed Assessment, 2003). This reservoir is subject to dewatering since the water in the reservoir is intended to irrigate the Round Valley Waterspreader.

The proposed action contains two units which are near or adjacent to Round Valley Reservoir. The reservoir does not contain any federally listed or BLM sensitive fish species. Although introduced fish species have been periodically documented in the reservoir [brown bullhead *(Ameiurus nebulosus)*, white crappie *(Pomoxis annularis)*, largemouth bass *(Micropterus salmoides)* and fathead minnow

(Pimephales promelas), it is not managed as a warm water fishery (Bill Tinniswood, ODFW, 2008, Pers. Com.).

Round Valley Reservoir is only hydrologically connected through the waterspreader to Gerber Reservoir during the late winter and early spring. This project is expected to occur between June 1 and October 30 and is about 2.6 miles from Gerber Reservoir. Because of the timing of the project, flat topography and distance from Gerber Reservoir, there is no opportunity for sediment to reach Gerber Reservoir, therefore, no impacts to federally listed or BLM sensitive fish species are expected to occur.

Dog Hollow Reservoir-
When full, Dog Hollow Reservoir has about 88 surface acres and a maximum depth of 16 feet. This reservoir is subject to periodic draining for irrigation purposes (Gerber Watershed Assessment, 2003).

The proposed action contains two units which are near or adjacent to Dog Hollow Reservoir. The reservoir does not contain any federally listed or BLM sensitive fish species. The reservoir was stocked by ODFW with largemouth bass *(Micropterus salmoides)* in 1989, but went dry in 1994. It is not currently managed as a warm water fishery (Bill Tinniswood, ODFW, 2008, Pers. Com).

Water from Dog Hollow Reservoir flows down an unnamed, intermittent, seasonal stream for about 2.9 miles to the confluence of Antelope Creek. Because of the timing of the project, flat topography and distance from Dog Hollow Reservoir, there is no opportunity for sediment to reach Antelope Creek, therefore, no impacts to federally listed or BLM sensitive fish species are expected to occur.

Copeland Reservoir-
When full, Copeland Reservoir has about 78 surface acres and is considered an ephemeral lake. In most years, the reservoir becomes completely dry.

The proposed action contains one unit which is adjacent to Copeland Reservoir. The reservoir does not contain any federally listed or BLM sensitive fish species.

Water from Copeland Reservoir flows down Pine Creek, an intermittent, seasonal stream for about 5.3 miles to the confluence of Miller Creek. Because of the timing of the project, the number of irrigation diversions from Pine Creek and distance from Copeland Reservoir, there is no opportunity for sediment to reach Miller Creek, therefore, no impacts to federally listed or BLM sensitive fish species are expected to occur.

Soils - Affected Environment

The U.S.D.A. Natural Resources Conservation Service (NRCS) classifies soils into map units including one or more dominant soil map unit components and inclusions. Soil map unit components may be designated based on the soil series, slope, aspect and texture modifier. Soil series are soils grouped together with similar pedogenesis (soil formation), soil chemistry, and physical properties. Thirteen different map units have been identified in the treatment area consisting of 16 different soil series designations (Table 8 and Figure 1). Forty-four percent of the proposed treatment area is on Norcross soils, 12% on Dranket soils, 11% on Devaul soils, 10% on Bumpheads soils, and 8% on Mound soils (Table 7 and Figure 1). These soils are classified as Mollisols because they have deep, high organic matter, nutrient-enriched, surface soil, typically between 60-80 cm thick. Many of the soils within the project area formed from weathered bedrock or alluvium (material transported by streams).

Norcross Series – Soils of the Norcross series are shallow, well drained, fine-textured Mollisols that formed in volcanic ash over residuum derived from basalt. They contain large quantities of coarse fragments (gravels, cobbles, and stones), and are typically underlain by hard vesicular basalt at

depths of 18-46 inches below the soil surface. Permeability is slow and soils of the Norcross series typically occur on slopes with gradients of 0–10%.

Dranket Series – Soils of the Dranket series are deep, well drained, fine-textured Mollisols that formed volcanic ash derived from dacite and residuum derived from basalt. They typically contain 35-55% rock fragments (gravels, cobbles, and stones) and are underlain by hard vesicular basalt at 20-30 inches below the soil surface. Permeability is slow and in the proposed treatment stands, soils of the Dranket series occur on slopes of 0-15%.

Devaul Series – Soils of the Devaul series are deep, well drained, cobbly loam Mollisols that formed from basalt and tuff. They typically contain appreciable quantities of pebbles and cobbles and are underlain by weathered ash-flow tuff at depths of 45–60 inches below the soil surface. Permeability is moderately slow. In the proposed treatment stands, soils of the Devaul series occur on slopes of 2-15%.

Bumpheads Series – Soils of the Bumpheads series are moderately deep, fine textured Mollisols that formed from weathered basalt and tuff. Permeability is moderately slow and the surface layer contains about 10% stones and 15% cobbles. In the proposed treatment stands, soils of the Bumpheads series occur on slopes of 1–10%.

Mound Series – Soils of the Mound series are deep, well drained, loamy Mollisols that formed in weathered basalt and tuff and in unconsolidated earth material transported at the base of slopes by gravity. The surface layer contains 35-65% cobbles and these soils are underlain by weathered tuff rock at depths of 40–60 inches below the soil surface. Within the project area, slope gradients typically range from 0 to 70%.

Soils in the project area have been rated for their potential to erode and compact following disturbance activities using rubber tired machinery, and their susceptibility to damage from fire following juniper pile burning activities.

Table 7 – Soil types and characteristics of the Juniper Disposal treatment area

Map Unit Code	Soil series	Area (acres)	% of total area	Depth	Surface texture	Drainage	Runoff
310A	Norcross, extremely cobbly-Dranket-Norcross complex, 0-10%	1,428	42%	Shallow to mod.deep to duripan	Extremely cobbly ashy loam	Well drained	High
312A	Norcross-Dranket complex, 0-8% slopes	1,060	31%	Shallow to mod.deep to duripan	Very cobbly loam	Well drained	High
515B	Bumpheads, high precipitation-Mound-Norcross complex, 1-10%	244	7%	Mod. deep	Very stony loam	Well drained	High
350B	Woolencanyon-Notchcorral-Wonser complex, 0-8% slopes	174	5%	Shallow to a duripan	Very stony clay loam	Well drained	High
402C	Devaul-Schnipps complex, 6-20% slopes	164	4.8%	Deep	Cobbly loam	Well drained	High
344A	Norcross-Boulder Lake-Jennett complex, 0-1% slopes	138	4%	Mod. deep to duripan	Very cobbly ashy loam	Well drained	High
330B	Casebeer-Norcross-Dranket complex, 1-8% slopes	106	3.1%	Mod. deep to duripan	Very cobbly loam	Well drained	High
400C	Schnipps cobbly loam, 6-20% slopes	51	1.5%	Deep	Cobbly loam	Well drained	Very high
410D	Drakce-Rock outcrop complex, 15-50% slopes	32.3	0.9%	Deep	Very stony loam	Well drained	Very high
610A	Hippyjim silty clay loam, 0-1% slopes	2.9	0.1%	Deep	Silty clay loam	Poorly drained	Negligible
600A	Boulder Lake-Hippyjim silty clay loams, 0-1% slopes	2.2	0.1%	Very deep	Silty clay loam	Somewh at poorly drained	Negligible
602A	Boulder Lake silt loam, 0-1% slopes	0.6	0%	Very deep	Silt loam	Somewh at poorly drained	Negligible
340A	Norcross, thick surface-Casebeer complex, 0-4% slopes	0.2	0%	Shallow to duripan	Very cobbly ashy loam	Well drained	High
Total Acres		**3,405**					

Table 8 – Textures and percent of soils per treatment area

			Percent of soil series per treatment area			
Soil series	**Textures**	**Resistance to Rupture**	**FTZ 95/71**	**Copeland**	**Dog Hollow**	**% of total area**
Norcross	Extremely cobbly ashy loam, very cobbly ashy loam	Hard	54%	---------	65%	44%
Dranket	Very cobbly ashy loam, very cobbly loam, very stony loam	Slightly hard	16%	4%	20%	12%
Devaul	Cobbly loam	Soft	-------	46%	---------	11%
Bumpheads	Very stony loam	Soft	7%	---------	---------	10%
Mound	Cobbly loam	Soft	6%	---------	---------	8%
Schnipps	Cobbly loam	Soft	-------	23%	---------	6%
Woolencanyon	Very stony clay loam	Hard	-------	10%	---------	2%
Casebeer	Very cobbly loam	Slightly hard	6%	---------	---------	1%
Rock Outcrop	Unweathered bedrock	Hard	4%	---------	---------	1%
Notchcorral	Very cobbly loam	Soft	-------	6%	---------	1%
Royst	Cobbly loam	Soft	-------	---------	---------	1%
Wonser	Extremely cobbly loam	Hard	-------	4%	---------	1%
Other*			7%	7%	15%	---------
* Other soil series include mostly Jennet loam, Hippyjim silty clay loam, Olene gravelly clay, and Drakce very stony loam.						

Soils – Environmental Consequences

Fire damage potential

Soils within the proposed treatment area have been evaluated for their susceptibility to damage following juniper pile burning activities and wildfire. Long-term soil productivity is maintained when soil porosity, soil organic matter, and soil depth are not significantly reduced. Juniper pile burning can damage organic matter and affect soil porosity depending on the duration and intensity of burning materials and soil and fuel moisture content at the time of burning. Larger and wetter juniper piles will tend to burn longer and damage to organic matter will increase as the duration of soil heating increases (Pierson et. al, 2007).

As soil organic matter is destroyed by fire, soil productivity can decrease. Organic matter is important to the health and productivity of grasslands because of its nutrient and water content, its influence on physical, chemical, and biological characteristics; and its ability to support root and microbial growth. At 220°C, 37% of carbon (organic matter) can be lost and at soil temperatures of 350°C, 90% of carbon can be lost (Gaylor, 1974). Soil temperatures have been found to rarely exceed 200°C when burning dry juniper on wet soils (Miller et. al, 2005) in southeastern Oregon. Burning juniper on dry soils when ground litter water content is minimal has shown to result in surface soil temperatures exceeding 870°C and a near 100% loss of herbaceous perennials, especially bunchgrass. Water repellency or hydrophobicity is a soil physical property limiting water infiltration in which water will "ball up" on the soil surface rather than infiltrate into the soil (Debano 1981). Soil porosity can decrease following juniper pile burning or wildfires when soil temperatures are between 175°C-200°C.

The burning of soil organic matter can cause chemical changes in soils that can have both positive and negative effects on nutrient availability and plant growth. The potash (calcium, magnesium and potassium) created by burning organic matter can make the soil more alkaline, which in turn makes calcium, magnesium, and potassium more available to plants. The majority of Nitrogen stored in organic matter, however, can be lost through burning (Debell and Ralston, 1970). Above 200°C, nitrogen may be lost through volatilization when it is converted to a gas. The loss of nitrogen is

partially compensated by the increased availability of the nitrogen remaining after the fire, yet nitrogen and other nutrients can be lost from the site in smoke, by erosion or leached through the soil before they can be used.

The potential damage to soil by fire is rated based on the texture, content of rock fragments, and organic matter in the surface layer, thickness of the surface layer, and slope. Based on this criteria, the fire damage potential of soils within the treatment area is low (Forest Encyclopedia, 2008) indicating fire damage is unlikely, little or no maintenance is needed, and soil physical and chemical properties are expected to remain in good condition.

Soil Erosion

Soils within the proposed treatment area have been evaluated for their susceptibility to erode resulting from soil disturbance. The dragging of juniper material on skid trails and landings can result in the removal of vegetative cover. When soil cover is removed, soil particles are more easily detached from falling rain and can be removed from the site. Plant nutrients in the surface layer are removed as erosion occurs leaving a soil of low fertility. Potentially, sediment could enter a watercourse after leaving a road or skid trail.

The Forest Service Water Erosion Prediction Project (FSWEPP) road analysis model was used to predict (within +/-50%) runoff and sediment yield from compacted skid trails, roads, and landings (Table 9). Characteristics of the skid trails were specified in terms of climate, soil and gravel addition, local topography, drain spacing, road design, and surface and ditch condition (Elliot, 1997). Amounts of sediment reaching a channel were modeled for seven skid trail lengths (Figure 1). Rainfall and slope are both major factors in soil erosion. Overall, potential erosion within the treatment sites should be low as most of the precipitation within the proposed treatment area is snow and the slope on most of the treatment area is less than 15%.

Table 9 – Predicted runoff and sediment yield from skid trails, roads, and landings (+/- 50%)

Skid trail length (ft)	Skid trail gradient (%)	Buffer length (ft)	Buffer gradient (%)	Sediment from road (lb)	Sediment into channel (lb)
200 ft	13%	940 ft	13%	95	0
250 ft	24%	500 ft	32%	234	149
700 ft	17%	160 ft	21%	166	0
570 ft	12%	160 ft	2%	203	0
650 ft	12%	160 ft	2%	231	0
250 ft	12%	160 ft	6%	94	0
600 ft	6%	160 ft	6%	147	0

Based on field observations, there is little evidence of significant erosion in the project area. Soils are fine grained and mostly have high percentages of rock fragments indicating there is not a high potential for erosion. However, the steeper slopes are likely to be subject to erosion and transport if the vegetative cover is removed over a large area.

Soil compaction

Soil compaction and rutting has been evaluated for soils within the proposed treatment area. Soil compaction negatively affects physical and chemical properties thereby decreasing soil fertility. Compaction can increase soil bulk density and reduce plant root penetration, soil water holding capacity, and plant growth. Decreasing the soil pore space can decrease the size, reach, and extent of root systems. Destroying the soil structure can decrease water infiltration and increase runoff rates. As oxygen decreases in the soil, microbial respiration may be limited and severe compaction may disrupt root metabolism and cause the soil to become anaerobic. Soils with a range of soil

particle sizes (i.e. fine sandy loam) are generally more susceptible to compaction than soils with a more uniform particle size distribution.

Soils within the treatment area mostly have a uniform fine texture composed of coarse silt, fine sand, and clay. Finer textured soils have a higher susceptibility to compaction and generally, the risk of compaction tends to increase with increasing moisture content and the greatest sensitivity to compaction occurs at moisture contents are near but below field capacity (O'Neill 2005). Compaction is more likely to occur when bare ground is driven over when moisture content is just below field capacity. Other forest management practices using heavy metal tracked machinery has been found to cause detrimental levels of soil compaction.

Ruts can form as a result of the operation of forestland equipment, begin to concentrate soil runoff, and increase soil erosion. Criteria used to evaluate the soil rutting hazard includes the depth to the water table, the percent of rock fragments on or below the surface, the soil texture, depth to a restrictive layer, and slope. Only 18% of the area within the treatment area contains soft soils (Table 8), and nearly all soils in the treatment area contain at least 20% rock fragments (with the exception of the Boulder Lake silt loam).

Overall, dry soils are not expected to be highly compactable and susceptible to rutting because of their uniform fine texture and high percentage of stones, boulder, and cobble rock fragments. These soils with higher percentages of large rock fragments have a smaller percentage of bare ground and should be less susceptible to compaction. The Boulder Lake silt loam soil has no rock fragments and is more susceptible to compaction and rutting. This soil is only found on three acres within the project area on lake plains and has a strong very fine and fine granular structure. If these soils are wet they will be very susceptible to compaction.

Direct and Indirect Effects of Proposed Action – One end suspension mechanical yarding

Fire Damage Potential

Juniper will be yarded to landings for utilization and residual material will be burned in large landing piles. It is estimated less than 3% of the ground surface will be affected by burning landing piles. This would result in impacts of < 25 acres for FTZ 95-71, 26 acres for Dog Hollow, and 18 acres for Copeland. Larger piles will burn longer and damage to organic matter will increase as the duration of soil heating increases. Burning of dry juniper on wet soils will have less of an impact to soil organic matter yet it is expected damage to soil productivity may be significant as to limit soil productivity under burned piles for 5 to 10 years. Although soils in the proposed treatment area have a low NRCS fire damage potential rating, intense heat of long duration may cause one or more soil properties to become less than desirable and mitigating detrimental affects to soil physical and chemical properties would require special design, extra maintenance, and costly alterations.

Compaction and Erosion

One end suspension of material would result in the dragging of juniper material on skid trails. Qualitative observations to date indicate vegetation on the skid trails is often damaged or uprooted after multiple repetitive passes on the trails. Based on past monitoring of juniper removal projects and timber sales, it is anticipated 7-15% of a unit would be impacted from skid trails and landings. The WEPP model predicts up to 351 lbs. of sediment could erode from steeper (~25%), long (~250') segments of skid trails. When possible, these steeper slopes should be avoided or skid trails should be perpendicular to the slope.

Five years after juniper was yarded from the Windy Ridge treatment area (about 15 miles west of the proposed project area), vegetation has regrown on 95% of the treatment area (N. Hunner personal observation, 2008). The soils and proposed treatments of the Windy Ridge treatment area are similar to the treatments and soils of the proposed action. Therefore, vegetation on proposed juniper removal

areas is expected to cover most of the treated area (greater than 80%) within five years and accelerated wind and soil erosion is not expected to be high after five years. Re-vegetation to cheatgrass would not be considered as good of an improvement even though it does slow erosion compared to bare ground. Cheatgrass is less effective in controlling erosion than native grasses and more likely to burn in a wildfire in which erosion would subsequently increase (Ott, et al. 2003). This alternative has mitigation to seed disturbed areas with native grass seed following treatment. This would help accelerate recovery and inhibit the establishment of invasive annual species (cheatgrass).

Minor amounts of soil compaction would occur on main skid trails and around landings. Compaction is expected to ameliorate over time in these soils with high clay content due to the annual freezing, thawing, and drying typical of these smectic soils (O'Neill 2005). The Boulder Lake silt loam (on about three acres of proposed treatment area) is somewhat poorly drained and does not have rock fragments. Because of these physical characteristics, the Boulder Lake silt loam is more susceptible to erosion from wind, has a higher potential of rutting and compaction, and may remain wet for longer periods of time.

Allowing removal of firewood from cut juniper sites would only slightly increase vehicle traffic on existing roads accessing cut juniper in the proposed treatment area. These roads receive low use and are mostly closed by snow during the winter. Currently they are in good condition with minor amounts of accelerated erosion and sediment off route.

Construction of temporary roads and landings to access juniper piles can encourage off highway vehicle (OHV) traffic. Increased OHV traffic could lead to the increase in illegal user created routes and soil erosion. Currently, OHV activity is low and it is not expected OHV use will increase near units with temporary roads. Previously created temporary roads on similar units have been effectively obliterated to discourage OHV use and it is expected these temporary roads will be effectively obliterated as well.

The proposed action should have a very minimal effect on the roads near the project area especially if winter wet weather and seasonal closures can minimize soil rutting and erosion from roads. If rutting, rills, or gullies become apparent on existing roads within the proposed treatment areas, road improvements (including water bars and proper drainage) and additions of gravel, could effectively mitigate erosion and rutting. The proposed treatment area receives very little precipitation as rainfall (~5''/year), therefore, accelerated erosion will be very minimal. Accelerated erosion could occur on bare ground on steeper slopes yet most of the treatment area is on slopes less than 10% and potential surface runoff should be very minimal on most of the treatment units.

Soil Productivity

Long-term soil productivity is maintained when soil porosity, soil organic matter, and soil depth are not significantly reduced. Some soil may be removed from skid trails and landings during juniper yarding. Soil development and depth in the proposed treatment area is adequate to withstand minor amounts of soil removal on yarded treatment areas. Significant decreases in soil productivity affecting vegetation growth should not last more than five years. Decreases in soil productivity can be mitigated by re-vegetating disturbed areas. Under dry soil conditions, organic matter could burn and it may take more than five years for soil productivity to recover in localized areas yet should not be extensive enough to substantially reduce nitrogen availability of soil quality in the proposed treatment area. Damage to soil from burning juniper can be mitigated by burning dry juniper when the soil is wet. Under these conditions soil productivity under burned piles may increase.

Summary

The proposed action should not result in long term degradation of soil productivity. Under the proposed action, some amounts of decreased productivity, accelerated erosion and compaction would occur as vegetation is removed using heavy mechanical equipment on skid trails and landings

(varying from about 7-15% of the treatment areas). Short term accelerated erosion and compaction can be mitigated by seeding disturbed areas, avoiding slopes >35%, operating during dry soil conditions, covering skid trails with juniper litter and installing water bars on skid trails where erosion is a potential. Landing pile burns generating higher ground temperatures can cause localized reductions in soil nitrogen content. These losses are not likely to be extensive enough to substantially affect nitrogen availability or soil quality in the proposed treatment areas. Potential damage to the soil from burning juniper landing piles can be mitigated by burning dry juniper when soils are wet. Under these conditions soil productivity under burned juniper piles may increase.

On similar soils, juniper yarding and burning treatments using similar mitigations were found to re-vegetate in a few years. It is expected that accelerated erosion, would not occur after five years on proposed treatment areas because of applied mitigation measures including seeding disturbed areas. Although Juniper cutting is not part of this proposal, minor amounts of short term accelerated erosion and compaction would be offset by a long term decrease in erosion resulting from Juniper cutting and removal as grass vegetation increases.

Mitigation

Best management practices, project design features and mitigation proposed for vegetation recovery should include obliteration of temporary spur roads, renovating dirt roads at key locations, seeding disturbed areas with native grass seed, avoiding slopes >35%, and operating during dry soil conditions would reduce surface runoff. Covering disturbed areas with some juniper litter would reduce soil detachment and erosion, yet too much litter placed on disturbed areas may slow re-vegetation. Burning juniper piles when the soil is wet or frozen would reduce soil damage.

Direct and Indirect Effects of Alternative 1 – Mechanical Yarding, Full Suspension

Fire Damage Potential

This alternative will not change the percentage of juniper landing piles to be burned. Potential damage to soils from burned juniper piles will not differ between this Alternative and the proposed action.

Compaction and Erosion

Full suspension of material to the landing would result in less overall soil disturbance because the material would not be dragged and less uprooting of existing vegetation would occur. Fully suspending juniper may require more passes on skid trails to remove juniper and resulting compaction could be more severe than from one end suspension yarding. As less ground cover is removed in this alternative, accelerated soil erosion would be less than for one end suspension yarding.

Road usage would not differ from the proposed action for allowing removal of firewood from cut juniper sites. Potential increases to OHV/ATV traffic would be the same as for the proposed action alternative.

Soil Productivity

Less soil area should be affected by fully suspending yarded juniper, thus less existing vegetation would be removed. However, because more severe compaction could occur under Alternative 1, soil productivity may take longer to recover without mitigation compared to the proposed alternative. Significant soil compaction could be mitigated by ripping skid trails and landings.

Summary

Under Alternative 1, a smaller percentage of soil would be subject to accelerated erosion and degradation of soil productivity as less vegetation is removed on skid trails and landings. Decreased

soil porosity resulting from compaction under Alternative 1 would probably take longer to ameliorate than compaction resulting from the proposed action alternative. Amounts of soil compaction could be mitigated by ripping skid trails and landings and compaction would be significantly less when dry soil is driven over.

Mitigation

Best management practices and project design features such as; obliteration of temporary spur roads, renovating dirt roads at key locations, seeding disturbed areas, avoiding slopes >35%, and operating during dry soil conditions would reduce surface runoff. Covering disturbed areas with some juniper litter would reduce soil detachment and erosion, yet too much litter placed on disturbed areas may slow re-vegetation. Burning remnant juniper piles when the soil is wet or frozen would reduce soil damage.

Direct and Indirect Effects of Alternative 2 – Burn Only

Fire Damage Potential

For the burn only alternative there would be more burn piles as compared to Alternative 1 and the proposed action, yet the burn piles would be smaller. In the burn only alternative a greater area of soil would be affected by burn piles yet damage would be less intense compared to Alternative 1 and proposed action. Smaller burn piles in the burn only alternative would burn for a shorter duration thereby having less of an effect on soil organic matter. Soils in the proposed treatment area have a low NRCS Fire Damage Potential rating so soil damage is unlikely, minimal to no maintenance should be needed, and soil physical and chemical properties are expected to remain in good condition. Long term damage to soil productivity should be minimal. A greater overall area would be treated by only burning piles in this alternative and it is estimated 3-20% of the ground surface would be affected by burn piles (depending on juniper pile density of each treatment area). It is anticipated burning treatments will occur on wet soils during the winter and soils within the proposed treatment area are expected to re-vegetate within a few years. The soil under these burn piles is not expected to exceed 200°C at significant depth and soil productivity may increase if potash remains onsite. In southeastern Oregon burned juniper piles resulted in a more rapid recovery of perennial grass cover and density compared to piles that were not burned. Damage to soil productivity on similar juniper removal treatments on similar soils has not been significant as to negatively affect vegetation regrowth in the long term. On sites with similar soils to the west of the proposed treatment units, soils under burned piles have re-vegetated following burning (N. Hunner personal observation, 2008). However, most of this vegetation was cheatgrass, which would not be considered as good of an improvement even though it does slow erosion compared to bare ground. Cheatgrass is less effective in controlling erosion than native grasses and more likely to burn in a wildfire in which erosion would subsequently increase (Ott, et al. 2003).

Compaction and Erosion

Soil compaction is expected to be less than the Proposed Action and Alternative 1 because there would be no disturbed soil or destroyed vegetation associated with skid trails and landings. In addition, the piles are sporadic with desirable vegetation remaining between burned piles. As a result, any surface runoff should be less from burning.

Road usage would not differ from the Proposed Action and Alternative 1 for allowing removal of firewood from cut juniper sites. Minimal compaction may occur where limbs need to be re-piled after firewood cutters remove the boles. Construction of temporary roads and landings would not take place and OHV/ATV traffic would not be more likely to increase.

Soil Productivity

Alternative 2 should result in less degradation of soil productivity compared to Alternative 1 and the Proposed Action. Yarding would not occur under Alternative 2 and less of a decrease to soil

productivity would occur from erosion and compaction. Under dry soil conditions, organic matter could burn and it may take more than five years for soil productivity to recover. Damage to soil from burning juniper can be partially mitigated by burning dry juniper when the soil is wet. Under these conditions soil productivity under burned piles may increase.

Summary
Similar burned treatment areas were found to re-vegetate in a few years (N. Hunner personal observation, 2008), thus it appears that significant decreases to soil productivity would not last more than five years. Compared to the Proposed Action and Alternative 1, a larger area would be treated by burn piles and soil damage from burning would occur over a larger area. The intensity of fire and damage to soil organic matter would be lower than the burning of landing piles in the Proposed Action and Alternative 1. Compared to the Proposed Action and Alternative 1, less total soil compaction, accelerated erosion and decreased soil productivity would occur.

Mitigation
Burning juniper piles when the soil is wet or frozen would reduce soil damage.

No Action Alternative

Under the no action alternative, there would be less soil impacts in the short term (one to five years) than the proposed action and both alternatives as there would be no yarding or burning and thereby less overall ground disturbance.

Soil productivity could be more severely affected under the no action alternative if juniper debris burns during a wildfire. Leaving the juniper piles and not allowing removal of firewood results in an increased fuel loading that could eventually burn in a wildfire under very hot conditions. During a wildfire, soil moisture would likely be low and more severe and widespread damage to soil organic matter may occur than under controlled lower intensity burning.

Juniper debris may also create ideal microsites for invasion by undesirable non-native annual grasses and slow recovery of desired perennial species (Bates 2007).

Under the no action alternative, existing roads would be utilized to remove juniper for firewood. Erosion would still occur on these existing roads, yet tread wear would increase less as vehicle traffic would be less.

Overall, the no action alternative would cause less soil erosion, compaction, and degradation of soil productivity as skid trails, landings, and juniper pile burning would not occur. However, a greater percentage of area could be affected by a wildfire and degradation of soil productivity could be more severe and widespread. Native vegetation may be slower to recover if burn piles are left. Soil erosion would still occur on existing roads yet because new roads would not be created an increase in OHV user created routes would be less likely to occur.

Cumulative effects

Juniper Treatments
Although Juniper cutting is not part of this proposal, minor amounts of potential short term soil damage will be offset by a long term decrease in erosion resulting from Juniper cutting and removal, thus increasing water availability and facilitating grass vegetation increases.

Roads
Roads throughout the project area will continue to be a source of erosion. If road maintenance continues and wet season use is minimal, they will continue to be a minor source of erosion. Unauthorized OHV activity could create routes that would be a source of erosion. Currently there are

no user created routes and illegal OHV use is expected to be very minimal as law enforcement continues and temporary roads are obliterated.

Roads - Accessibility/Feasibility/Temporary Road Construction – Affected Environment

Legal Access

There is public access to all units regardless of alternative. No Right-Of-Way Agreements or temporary easements are necessary.

Existing Road Condition

- All units are accessible via asphalt, surfaced roads, and/or natural surface (dirt) roads. Some road renovation would be necessary including; widening, ditching, resurfacing, brushing, culvert replacement or removal, and small realignments. Road renovation would be implemented to allow access for equipment, reduce and redirect runoff.
- Roads to Copeland, Dog Hollow, and FTZ 95-71, are generally in a condition where a chip van could access with minimal road renovation.
- Any hauling would be limited to the summer months; May 1 to November 1 because of the dirt roads. Exceptions would be allowed on surfaced roads and under winter conditions where dirt roads are frozen or protected by snow.

Temporary Roads Needed & Landings

The following units would need temporary roads constructed to reduce yarding distances to less than 1,300 feet:

Unit Name:	**Temporary Roads Needed:**
Dog Hollow	Up to 1.0 miles
FTZ 95-71	Up to 1.5 miles
Copeland	Up to 0.5 miles
Total	Up to 3.0 miles (Approximately 6 acres)

There will be a need for landings as well as areas to turn chip vans around. Landing sizes and needs vary based upon operations. It is anticipated that landings would impact no more than 3% of any treatment unit (See Gerber Chips analysis). Material left on the landings that is not utilized would be burned and the sites seeded with grasses and/or replanted with shrubs, then tubed.

Spring Plantability

The KFRA has identified the need to analyze the accessibility of an area as it relates to the ability to access the units for spring planting needs. Generally, the KFRA plants about 100-200 acres per year of bitterbrush and other shrubs. To date, most of the planting has been done on units where the juniper has been cut, piled, and burned. Unless additional funding becomes available, it is anticipated that this level of planting will continue. It is anticipated that there are sufficient areas planned for cutting, piling, and burning (that are accessible in the spring) for planting.

Roads - Accessibility/Feasibility/Temporary Road Construction – Environmental Consequences

Proposed Action and Alternative 1

Legal Access
The proposed treatment would not modify legal access.

Impact of Road Renovation Treatments to Existing Roads
Under the Proposed Action and Alternative 1, the proposed road renovation treatments would be implemented by the contractor and would improve access to the unit locations for chip vans. Access would still be limited to primarily two wheel and four wheel drive pickups and all terrain vehicles (ATVs). The proposed road renovations are intended primarily to improve isolated spots that are impassable to chip trucks. Generally there would be some benefits from small road renovations as they would be designed to reduce and redirect any sediment from reaching drainages. During periods of chipping and hauling operations, there would be multiple uses of the proposed roads by both the general public and adjacent landowners. Signing of truck traffic and operations would serve to caution other road users. Generally, upon completion of operations, final road maintenance is required which includes water barring, water dips, and other measures to direct water off roads and to reduce rutting and sediment transport.

Impacts of Temporary Roads & Landings
Under the Proposed Action and Alternative 1, up to three miles of proposed temporary roads would be needed (approximately six acres would be impacted). Temporary road construction would result in soil disturbance, mixing of soil horizons, disturbance or removal of desirable rangeland vegetation and wildlife habitat, and an increase in sediment runoff. Temporary roads could be used by the public until obliteration occurs. Once temporary roads are obliterated, it is possible that ATVs may continue to use decommissioned areas. Temporary roads would be obliterated by pushing side cast, berms, rocks, and slash, back onto the surface and then seeding. These project design features would reduce the potential for runoff of sediment and ATV use.

Spring Plantability
Spring planting would be implemented regardless of yarding method. Present funding limits the amount of acres that can be planted annually. Regardless of alternative, there will be sufficient locations that will be accessible for spring planting.

Alternative 2 and No Action

Legal Access
The proposed treatment would not modify legal access

Impact of Road Renovation Treatments to Existing Roads
Under Alternative 2 and No Action, periodic road renovation would be done by the government and would occur as priority and funding allowed. Existing access roads would generally stay in their present conditions. Any runoff presently occurring from roads would be addressed as priority and funding allowed. There would be no anticipated change in use by the general public.

Impacts of Temporary Roads
Under Alternative 2 and No Action, no temporary road construction would occur. Soil impacts would be less than the Proposed Action and Alternative 1. Traffic would be limited to crews needed to implement burning and personal use firewood cutting. The likelihood of firewood cutters pioneering in temporary roads or trails to access the cut piles is moderate to high based upon monitoring of past public firewood cutting areas. Impacts could include locating road or trails without consideration of

slope, vegetation, riparian areas or other resources. Administration and control of firewood cutting areas in units that have been cut and piled can be more difficult than administering a single operation like a fuels or stewardship task order because much of the activity occurs on weekends and multiple parties are involved.

Mitigations Measures
Under Alternative 2 and No Action, allow firewood access only during the dry season. Roads and or trails pioneered in by the firewood cutters could be obliterated, blocked, seeded and water barred when the fuels bobcat goes back into to re-pile the residual material from the firewood cutters.

Spring Plantability
Spring planting would be implemented regardless of alternatives. Present funding limits the amount of acres that can be planted annually. Regardless of alternative, there will be sufficient locations that will be accessible for spring planting.

Air Quality – Affected Environment

Estimated tonnage in existing piles

To comply with air quality standards and prior to burning, the KFRA reports to the Oregon Department of Forestry (ODF) an estimate on the amount of tons it expects to burn for each proposed project. Approximately 23,000 tons of biomass is presently cut and piled within the 2,300 acre analysis area. The KFRA has been tracking removal of western juniper for biomass purposes since 2005 and tons/acre removed has varied from four to 15 tons/acre. In the assessment of environmental consequences below, the following assumptions are made:

1. One acre with 10 tons of piled whole junipers openly burned emits 119 lbs of $PM_{2.5}$. This same quantity of material (10 tons) burned in a biomass plant equipped with an electrostatic precipitator equates to 6 lbs of $PM_{2.5}$ (Burke 1994 & AP-42 1992). It should be noted that open burning of an acre of piled junipers does not typically consume all 10 tons of material.
2. One ton of juniper firewood burned in a wood stove emits 20-31 lbs of PM_{10} (particle sizes less than 10 microns in diameter) depending on burning practices and wood stove type (AP-42 1992). Of the 20-31 lbs of PM_{10}, nearly all of this particulate matter is $PM_{2.5}$ (less than 2.5 microns in diameter) (Rau & Huntzicker 1984).
3. Burning would be done in compliance with the Oregon Smoke Management Plan (OAR 629-048-0010) to minimize smoke impacts to populated areas.
4. Juniper processed as clean chips or saw logs and utilized in hardboard or some other forest product can result in carbon sequestration and less contribution to green house gases. It is recognized that some fossil fuels are being burned to in order to transport any biomass from the woods to the manufacturing and/or energy facilities. This EA does not speculate nor analyze the trade-offs of the amount of fossil fuels burned to transport the biomass in lieu of burning it.

Air Quality – Environmental Consequences

Proposed Action and Alternative 1

Under the Proposed Action and Alternative 1, the impacts to air quality would be similar. Those impacts would be:

- A reduction of wood smoke emissions as a result of utilizing the juniper. Juniper utilized in a biomass plant would result in a reduction of approximately 95% of the particulate matter (less than 2.5 microns in diameter) into the atmosphere. Juniper processed as clean chips or sawlogs and used in hardboard board production or other forest products can result in carbon sequestration and lower contributions of carbon dioxide to the atmosphere as well.

- Some burning of residual landing material would still occur but it is anticipated that 90+% of the debris would be utilized.
- There would be less dust generated under Alternative 1 compared to the Proposed Action because the material would be fully suspended and not dragged along the surface. The difference in dust generated from the two operations would be minimal.
- Under both the Proposed Action and Alternative 1, there would be more additional emissions of dust and diesel exhaust into the air from the yarding, chipping, and hauling operations.
- Combustion of biomass for power generation would contribute to overall greenhouse gasses, but effects are immeasurable at the level of this analysis.

Alternative 2

Under Alternative 2:

- More smoke emissions and particulate matter would occur than under any of the other alternatives.
- Burning would be implemented under approved conditions so local impact to populated areas would be minimal.
- Burning would contribute to overall greenhouse gasses, but effects are immeasurable at the level of this analysis.
- Smoke emissions vary considerably from firewood use depending upon burning practices and stove types. Under the No Action Alternative, more firewood might be utilized because the juniper would remain in place over a much longer time period, allowing greater potential for firewood use.
- Firewood utilization could result in more total emissions of carbon monoxide than yarding and hardboard manufacturing.

No Action

Under the No Action Alternative:

- There would be no smoke emissions from scheduled activities. Piles could eventually burn under a wildfire, but those emissions would be unplanned.
- Smoke emissions vary considerably from firewood use depending upon burning practices and stove types. Under the No Action Alternative, more firewood might be utilized because the juniper would remain in place over a much longer time period, allowing greater potential for firewood use.
- There would be no dust generated as the material would not be yarded, chipped, and hauled away.
- The carbon would remain as part of the slash, if not used for firewood, and released slowly via decomposition, as long as wildfire was excluded.

Socioeconomics – Affected Environment

Existing Uses

Ranching

All the units are within approved and active allotments with approved grazing permits. Grazing in the area is a long time and traditional occupation and provides positive socioeconomic benefits for the ranching industry.

Recreation

The area is popular for recreational and hunting purposes.

Western Juniper Demand

A new economic opportunity and demand has developed locally for western juniper. A number of local forest products manufacturing facilities have begun using western juniper in their production lines. A local hardboard and particleboard plant that historically utilized primarily pine chips has begun using other species including western juniper. In addition, a local sawmill continues to expand its western juniper product line including; fence boards, mining timbers, paneling, flooring, and numerous specialty products. With the increasing demand and use of western juniper come additional opportunities for employment. Additional job opportunities include; logging operations (skidding, processing, and hauling), manufacturing facilities, and secondary employment (equipment sales, repairs, fuel suppliers, retailers, etc.). For forest residue that is being used to fuel a biomass plant, approximately 4.9 jobs are created for each megawatt hour that is produced (Tad Mason, March 2008, Biomass Symposium, Medford, Oregon). It is estimated that 8,000 Bone Dry Tons (BDT) of fuel can generate 1 megawatt of electricity to power 750-1,000 homes (Tad Mason, March 2008, Biomass Symposium, Medford, Oregon). Over the past three seasons on KFRA juniper yarding projects, approximately 4-8 jobs are created during the summer months (skidder, delimber, loader operator, three truck drivers and foreman). This does not include the manufacturing industry or secondary employment opportunities. In addition, at the local REACH mill where western juniper is processed for multiple products, a number of job opportunities are made available for the mentally handicapped assisting with the production line.

Present Markets

Depending upon market prices for value added products or electricity, presently the end value of western juniper is variable and may not cover the costs of cutting, yarding, processing, and hauling to a manufacturing or biomass facility. In the case of the KFRA stewardship contract, the government presently pays to yard the material to a loading point (landing). The value of the western juniper once yarded to a landing, will cover the processing and hauling costs to local facilities. On surrounding federal lands, sometimes the logging costs do not have to be subsidized in order to get the material removed (Personal Communication 2008 – Peter Hall - Alturas BLM Forester). On the other hand, a recent BLM timber sale, the Adobe East Timber Sale, included juniper removal from the timbered stands in the southern portion of the Gerber Block. Approximately 4,882 green tons (GT) of juniper was removed from the sale and delivered to REACH without additional cost to the government.

Socioeconomics – Environmental Consequences

Proposed Action and Alternative 1

Employment Opportunity

Employment opportunity would increase. The difference between one-end suspension and full suspension of the material is minimal. Therefore there is no difference between the two alternatives in regards to employment opportunities. Fully suspending the material is harder on the equipment and the potential for more breakdowns and repair is possible. Additional employment could result in 3-7 jobs per 8,000 tons removed if utilized for energy production. Utilizing the material for hardboard or sawlogs would likely generate similar employment opportunities.

Cost of Treatment

Presently the KFRA is paying approximately $20-$50/acre to burn the western juniper and approximately $80-$100/acre to yard the material. Fully suspending the western juniper during yarding operations generally costs about $20/acre more than one-end suspension yarding. The additional cost per acre to yard the material versus burning it could result in less overall acres being treated based upon limited funding. However, as noted above and observed in an adjacent BLM district, as the local and surrounding infrastructure becomes more stable and the demand for western juniper continues to rise, it is expected that the need to subsidize the cutting and yarding operations will be reduced.

Long Term (>20 years) Supply of Western Juniper for Commercial Use
The long term strategy for managing western juniper in the KFRA is to maintain a composition of vegetation that is reflective of historic cover levels. Once the initial treatment of the encroaching western juniper is completed, follow-up maintenance treatments are anticipated when the juniper is relatively young and non-commercial. As a result, the KFRA does not expect a long term sustainable and commercial supply of western juniper (beyond 20 years) to be available from KFRA lands. In contrast, because the KFRA has approximately 20,000 to 30,000+ acres of western juniper remaining and potentially available for treatment, a short term supply (<20 years) of juniper should be available from KFRA lands for commercial use.

There are many thousands of acres of western juniper on private land in the Klamath Basin and surrounding area. The supply of western juniper on both private and public lands should result in positive socioeconomic benefits at least in the short term as long as demand continues for its commercial use; whether for hog fuel or other forest products.

Alternative 2

Employment Opportunity
There would be some employment opportunities. Often, the KFRA will contract out the burning to surrounding contractors under a service contract. This provides employment for the contractors for a short period. Depending upon the location of the units, costs/acre and associated risks can be higher. However, the overall risk of escaped fire on the three proposed units is low to moderate and well outside any WUI areas.

Long Term (>20 years) Supply of Western Juniper For Commercial Use
Under Alternative 2, the primary use of western juniper would be for commercial or personal use firewood. The existing local industries that are continuing to use western juniper for a variety of forest products and hog fuel would have to get their supply from other federal or private lands. There would be minimal incentive for the local manufacturing sector to invest any money into expanding their existing facilities or increasing their staffs.

No Action Alternative

Employment Opportunity
There would be no employment opportunities with the exception of some commercial firewood cutters. No contractors would be needed to either burn or remove the material.

Long Term (>20 years) Supply of Western Juniper for Commercial Use
Under Alternative 2, the primary use of western juniper would be for commercial or personal use firewood. The existing local industries that are continuing to use western juniper for a variety of forest products and hog fuel would have to get their supply from other federal or private lands. There would be minimal incentive for the local manufacturing sector to invest any money into expanding their existing facilities or increasing their staffs.

Cultural Resources and Native American Concerns – Affected Environment

Archaeological information indicates a continuous Native American presence in the region beginning at least 10,000 years ago (Minor et al. 1979:102). Traditionally, the area was utilized by the Modoc and Klamath peoples. Unlike the Pacific Northwest coast, the Klamath Basin was not explored in the late 18th century by coastal explorers. Land-based exploration began with the Lewis and Clark

Expedition (1805-06). Historic contact between the Native American tribes and Euro-Americans began around the 1820s and culminated with the Klamath Lake Treaty of 1864 in which the lands in and around the project area were ceded to the United States by the Klamath Tribes (Minor et al. 1979:185). The Klamath Tribes consists of the closely related Klamath, Modoc, and Yahooskin peoples. By the mid 1800s, Euro-Americans began settling the Klamath Basin.

The proposed Juniper Disposal Units have all been previously inventoried for cultural sites as part of the planning process for previous fuels reduction projects which resulted in the existing juniper piles. Each proposed juniper disposal unit has had a records review completed for known cultural sites from previous inventories. All units include some level of road construction, road renovation, or the use of ATVs for accessing existing piles and sites in these units have been flagged for avoidance from such activities.

Site monitoring activities for this project resulted in identifying juniper piles within known and unknown site boundaries in the three units identified in this EA; sites were not recorded to their fullest or identified in previous work by contract archaeologists. Prior to juniper utilization in FTZ 95/71, Dog Hollow, and Copeland units the juniper piles within the 13 site boundaries will need to be mitigated by removal of these piles as outlined in the mitigation plan developed by the KFRA Archaeologist (Brown 2008). FTZ 95/71 has three sites that will require juniper pile mitigation, Dog Hollow has one site that will require mitigation, and Copeland has nine sites what will require juniper pile mitigation.

The Klamath Tribes were made aware of this project at the bi-monthly tribal consultation meeting on April 16, 2008, and as long as sites are freshly flagged and avoided they have no concerns with the undertaking. The Klamath Tribes have also been consulted regarding the juniper piles within site boundaries and the need for their removal in September and October 2008 discussions, and the November 2008 bi-monthly meeting.

Cultural Resources and Native American Concerns – Environmental Consequences

Proposed Action and Alternative 1

Mitigating Measures

Sites near juniper piles, roads, new roads, or units accessed with ATVs are flagged for avoidance and existing juniper piles within the 13 site boundaries will be removed in conformance with the juniper mitigation measures report by the KFRA Archaeologist prior to implementing juniper utilization.

Alternative 2

Mitigating Measures

Sites near juniper piles are flagged for avoidance as a buffer and existing juniper piles within the 13 site boundaries will be removed in conformance with the juniper mitigation measures report by the KFRA Archaeologist prior to implementing Alternative 2.

No Action Alternative

No mitigating measures needed.

Noxious Weeds – Affected Environment

Many noxious weed species have a competitive advantage over native species in areas where existing vegetation is disturbed. Within the FTZ97-71, Dog Hollow, & Copeland project areas, human activities including timber harvest, grazing, recent machine cutting & piling of western juniper and past road construction have created disturbed conditions. Consequently, noxious weeds have become

established in a wide range of habitats, including riparian areas and wetlands, roadsides, campgrounds, rock pits, trails, forested and non-forested areas. These unwanted, introduced species have the potential to adversely affect species diversity, special status plant/animal species, range condition and forage production.

Botanical surveys were conducted in the FTZ97-71, Dog Hollow, & Copeland project areas in 2001, 2002, and 2003. Three species of noxious weeds were documented on BLM lands within the analysis area. These species are medusahead (*Taeniatherum caput-medusae*), Canada thistle (*Cirsium arvense*), and musk thistle (*Carduus nutans*). Bull thistle (*Cirsium vulgare*) was also observed within the analysis area. See Table 11 for sectional descriptions of noxious weed locations. Extensive populations of musk, bull and Canada thistle occurred at the time of survey on the western edge of Round Valley Reservoir immediately adjacent to the FTZ95-71 and Dog Hollow project areas. However, a recent visit to the area indicates that noxious weed treatments have been effective on the musk and Canada thistle and only bull thistle was located adjacent to Round Valley Reservoir. Another population of musk thistle occurs within the project boundaries of the NE Dog Hollow unit. Additionally, medusahead, a state listed noxious weed, exists in scattered populations in the Copeland and Dog Hollow project areas.

Musk thistle is a biennial plant that aggressively invades disturbed sites and can form dense stands which eventually crowd out desirable plants. This thistle is generally found in forested areas that have been logged or can be found in other areas associated with ground disturbance. Canada thistle has the capability to remain in relatively small populations for a number of years then increase exponentially. It is an aggressive colony forming perennial that reproduces by seed and by rhizomes that enable this plant to spread rapidly over large areas. This weed commonly invades riparian areas and has the capability to crowd out the native riparian flora, forming extensive underground rhizomes that are currently controllable only by translocated herbicides. Medusahead is an annual invasive grass that has been increasing on BLM lands in the Gerber area. Please refer to the discussion in the Rangeland Vegetation Environmental Consequences section for more medusahead information. Bull thistle is a biennial that is closely associated with physical disturbance, and can be the dominant species on extremely disturbed sites, such as landings, where it persists for approximately 5-10 years following disturbance.

Noxious Weeds – Environmental Consequences

Transport of Noxious Weed Propagules

Any vehicular traffic in the project areas has the potential to introduce noxious weed seeds and propagules. Project design features for the prevention of the introduction of noxious weed seeds and plant parts would reduce the potential for the dispersal of these species into the project area (See Appendix A.). The potential exists to spread known populations of noxious weeds as a result of project activities. Flagging and avoidance of these populations will reduce the potential to spread these noxious weeds. Additionally, project design features to avoid known noxious weed populations completely and wash vehicles before leaving these areas would reduce the potential to spread noxious weeds (See Appendix A.).

Soil Disturbance

Vehicles and heavy machinery traveling in project areas will cause soil disturbance. This could result in colonization or an increase of noxious weeds in the project areas. However, seeding and planting native species would provide competition against noxious weed invasion.

Fire Damage

Fire damage would be minimal under the Proposed Action and Alternative 1 since only debris remaining after yarding would be burned.

Direct and Indirect Effects of Proposed Action – One end suspension mechanical yarding

Transport of Noxious Weed Propagules
The vehicles and machinery entering the project area to implement these treatments would increase the potential for the introduction of noxious weeds into the area from sources outside the project area.

Ground Disturbance
The effects of using one end suspension methods would result in ground disturbance to 7-15% of the project area. The use of the mechanical equipment in the Proposed Action will create the disturbed conditions under which many noxious weeds have a competitive advantage.

Fire Damage
Fire damage would be minimal in the Proposed Action since only landing debris and inaccessible piles remaining after yarding would be burned. However, burning has increased noxious weed populations located in or next to burn piles in similar habitats in this resource area.

Mitigation
Flagging noxious weed populations near roads and within project areas will aid in avoiding these populations. Treating known noxious weed populations with herbicides or mowing to prevent seed heads prior to yarding work will reduce the spread of plants. Yarding through concentrated areas of noxious weeds should be avoided to limit spread. Pressure washing or otherwise cleaning equipment and vehicles prior to arrival at the project area will reduce the risk of transporting noxious weeds to the site. Seeding disturbed ground with native grass seed and planting native shrubs will colonize bare areas, improve habitat, and limit noxious weed invasion.

Direct and Indirect Effects of Alternative 1 – Mechanical Yarding, Full Suspension

Transport of Noxious Weed Propagules
The vehicles and machinery entering the project area to implement these treatments would increase the potential for the introduction of noxious weeds into the area from sources outside the project area.

Ground Disturbance
The effects of using full suspension methods would decrease ground disturbance of the project area when compared to one-end suspension. The use of the mechanical equipment in Alternative 1 will create the disturbed conditions under which many noxious weeds have a competitive advantage.

Fire Damage
Fire damage would be minimal in the Proposed Action since only landing debris and inaccessible piles remaining after yarding would be burned. However, burning has increased noxious weed populations located in or next to burn piles in similar habitats in this resource area.

Mitigation
Flagging noxious weed populations near roads and within project areas will aid in avoiding these populations. Treating known noxious weed populations with herbicides or mowing to prevent seed heads prior to yarding work will reduce the spread of plants. Yarding through concentrated areas of noxious weeds should be avoided to limit spread. Pressure washing or otherwise cleaning equipment and vehicles prior to arrival at the project area will reduce the risk of transporting noxious weeds to the site. Seeding disturbed ground with native grass seed and planting native shrubs will colonize bare areas, improve habitat, and limit noxious weed invasion.

Direct and Indirect Effects of Alternative 2 – Burn Only

Transport of Noxious Weed Propagules

The vehicles entering the project area to implement these treatments would increase the potential for the introduction of noxious weeds into the area from sources outside the project area. This effect would be less than under the Proposed Action and Alternative 1 because only BLM fire vehicles would be entering the project area, resulting in minor ground disturbance. The potential exists to spread known populations of noxious weeds as a result of project activities. Flagging and avoidance of these populations will reduce the potential to spread these noxious weeds. Additionally, project design features to avoid known noxious weed populations completely and wash vehicles before leaving these areas would further reduce the potential to spread noxious weeds (See Appendix A.).

Ground Disturbance

Ground disturbance would be none to minimal in Alternative 2, and should not result in an increase in noxious weeds.

Fire Damage

The area impacted by burning piles would increase under this alternative as compared to the Proposed Action. Burning has increased noxious weed populations located in or next to burn piles in similar habitats in this resource area.

Mitigation

Flagging noxious weed populations within project areas near juniper piles will aid in avoiding these populations. Treating known noxious weed populations with herbicides or mowing to prevent seed heads prior to burn work will reduce the spread of plants. Traveling through concentrated areas of noxious weeds should be avoided to limit spread. Pressure washing or otherwise cleaning fire equipment and vehicles prior to arrival at the project area will reduce the risk of transporting noxious weeds to the site. Seeding disturbed ground with native grass seed and planting native shrubs where juniper piles have been burned will colonize bare areas, improve habitat, and limit noxious weed invasion. Treating new noxious weed populations associated with the burn piles in the first few years after burning would curb spread.

No Action Alternative

Transport of Noxious Weed Propagules

Any vehicles entering the project area for firewood cutting would have only a minor effect of an increase in the potential for the introduction of noxious weeds into the area from sources outside the project area. Firewood permittees would be encouraged to clean their vehicles prior to traveling into the project areas.

Ground Disturbance

Litter and debris accumulation favor the establishment of squirreltail, the persistence of cheatgrass, and the slow recovery of other perennial grasses (Bates, 2007). The No Action alternative would favor the increase in weedy plant species, which could lead to site degradation and vulnerability to noxious weed invasion.

Fire Damage

This alternative does not include pile burning; no damage would occur.

Mitigation

Treating known noxious weed populations with herbicides or mowing to prevent seed heads prior to public firewood collecting access will reduce the spread of plants.

Cumulative Effects

The cumulative effects of past, present and future treatments include disturbance of existing vegetation and increased potential for the spread of noxious weeds in the analysis area. Project Design Features (PDFs) and Best Management Practices (BMPs) for weed prevention and soil protection have demonstrated effectiveness in controlling the spread of weeds from past activities. These measures (Appendix A) will continue to be implemented. Cumulative effects on noxious weed distribution and dispersal are expected to be minimal.

Special Status Vascular Plant Species – Affected Environment

Botanical surveys were been conducted in the FTZ95-71, Dog Hollow, & Copeland project areas in 2001, 2002, and 2003. No special status vascular plants were located within the areas identified for this project. However, populations of Bureau Sensitive *Pogogyne floribunda* and *Mimulus evanescens*, and former Bureau Assessment Species *Silene nuda* occur nearby. See Table 10 for Botanical Survey Results.

Special Status Vascular Plant Species – Environmental Consequences

Proposed Action, Alternative 1, and Alternative 2

Known special status plant populations would be identified and appropriate protection measures would be implemented, therefore, negative impacts to these populations are not expected. Protection measures can include flagging and avoiding sites, flagging of buffers around sites, or unit boundary adjustments. In the unlikely event that populations of special status plant species are undetected by pre-project surveys, the use of mechanical equipment would have the potential to impact these populations.

No Action Alternative

No special status vascular plants were located within the areas identified for this project. Populations of special status plants that are near project sites should not be greatly impacted by firewood gathering because they are not between road access and project areas. Lack of significant ground disturbance to remove or burn juniper in this alternative would not limit the spread of special status plants into the project areas. However, as mentioned in the noxious weed section, weedy species such as cheatgrass would be expected to increase under this alternative. These weedy species may inhibit potential special status plant spread. No mitigating measures needed.

Table 10 – Special Status Plant and Noxious Weed Botanical Survey Results[1]

Project Area	Range/Township/ Section	Special Status Plants	Noxious Weeds
FTZ 95-712	39S. 13E., 25	None found	Musk and Canada thistle
	39S. 13E., 30	None found	None found
	39S. 13E., 36	None found	None found
	39S. 14E., 30	None found	None found
	39S. 14E., 31	*Silene nuda*, a former BLM Assessment Species, was found in an isolated population along the edge of a dry rocky meadow	None found
	39S. 14E., 32	None found	Musk, Canada, and bull thistle found in abundance around the edge of Round Valley Reservoir; medusahead also observed near the north edge of the reservoir outside of project area.
	40S.14.5E., 6	*Pogogyne floribunda*, a BLM sensitive species, occurs in this section	None found
Dog Hollow3	40S.14.5E., 5	None found	Musk, Canada, and bull thistle found in abundance around the edge of Round Valley Reservoir
	40S.14.5E., 6	*Pogogyne floribunda*, a BLM sensitive species, occurs in this section	None found
	40S.14.5E., 7	*Mimulus evanescens*, a BLM sensitive species, occurs on the northeastern shore of Dog Hollow Reservoir	Canada thistle found on the south end of Dog Hollow Reservoir; medusahead also found
	40S.14.5E., 8	None found	Musk thistle found adjacent to the project area, across the road
	40S.14.5E., 17	None found	Medusahead
	40S.14.5E., 18	None found	Medusahead
	40S. 14E., 1	None found	Medusahead
	40S. 14E., 12	None found	None found
Copeland[4]	40S. 14E., 11	None found	Medusahead
	40S. 14E., 12	None found	Medusahead
	40S. 14E., 13	None found	None found
	40S. 14E., 14	None found	None found
	40S. 14E., 24	None found	Medusahead
	40S. 14.5E., 19	None found	Medusahead

[1] Additional in-house surveys of the project areas occurred in 2008
[2] FTZ 95-71 –2001 Round Valley Botanical Survey
[3] Dog Hollow – 2002 Midway / Kilgore and 2003 Copeland Botanical Surveys
[4]Copeland - 2003 Copeland Botanical Survey

Table 11 – Resource Impacts Summary Table – Resiliency of Unit to Disturbance

Unit Name:	Total Acres	Air Quality	Soil Impacts	Vegetation Impacts	Socioeconomic Benefits	Wildlife	
FTZ 95/71	**840**						
Dog Hollow	**852**						
Copeland	**610**						
Totals	**2302**						

Fire – Affected Environment

Current fuel within the units is generally composed of grass with large juniper piles. The juniper piles within the Dog Hollow and Copeland units still have needles, which greatly increase their flammability. The fuel within the unit is best modeled as GR2 (low load, dry climate grass)(Scott and Burgan 2005). Fire spreads rapidly through this fuel type, approximately 2 mph (160 ch/hr) under normal fire season weather. The juniper piles have little effect on the rate of spread; however they greatly increase a wildfire's resistance to suppression. This is due to the greater flame lengths and spotting distances produced.

Fire – Environmental Consequences

Proposed Action & Alternative 1

Juniper piles would be mostly removed from the units, resulting in a GR2 fuel bed. Increased medusahead or cheatgrass would further increase rate of spread of any fire. However, fire occurring within the units would be easier to suppress than under the other alternatives due to the lack of large jackpots of fuel and the presence of skid roads. Until the skid roads re-vegetate, they will provide good control points at which fires may be stopped.

Alternative 2

Juniper piles would be mostly removed from the units, resulting in a GR2 fuel bed. Fire occurring within the units would be easier to suppress than under the no-action alternative due to the lack of large concentrations of fuel. Until the burn scars re-vegetate, they will slow the spread of fire somewhat, particularly in Dog Hollow, which has a higher density of piles.

No Action Alternative

Juniper piles would remain in the units, resulting in no change in the fuel bed. Needles from the juniper piles in the Dog Hollow and Copeland units will fall off over time, decreasing flammability somewhat. Fire occurring within the units would be more difficult to suppress than under the other alternatives due to the continued presence of large concentrations of fuel.

CHAPTER 4 – CONSULTATION

Endangered Species Act (ESA) Consultation

A "No Effect" determination has been made by the BLM for all Federally Listed species for the proposed actions. There are currently no listed species or Designated Critical Habitat present and no federally listed species would be affected by the proposed action.

Tribal Consultation

This project has been presented to and discussed with Perry Chocktoot, Cultural and Heritage Director of The Klamath Tribes during regular bi-monthly consultation meetings in April 2008, as well as further discussions with both Perry Chocktoot and Les Anderson in September, October, and the November bi-monthly meeting.

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Appendix A – Assumptions and Best Management Practices

Assumptions For Analysis:

- Yarding would be done with a rubber tired grapple skidder capable of either one-end suspension or full suspension of the logs.
- Approximately 7-15% of the area would be disturbed by grapple skidders via skid trails and landings if full suspension is applied. Of this, less than 3% would be in landings and the rest in skid trails.
- Approximately 7-15% of the area would be disturbed by grapple skidders via skid trails and landings if one end suspension is applied. Of this, less than 3% would be in landings.
- Maximum yarding distance would be 1,300 feet. Temporary roads with turnarounds and landings would be needed for areas where the yarding distance exceeds 1,300 feet from existing roads (up to 3 miles of new temporary roads).
- All temporary dirt spurs would obliterated upon completion of operations.
- Some residual landing debris would remain after utilization operations are complete. This residual material would be burned on site in accordance with an approved burn plan. (Approximately 5-20% of the total burned areas would be seeded and/or planted and tubed.)
- Hauling of material: Although there are subtle differences in the type of trucks that would be used to haul material, the effects of hauling would be similar.
- Less than 3% of the yarded areas would be in landings.
- Under Alternative 2 (Burn Only) vegetation would be killed or damaged by fire on approximately 3 to 20 percent of the proposed treatment areas (variability due to different juniper densities on different units), with 3-5% of the unit resulting in soil “sterilized” or heated to the point of becoming hydrophobic and largely devoid of organic matter.
- All yarding and hauling would occur outside the seasonal restriction period for deer winter range (Nov. 1– April 15) unless approved by KFRA wildlife biologists and resource specialists.

Appendix D of the RMP (pages D1-D46) describes the Best Management Practices (BMPs) that are “designed to achieve the objectives of maintaining or improving water quality and soil productivity and the protection of riparian-wetland areas”. Best management practices are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level (D-1, Appendix D, RMP).

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Appendix C – List of Documentation Addressing the Cutting and Piling of Proposed Units

Unit Name	CX Document
Unit 95-71	OR-014-DNA-01-02
Dog Hollow	OR-014-CX-05-02
Copeland	OR-014-DNA-02-03

Appendix D - Glossary - Definition of key terms used in this document

Juniper removal/disposal: Removing western juniper out of the ecosystem by cutting and then disposing of it either by burning it on site or yarding it to a landing location where it can be processed and/or loaded on trucks and hauled away. Includes use as firewood for personal use.

Yarding: The process of moving trees or logs from the stump to a landing where they can be processed, loaded on trucks and hauled away. Includes both full suspension (all material being transported is elevated above the ground while moving), and partial suspension (one end only of logs or tree elevated while moving) techniques. Typically accomplished with rubber tired log skidder, bulldozer, or rubber tired forwarder.

Yarding distance: The distance a tree or log is moved when yarded from stump to landing.

Utilization: Disposing of cut juniper by any method other than burning it on site which includes yarding, processing and hauling for chips, sawlogs, commercial firewood, personal use firewood, posts, poles, or other products

Machine cut and pile: Severing junipers from the stump and placing the entire trees in piles consisting of multiple trees. This is usually accomplished with a tracked or rubber- tired timber harvester. After treatment, piles are distributed in variable densities across the unit.

Hand cut: Felling junipers with chainsaws.

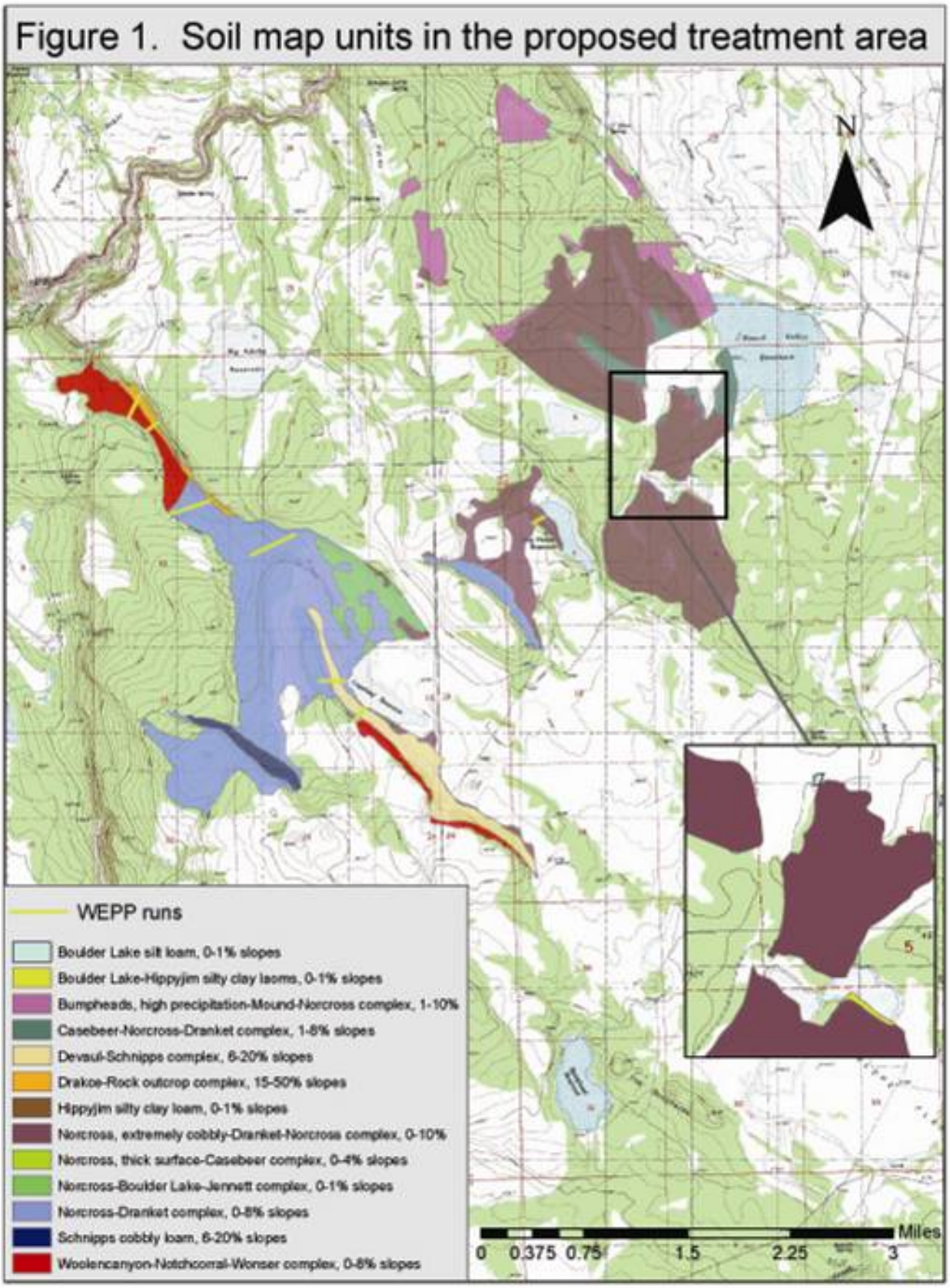
Hand cut and pile: Felling, limbing, and toping junipers with chainsaws; then hand piling all severed material generally less than six inches in diameter on the big end. Stem material greater than six inch diameter on the small end is generally not included in piles.

Skid road (skid trail): A trail used in yarding operations in order to transport trees or logs from stump to landing. Not used by haul trucks.

Temporary road (temporary dirt spur): A natural surfaced temporary road built to a standard to allow passage by log and/or chip hauling trucks. Once hauling is completed, the temporary road would be obliterated.

Road obliteration: Once hauling is completed, temporary roads would be obliterated by pushing any outside berms of rocks and dirt back onto the surface, scattering slash on the roads, seeding and/or planting with native seed and vegetation and, if possible, making the road impassable for travel to motorized vehicles.

Landing: A cleared area next to a haul road. Used for processing trees and logs and loading logs and chips onto haul trucks. May be as small as ½ acre or as large as several acres.

Haul road: A permanent road maintained in a condition to allow passage by log and/or chip hauling trucks.

Appendix E – Soil Map Units in the Proposed Treatment Area