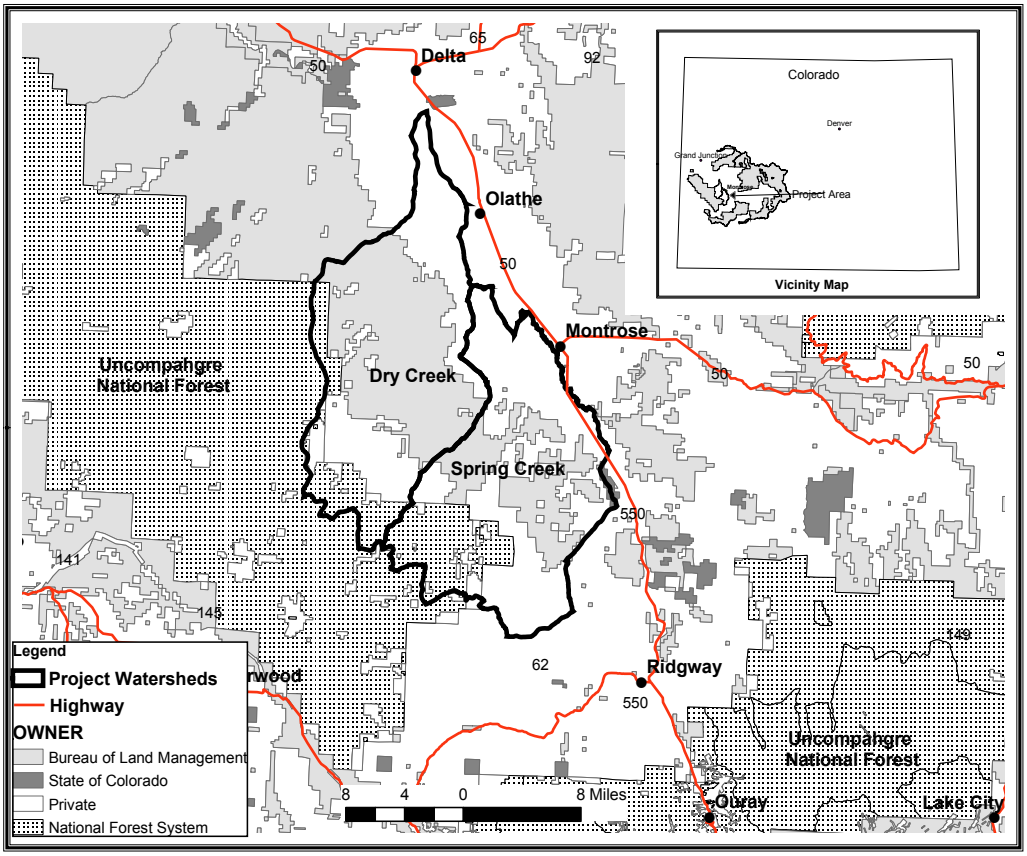
CHAPTER 1 – PROPOSED ACTION PURPOSE AND NEED

Introduction

The Forest Service proposes to apply various treatments to vegetation in the National Forest portions of the Dry Creek and Spring Creek watersheds southwest of Montrose, and is inviting public comment. The map below shows the vicinity of these treatment proposals. Specific proposals are listed, described and analyzed in following pages.

Vicinity Map of Spring Creek and Dry Creek Watersheds



Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- Introduction: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

- Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- Environmental Consequences: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource areas, as defined by significant issues identified by the ID Team. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Background

The U.S. Forest Service (FS) and the Bureau of Land Management (BLM) have written a joint vegetation management strategy for the Spring Creek and Dry Creek watersheds. This document is available from either the Forest Service in Delta, Colorado, or from the BLM in Montrose, Colorado, upon request.

Dry Creek and Spring Creek watersheds were selected for analysis and planning through a collaborative community involvement effort and an interagency interdisciplinary planning approach. Criteria used for selecting these two watersheds included the potential to improve conditions on previous projects within the watersheds, a high density of wintering mule deer combined with a low amount of high quality winter range, an opportunity to improve Gunnison sage grouse habitat, and the high level of Wildland-Urban interface (WUI) areas.

Vegetation issues identified in the vegetation management strategy indicate that the structure, composition and landscape pattern of many current vegetation cover types in these two watersheds are inconsistent with historic conditions. From the vegetation management strategy, selected treatment proposals have been identified to take forward into this NEPA process for consideration for implementation in the next five years.

It should be noted that additional treatments of tall forest cover next to the Western Area Power Alliance (Western), and Tri-State Power lines crossing the Forest in these watersheds are being considered in a separate Environmental Assessment. These treatments are stand alone treatments in the upper eleveations of the Forest, propose to treated tree vegetation and to address forest fuels, represent no opportunity of cumulative effects, or connected actions, and are affected by different issues. Hence they are being analyized separately.

Proposed Actions

Treatments proposed are represented in the follow table, maps and narratives. Units are numbered and summarized in the table, portrayed in terms of area and location on the following maps, and then described in more detail in the following narratives.

Treatment Unit Number	Acres	Vegetation Type	Treatment Method(s)	Objectives	Access #
1	41	Mature PP/oak	Thin, underburn	Stand improvement	1
2	69	PP plantation	Thin, prune limbs	Stand improvement	1
3	77	Mature PP/oak	Rx burn	Stand improvement	1
4	73	Mature PP/oak	Rx burn	Stand improvement	1
5	111	Mature PP/oak	Rx burn	Stand improvement	1
6	237	Oak,scattered PJ	Roller-choppping	Alter seral stage	1
7	101	Aspen/conif.	Rx burn	Alter seral stage	2
8 ##	79	PP/mtn shrub	Roller-chopping	Alter seral stage	2
9 ##	97	PP plantation	Pruning	Stand improvement	2
10	203	Mature PP/oak	Underburn	Stand improvement	2
11	295	Mature PP/oak	Underburn	Stand improvement	1
12	316	Mature PP/oak	Underburn	Stand improvement	1
13	551	Mature PP/oak	Underburn	Stand improvement	2
14	68	Mature aspen	Fuelwood harvest Rx burn	Alter seral stage	1
15 Deleted					
16	184	PP/mtn shrub	Rx burn	Alter seral stage	4
17	186	PP/mtn shrub	Rx burn	Alter seral stage	3
18	636	Oak,scattered PP	Roller-chopping	Alter seral stage	3
19	433	Oak,scattered PP	Roller- chopping	Alter seral stage	3
20	151	Oak,scattered PP	Roller-chopping	Alter seral stage	3
21 ##	50	PP/mtn shrub	Rx burn	Alter seral stage	1
22 ##	88	PP/mtn shrub	Commercial Thin,underburn	Alter seral stage/ Stand improvement	1
23 ##	38	PP/mtn shrub	Rx burn	Alter seral stage	1
24 ##	27	PP/mtn shrub	Rx burn	Alter seral stage	1
25 ##	59	PP/mtn shrub	Commercial Thin/ Underburn	Alter seral stage/ Stand improvement	1
26	29	PP/mtn shrub	Hydro-ax / Rx burn	Alter seral stage	3
27	22	PP/mtn shrub	Hydro-ax or Roller-chopping, Rx burn	Alter seral stage	3
28	60	PP/mtn shrub	Hydro-ax or Roller-chopping/ Rx burn	Alter seral stage	3
29	206	Oak,mtn shr, PP	Commercial Thin/ Underburn	Alter seral stage	3

Treatment Unit Number	Acres	Vegetation Type	Treatment Method(s)	Objectives	Access #
30	67	Oak,mtn shr,PP	Thin/Underburn	Alter seral stage	3
31	157	Oak,mtn shr,PP	Hydro-ax or Roller-chopping/ Rx burn	Alter seral stage	2
32	186	Oak,mtn shr,PP	Hydro-ax or Roller-chopping RX burn	Alter seral stage	2
33	406	Mature PP/oak	CommercialThin, Rx burn	Stand improvement	
43	532	Mature PP/Oak/PJ	Commercial Thin,Underburn	Fuels/stand improvement	1
Travel Management		All Forest types	Road decommissioning already identified in Uncompahgre Travel Plan within treatment units	Habitat effectiveness	N/A
Vista Points	10	Aspen, S/F	Mechanical	Alter seral stage	1

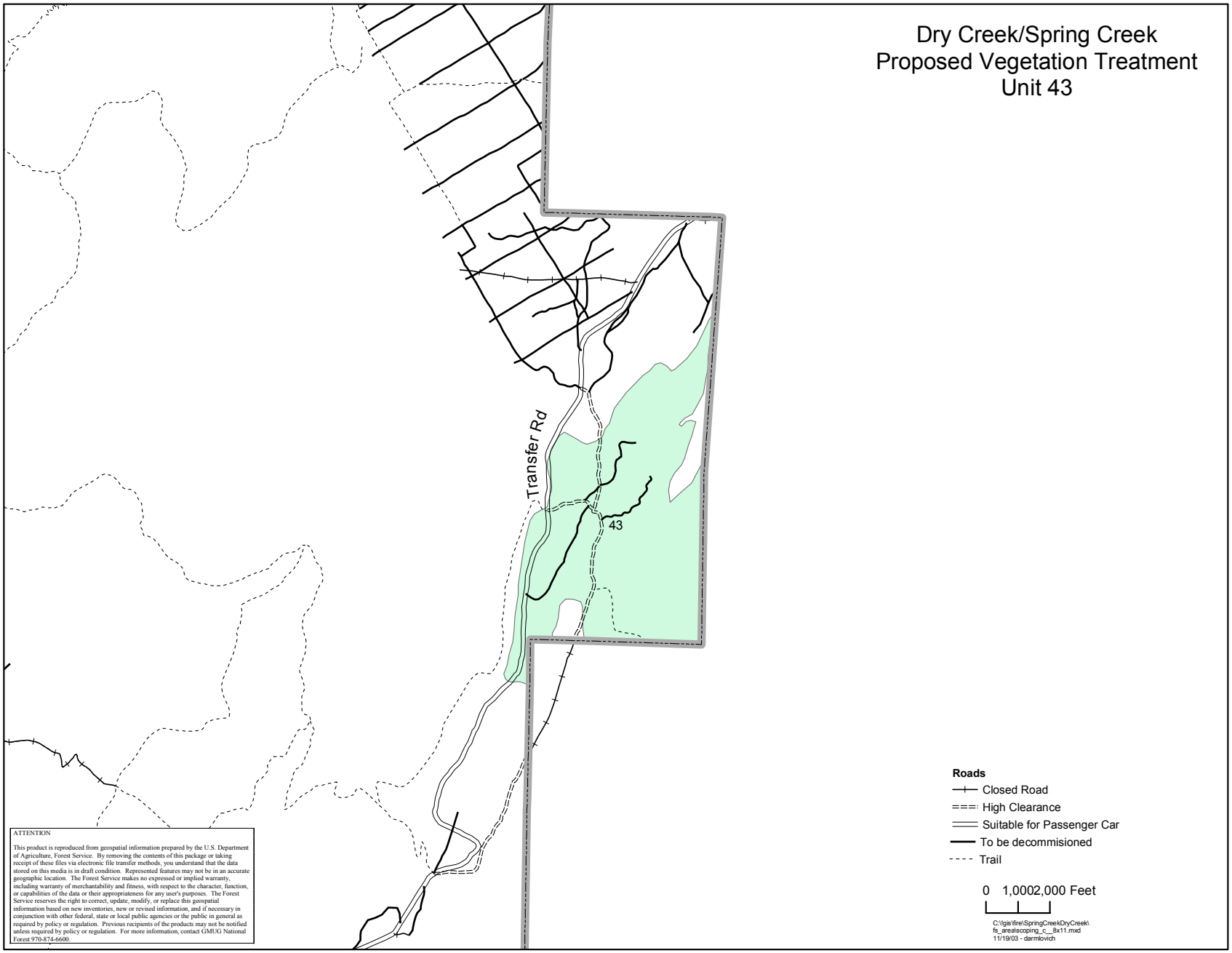
Some units have already have had some treatment, but will need further treatments

 # 1 – Use existing Roads, 2 – Use existing Roads with Maintenance, 3 – Gain access from private lands, 4 – Use Trail access

*** Unit #15 will not be considered under this EA, but will considered later with the Powerline EA.**

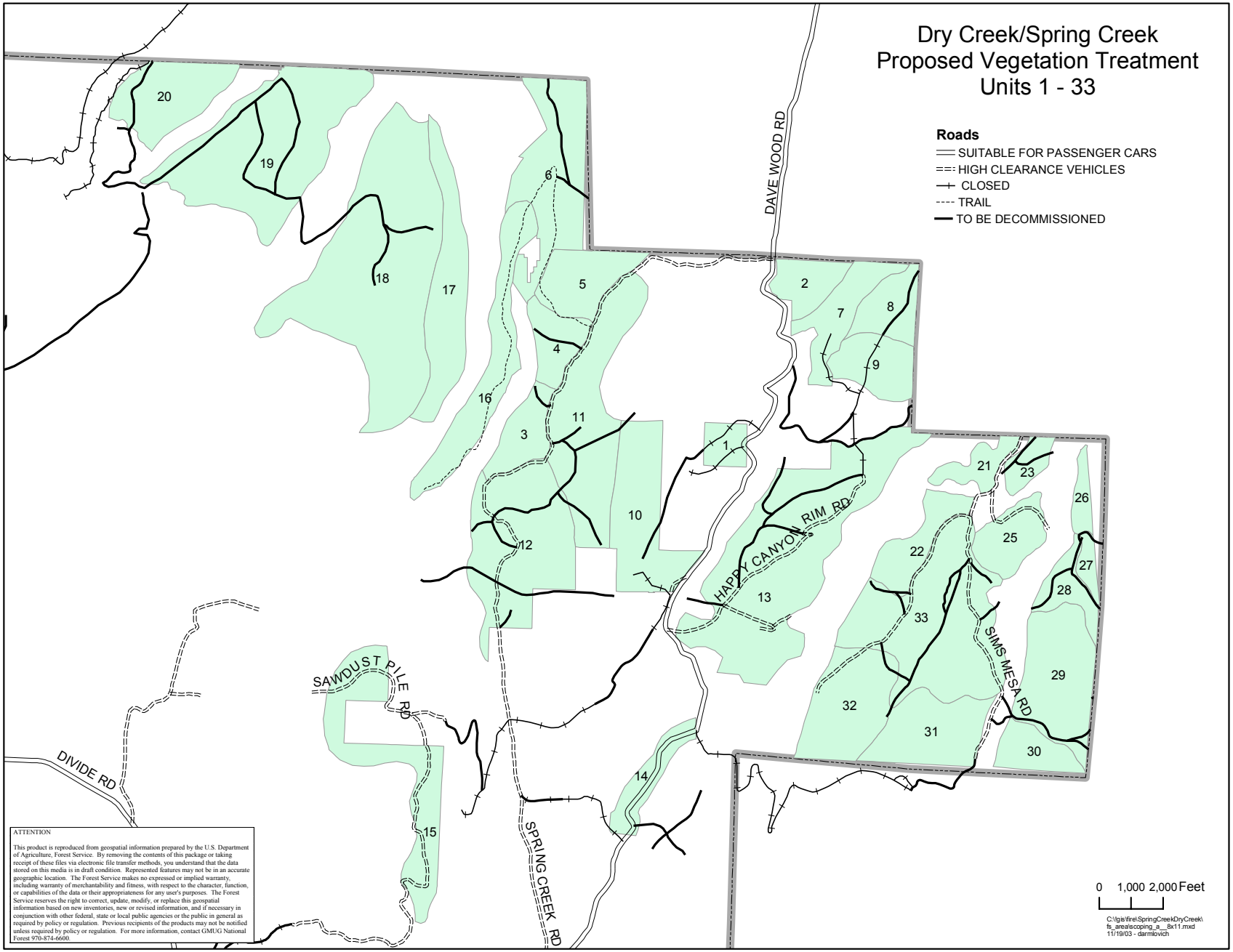
Units have had previous treatments

Dry Creek/Spring Creek
Proposed Vegetation Treatment
Unit 43



ATTENTION

This product is reproduced from geospatial information prepared by the U.S. Department of Agriculture, Forest Service. By removing the contents of this package or taking receipt of these files via electronic file transfer methods, you understand that the data stored on this media is in draft condition. Represented features may not be in an accurate geographic location. The Forest Service makes no expressed or implied warranty, including warranty of merchantability and fitness, with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes. The Forest Service reserves the right to correct, update, modify, or replace this geospatial information based on new inventories, new or revised information, and if necessary in conjunction with other federal, state or local public agencies or the public in general as required by policy or regulation. Previous recipients of the products may not be notified unless required by policy or regulation. For more information, contact GMUG National Forest 970-874-6600.



ATTENTION

This product is reproduced from geospatial information prepared by the U.S. Department of Agriculture, Forest Service. By removing the contents of this package or taking receipt of these files via electronic file transfer methods, you understand that the data stored on this media is in draft condition. Represented features may not be in an accurate geographic location. The Forest Service makes no expressed or implied warranty, including warranty of merchantability and fitness, with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes. The Forest Service reserves the right to correct, update, modify, or replace this geospatial information based on new inventories, new or revised information, and if necessary in conjunction with other federal, state or local public agencies or the public in general as required by policy or regulation. Previous recipients of the products may not be notified unless required by policy or regulation. For more information, contact GMUG National Forest 970-874-6600.

Unit #1 – This area is a mature stand of ponderosa pine with an oakbrush understory. The area would be thinned, removing the understory ponderosa pine followed by underburning to remove thinning slash and set back the oak to an early seral stage to further reduce fuel loadings and improve browse vigor/production for big game. The Access is off of the Davewood road. No R.O.W. is needed for this project area. The boundary has been surevey.

Unit #2 – This area is a ponderosa pine plantation that has been thinned three years ago and needs to have the trees pruned to reduce the amount of ladder fuels(shrubs and sage brush) which will reduce the risk of losing the stand to wildfire. The thinning and pruning will allow for low intensity fire to burn without total loss of the stand. The entire treatment area is within the Dave Wood Outdoor Education Area on the Ouray Ranger District. The treatment would be part of the resource management demonstration area for local schools. Non-motorized trails exist in this unit. Hiking, horseback riding and mountain biking are the primary recreaton uses of this area. A recreation special use permit exits in this area for day hikes. Access is off of the Davewood Road, and the area boundary between Private land and Public lands has been surveyed and posted.

Units 3, 4, 5 – These areas all consist of a mature stand of ponderosa pine with an oakbrush understory. All units would be Rx burned to reduce natural fuels and set back the oak to an early stage to improve stand conditions. NEPA completed for these units under the Ouray Small Sales EA 2002. A mixture of motorized and non-motorized uses occur above these units along trails and roads to the east. Recreation uses includes cross-country skiing, snowmobiling, ATV riding, mountain biking, hiking, horseback riding, hunting and dispersed camping. A recreation special use permit exits for snowmobiling trail grooming. The access for these units is off the spring creek rim road.

Unit 6 – This area has an overstory of mature P/J with a mixed-shrub (oak/serviceberry/mountain mahogany) understory. The site would be mechanically treated to reduce fuel continuity and set back the seral stage of the vegetation treated (mosaic pattern or savannah) to reduce fire hazard from Spring Creek canyon. The treatment would be either treated with hydro-axe or roller-chopping. Trail 116 lies partly in this unit with an unclassified motorcycle trail leading off of it to the north. Trail 116 is open to ATV use, but receives frequent use from hikers, horses and mountain bikes. The access is off the spring creek rim road. The boundary between private and public lands has been surveyed and posted.

Unit 7 – This area is a draw with an intermittent stream that has become overgrown with older shrubs and dead/dying trees. This unit will be Rx burned to alter the seral stage of the dominant vegetation. The primary emphasis is to improve habitat conditions for wildlife and remove fuel loading to reduce the chance of wildland fire from going on to private lands. This unit is within the boundaries of the Dave Wood Outdoor Education Area on the Ouray Ranger District. The treatment would be part of the resource management demonstration area for local schools. Non-motorized trails exist in this unit. Trail 115 is identified on the map as a closed road. Hiking, horseback riding and mountain biking are the primary recreaton uses of this area. A recreation special use

permit exits in this area for day hikes. The access is off the Davewood road. The boundary between private and public lands has been surveyed and posted.

Unit 8 – This is the Happy Canyon Wildlife Habitat Enhancement project area. NEPA was completed in 2002. The project will utilize roller chopping to set back the existing stands of Gambel oak and mixed-shrub to an early seral stage for mule deer and elk. The project is designed to treat 50% of the brush within the project area in patches ranging in size from 1 to 20 acres, targeting shrubs with low vigor and poor growth form. Untreated patches of brush will be left to provide mature to late seral habitat. All existing ponderosa pine and large pinyon and juniper trees will be retained on site. This project is designed and planned for implementation in coordination with the adjacent private landowner (NRCS program $). This unit is within the boundaries of the Dave Wood Outdoor Education Area on the Ouray Ranger District. The treatment would be part of the resource management demonstration area for local schools. Recreation use is non-motorized and limited by few exisiting trails or roads. The access is on FDR 510.3c. Other non-system roads within the project area will be decommissioned in accordance with the Uncompahgre travel plan. The boundary between private lands and the public lands have been surveyed and posted.

Unit 9 – This is a ponderosa pine plantation that was thinnedin 1999. The proposed action now is to follow-up with pruning and removal of shrubs and sage to reduce the ladder fuels and reduce the chance of crown fire destroying the stand. Following pruning, underburning will be used to remove slash. Burning will occur toward the end of the period covered by this analysis – probably in 2008 or 2009. This will allow time for the 1999 thinning slash as well as pruning slash to “cure,” which will reduce fuel flamability and result in a safe burn. . Recreation use is non-motorized and limited by few exisiting trails or roads. The access is off of FDR 510.3C. The boundary between private land and public has been surveyed and posted.

Units 10, 11, 12, 13 – This area consists of mature ponderosa pine with an understory of mixed-shrubs. The pine within these units will be commercially thinned to reduce stocking. Then underburned to remove slash and reduce the mixed-shrub understory. NEPA completed for #11 (Ouray Small Sales EA 2002).). A mixture of motorized and non-motorized uses occur in these units along trails and roads. Units 10 & 11 contain several miles of nordic cross-country ski trails. Recreation uses includes cross-country skiing, snowmobiling, ATV riding, mountain biking, hiking, horseback riding, hunting and dispersed camping. Several prominent dispersed campsites exists in Units 11 & 12. A recreation special use permit exists for snowmobile trail grooming. An overlook exists in unit 12. The spring creek rim road is used heavily in the summer and winter by recreationists. Road 510.3C continues to trail 115.1. Access is off of the spring creek rim road. All boundary has been surveyed and posted.

Unit 14 – This is an area of declining aspen. The unit has been designated as a public fuelwood cutting area in which standing and down dead trees will be removed. Fuelwood slash will be broadcast burned to reduce the fuel loading and help with the regeneration of the aspen stand. Motorized recreation dominates in this unit. A summer ATV and winter snowmobile staging area lies within the unit. A cut-off trail between the Davewood and Spring Creek Rim roads begins in this unit. Access is off of the Davewood road. Land lines have been surveyed and posted.

Unit 15 – Deleted

Units 16, 17 – This area consists of mature ponderosa pine with a mixed-shrub understory. The area would be Rx burned to reduce the fuel loadings and regenerate browse for big game species. Burning effectiveness very limited in #16 due to heavy livestock use. . Recreation is mainly motorized, with ATV use occuring on the spring creek trail. Access is off of the spring creek trail, it is limited to ATV and foot travel.

Units 18, 19, 20 – These units consist of gamble oak with scattered ponderosa pine and P/J over story . Up to 50% of the brush within the project areas in patch sizes of 20 to 50 acres would be roller chopped to reduce natural fuels and improve forage/browse conditions for big game. Roller chopping will focus on stands of oak and mixed-shrub with poor growth form and vigor. Untreated patches of brush will be managed to provide mature to late seral habitat. All aspen stands and ponderosa pine and P/J trees will be retained on the site. Recreation use is primarily non-motorized with limited access. The access is off of private lands from the north into unit #20. Access has been given for this project at this time. Roads within the project area will be decommissioned in accordance with the Uncompahgre travel plan. All land lines have been surveyed and postedUnits 21, 22, 23, 24, 25 – All of these areas consist of mature stands of mixed-shrubs (oak, serviceberry, mountain mahogany) with scattered over story of mature ponderosa pine. All units been treated mechanically by hydro-ax and force account chain saw crews. The CE was done in 2003, access is off the Sims Mesa road. These units will receive further treatments of Rx burning in the next 2-3 years. Unit 22 will possibly need to be commercially thinned.

Within Unit 22 is a 32-acre portion of a proposed commercial timber harvest area(THA#240). Timber would be harvested in a thinning-from-below cut, yielding an estimated Unit 14 – This is an area of declining aspen. The unit has been designated as a public fuelwood cutting area in which standing and down dead trees will be removed. Fuelwood slash will be broadcast burned to reduce the fuel loading and help with the regeneration of the aspen stand. Access is off of the Davewood road. Land lines have been surveyed and posted.

Units 26, 27, 28 – All of these areas consist of mature stands of ponderosa pine, PJ, and mountain-shrubs. All units would be mechanically treated to reduce continuous fuels and set the mixed-shrub and P/J back to an early seral stage. The larger P/J within Unit 26 will be retained to provide a savanna type mosaic. Within Units 27 and 28, mechanical treatment will remove P/J and brush. The ponderosa pine over story would be retained. Access will need to be granted from private land to do the treatment. A Rx burn would be evaluated for furhter need by post treatment monitoring. Recreation is a mix of motorized and non-motorzed occuring mainly along NFSR 574 and NFSR 574.1a. A recreation event is under special use permit in this area.

Units 30, 31, 32 – All units are dominated by mature stands of Gambel oak and mixed-shrubs with widely scattered ponderosa pine. A roleer chopper or hydroaxe would be used to mechanically treat the oak and mixed-shrub to reduce continuous acres and improve forage/browse conditions for big game. Up to 50% of the brush would be treated in patches ranging from 5 to 20 acres in size. The untreated brush would be

managed to provide mature to late seral habitat. All ponderosa pine trees will be retained.

Unit 29, 33 – This area consists of mature ponderosa pine and oak. Within Unit 33 is about 150 acres of relatively dense commercial-size ponderosa pine forest in which commercial timber harvest is proposed (all of THA #242 , about 53 acres of THA's #241, and about 14 acres of THA #240). Timber would be harvested in a thinning-from-below cut, yielding an estimated 291 thousand board-feet of wood products. The Sims mesa road would remain open following completion of the timber sale and Way 229 would be decommissioned. About two years after completion of the timber sale, a underburn would be conducted to reduce fuels and regenerate the under story vegetation to improve forage/browse conditions for big game. Recreation is a mix of motorized and non-motorzed occuring mainly along NFSR 574 and NFSR 574.1a. A recreation event is under special use permit in this area

Within Unit 29 is about 102 acres of relatively dense commercial-size ponderosa pine, which comprises THA's #244. This THA contains an estimated 469 thousand board-feet of thinnable timber. The Forest Service does not currently have access into this area, but is actively pursuing temporary access. Timber harvest is contingent upon the acquisition of access. The area will be under burned to improve the forage and browse conditions for big game.

Unit 43 – This area consists of mature ponderosa pine, PINYON/JUNIPER and oak. THA #258 is a moderately dense area of ponderosa pine in which commercial thinning is proposed. An estimated 113 thousand_board-feet of commercial timber would be cut from this area in a thinning-from-below cut.The rest of the stand will be thinned mechanically by force account crews to allow the area to be under burned without loss of over story. The area can be accessed off the Transfer road. All land lines have been surveyed and posted.

Travel Management – The Forest Service completed revision of the travel plan for the Uncompahgre NF in March of 2002. All decisions on area travel and individual route use/designations were made in that EIS. Site-specific NEPA is now required on the environmental effects of road/trail closures that result in ground disturbing activities.

We (USFS) will be generating a map and table(s) of the specific routes included in the proposed action, as well as a description of the methods proposed for decommissioning. Included are approximately 109 miles of road decommissioning and 21.5 miles of road to be limited to administrative use.

Vista Points – The Forest Service has three vista points adjacent to the Divide Road that were established in the 1990's. A turnout and sign were developed next to the Divide road, and the tree cover was removed (clearcut) to provide views of the Forest and distant landscapes. The proposal now is to maintain these openings in an early seral stage at both sites.

Purpose & Need for Action

The purpose for the proposed actions is to change vegetation age classes and vegetation conditions in specific amounts and patterns across National Forest System lands in the Dry Creek and Spring Creek watersheds so that they meet, or will be on

track to meet vegetation mosaic objectives. “Vegetation Mosaic” is the term used to describe the pattern and amounts of vegetation age classes across a landscape. There are three vegetation mosaic objectives on FS lands, each specific to a major vegetation or habitat type, and each designed to promote one of the following: 1) habitat for Threatened & Endangered species (Canada Lynx), 2) optimal fuels arrangement to prevent spread of wildfire into areas with residences, and 3) natural ecosystem function. Only one objective applies to each part of the landscape; where each objective applies is determined by the vegetation type, habitat type or presence of wildland-urban interface.

The need for the proposed action is based on an analysis which found the existing vegetation mosaic does not meet the vegetation mosaic objectives on most of the publicly owned lands in the Dry Creek and Spring Creek watersheds (USFS, BLM 2003).

1) Results of analysis of existing vegetation conditions. Existing vegetation age classes were analyzed relative to the vegetation mosaic objectives within each of the two-watersheds (UP Mosaic Group 2003). The analysis showed that each of the areas assessed had some problems relative to the objectives: they were either more than 10% away from the age class targets, and/or more than 10% away from the patch size targets. Some were missing significant amounts of acres of some age classes, and had a substantial number of acres in excess of other age classes. In many areas there was an abundance of mid and early-mid age classes, which is the result of the chainings from the 1960s. Past timber harvest in the ponderosa pine zone has created even aged and dense stands that are susceptible to stand replacement fires and insects and disease. In other areas there was too little early seral, late seral and old growth. The nature of the problems appears to be a combination of past management practices, and the issue or driving force behind the vegetation mosaic objective.

2) Mule deer decline. There is evidence that mule deer have declined on the Uncompahgre Plateau, as they are in much of the West. Data ranging from hunter success, winter aerial counts, and radio collar surveys is indicating that deer numbers have declined substantially in the last 20-30 years, and habitat quality is thought to be the biggest contributing factor (Watkins et al, 2001). Observations of browse conditions in deer winter ranges in the region indicate many stands of shrubs are dominated by older, unproductive plants that have been chronically hedged by browsing, and that the understory vegetation is often depleted. In addition, much of the winter range is currently vegetated by middle-age vegetation--young trees and dying shrubs. This particular seral stage does not produce much forage for deer. Additionally, based on 1998 census quadrat surveys by the CDOW, more than 45% of the mule deer wintering on the Uncompahgre Plateau occurred south of Roubideau Canyon in Unit 62. This area primarily consists of the Dry Creek and Spring Creek watersheds. There are opportunities to “short stop” elk on Forest Service land by improving habitat conditions along the band of upper elevation winter range thus reducing inter-specific competitive pressure on lower elevation mule deer winter range.

3) Hazardous fuels distribution and arrangement. The two-watershed area lies south and west of Montrose, a rapidly growing community. Lower parts of the watershed have a great deal of intermingled private and public land. Many of the private parcels are

being subdivided and residential construction within this vegetation zone is considered moderately hazardous for wildfire risk due to hazardous fuels. Several major electric transmission lines pass through these watersheds, and pass through these same fuel types. Fire management specialists have evaluated the distribution of fuels on nearby public lands, and determined that the vegetation is very homogeneous and very continuous. This could result in large, high intensity fires near human development. These fuels, and the potential fire behavior, also reduce the safety of firefighters attempting to control a fire (Huisjen, personal communication).

4) Poor vegetation conditions.

a) Past vegetation treatments. Large scale chainings, range improvements, and logging in the past altered the vegetation mosaic across these watersheds and established nonnative, competitive species into the native vegetation types. Now many of these treatments have aged, and there are extensive stands of mid-seral vegetation. In many of these, the understory is dominated by the introduced species.

b) Poor past grazing management. There is a history of sudden and severe overgrazing on the Uncompahgre Plateau that followed settlement. While grazing pressure and numbers have declined tremendously since that time, problems associated with overgrazing persist in some areas in the form of depleted herbaceous communities, domination by weedy exotic plants, and domination by unpalatable species. In some areas, native woody or unpalatable species dominate at high densities so that they tie up available resources and prevent establishment of palatable herbaceous plants. Many range managers believe this is a phenomenon brought about by heavy grazing (National Research Council, 1994).

c) Weeds. Noxious weeds as well as other exotics are well established in the two watersheds. Some of the noxious weeds such as hounds tongue are moving from disturbed sites of invasion into nearby undisturbed communities. Areas where the plant community is in poor condition are especially susceptible to invasion.

d) Bare ground and lack of adequate groundcover. Bare ground is vulnerable to erosion, and inhibits infiltration of water. The condition of the plant community greatly influences the amount of bare ground and surface soil protection (National Research Council, 1994). Assessments of similar plant communities in other parts of the region have indicated that semi-arid communities with high densities of woody, unpalatable species often have high levels of bare ground, as do heavily grazed areas and mid seral plant communities in the sagebrush/pinyon-juniper zone (BLM 2001).

e) Low plant species diversity. Many areas do not appear to be supporting the predicted variety of species that should be present, which has resulted in near monocultures of sagebrush, introduced grasses, and pinyon and juniper trees on BLM lands, and even aged stands. Diversity is one component of the condition of a community, which reflects its ability to recover from a disturbance, and its ability to use resources efficiently (National Research Council, 1994). Communities that have reduced diversity and high density of competitive species may not be able to increase in native species diversity without some outside intervention.

f) Perceived problems brought about through fire suppression. Fires have been actively suppressed in the two watersheds since the 1940s, and before that were most likely reduced by heavy livestock grazing of fine fuels. The ability of fires to affect large acreages and transform the vegetation community has been witnessed in the region with other wildfires, and is still evident on parts of the two watersheds where burned snags are still visible. Land managers believe that the suppression of such a powerful mechanism for shaping vegetation has led to a deficit in the amount of younger vegetation in the two watersheds compared with what would be there if fire suppression had not occurred. Research from Mesa Verde National Park indicates that the fire interval was as long as 400 years in the Park's high elevation pinyon-juniper woodland (Floyd-Hannah and Romme 1993). However since that report was written, nearly half of the pinyon-juniper woodlands in the park have burned in 6 separate fires (San Miguel 2003). More recent, but not yet completed work on various pinyon-juniper woodland stands on the Uncompahgre Plateau indicates that stand ages vary substantially (Eisenhart 2003 personal communication) indicating different fire return intervals may be associated with different parts of the region.

Vegetative Issues Within Specific Plant Communities to which Proposed Action Responds

Grass/Forb Communities

- Historic livestock grazing and fire suppression have contributed to the reduction of grass/forb communities while favoring piñon-juniper and shrub encroachment.
- The diversity and quality of the grasslands has declined due to seeding of non-native grasses and the invasion of noxious weeds.

Mountain Shrubland and Gambel Oak

- The overstory has become more decadent and dominant than would be expected historically, as a result of fire suppression. The understory has become less abundant and diverse. As a result, the available forage in this cover type is of lower quantity and quality than it is capable of producing.
- There is less patchiness and structural stage diversity in this cover type across the landscape

Ponderosa Pine

- Historic timber harvest practices have resulted in a lack of late seral structural conditions.
- Large areas of ponderosa pine are in even-aged, dense stand conditions increasing the potential of large stand replacing fires and heavy mortality from insects.

Aspen

- A large percentage of the aspen is even-aged and mature due to a large stand replacing event that occurred in 1879.
- Aspen can occur as climax self-regenerating stands, or as seral stands resulting from some disturbance, which will revert to conifer stands in the absence of

disturbances. Vegetative treatments in aspen need to consider which type of stands are being proposed for treatment.

Decisions to Be Made

Decisions to be made using the information generated through this analysis include:

- Which, if any, of the proposed treatments should be implemented;
- In treatment units that might be treated with different options (roller chop vs. hydroax, vs just Rx burn), which options should be implemented;
- Which if any, decommissioning proposals should be implemented;
- What mitigation measures should be implemented as part of treatments/action selected for implementation.

Public Involvement

The NEPA process and the associated Forest Service implementing regulations provide for an open public involvement process. The NEPA phase of a proposal begins with public and agency scoping. Scoping is the process used to identify major issues and to determine the extent of environmental analysis necessary for an informed decision to be made concerning a proposed action. Issues are identified, alternatives are developed, and the environmental analysis is conducted and documented.

These proposals were described in a scoping notice/notice of opportunity to comment that was mailed to the public and other agencies for comment on November 20, 2003. This information was also posted on the Forest www site at on the web at http://www.fs.fed.us/r2/gmug, under “Projects and Plans”.

This notice served as both scoping for these projects under the requirements of NEPA, and the 30 day opportunity to comment required at 36 CFR 215.3. Legal notice of this opportunity to comment was published in the Grand Junction Daily Sentinel, on November 25, 2003.

The proposal was also listed in the Schedule of Proposed Actions published for the following time periods:

January 1 through March 31, 2003,
April 1 through June 30, 2003,
July 1 through September 30, 2003 and
October 1 through December 31, 2003.

Contact regarding the proposals within the salvage area was initiated with Ute Indian Tribes as part of scoping.

Issues

The first step in the environmental analysis process is to determine what needs to be analyzed. "Scoping" (refer to 40 CFR 1501.7) is an open process designed to determine the potential issues associated with a proposed action and then from this list further identify those issues that are significant to the decision.

Issues are points of discussion, debate, or dispute about environmental effects that may occur as a result of the proposed action or an alternative. It is these potential environmental effects, particularly potential negative effects, which provide focus for analysis, influence alternative development, and lead to development of mitigation measures. Issues are used to display differing effects between the proposed action and the alternatives regarding specific resource elements.

A list of potential issues was developed by the Project ID Team on the basis of their knowledge of the proposed action and the area affected, and on the basis of public comment during scoping. These "potential issues" are reviewed by the interdisciplinary team to determine: a) the significant issues to be analyzed in depth, and b) issues which are not significant or which have been covered by prior environmental review and, therefore should be eliminated from detailed analysis.

SIGNIFICANT ISSUES: The following issues were identified to be significant issues to be carried through the analysis. These become the basis for the organization of Chapter 3.

Effects on soils
- Soil loss
- Erosion
- Compaction

Effects on water
- Sediment
- Yield
- Riparian Function
- Wetlands

Effects on wildlife
- Wildlife habitats and species
- Threatened/Endangered or Sensitive Species
- Habitat Effectiveness for elk/deer
- Management Indicator Species

Effects on vegetation
- Diversity/Pattern/Mosaic
- Age/Structure/Ecological Function
- Insect/disease
- Noxious weeds
- Exotic species

Effects on air
- Smoke from Rx Burning

Effects on cultural/heritage resources

Effects on visual resource

Effects on recreation
- Dispersed Recreation – summer and winter
- Trails and trailheads
  - Impact of proposals on existing trails and trailheads within treatment areas
- Recreation Special Uses
- Travel Management

- Consistency with Uncompahgre Travel Plan
- Visual Resources

Hunting

Effects on grazing management

- Forage Production
- Vegetation Composition
- Displacement of Permitted livestock
- Effects of grazing on vegetation condition

Effects on fire Hazard/Fuels

- Hazard (of catastrophic fires, large events)
- Risk of escaped fire from Rx burning
- Risk to urban facilities
- Hazardous fuels distribution/arrangement
- Cumulative effects
- Monitoring

ISSUES NOT CONSIDERED SIGNIFICANT: The following are issues identified during scoping which are not considered significant in terms of the location of proposed actions or in terms of effects.

- Effect of proposals on global climate
- Effects of proposals on microclimate within treatment areas
- Alternatives – consider use of chaining

Cumulative Actions

Cumulative actions are those past, present and reasonably foreseeable activities in or near the project areas that may not individually, but may cumulatively result in effects of concern. Consideration of these actions aids in the understanding of the context of the proposed action within the broader setting, and is important in determining whether "significant effect to the quality of the human environment" may occur as result of the propose action or alternatives.

Cumulative actions to be considered in the analysis include:

- Past timber harvest in the area
- Current small timber sales
- Happy Canyon roller chopping project
- Sims Mesa Hydroax project
- BLM vegetation/fuels treatments below National Forest.
- Winter recreation/snowmobiles/snow plowing
- Ongoing grazing
- Urban Development on Dave Wood/Sims Mesa/Government Springs

The following table summarizes activities in terms of acres of each. It should be noted that some acres have had more than one activities take place, and so acres may not add to the same total. Also, and indicated in the second part of the table, there has been considerable time between many of these activities, and natural recovery of the areas make it difficult to impossible to see the effects of them. Effects are only cumulative if they occur in the same time and space, and this does vary by resource.

Activity Acres for Dry Creek and Spring Creek

ACTIVITY GROUP	ACRES
Activity Fuels Treatment	1667
Clearcut Harvest	1755
Partial Cut Timber Harvest	3556
Precommercial Thinning	66
Range or Wildlife Mecahnical Treatment	216
Range or Wildlife Seeding	159
Reforestation	640
TOTAL	8058

ACTIVITY GROUP	1910'S	1920'S	1950'S	1960'S	1970'S	1980'S	1990'S	2000'S	TOTAL
Activity Fuels Treatment				41		1626			1667
Clearcut Harvest				909	92	284	470		1755
Partial Cut Timber Harvest			268	429		2189	654		3556
Precommercial Thinning						0	66		66
Range or Wildlife Mecahnical Treatment				58			159		216
Range or Wildlife Seeding				0			159		159
Reforestation	15	0	6	235	98	286			640
TOTAL	15	0	273	1672	190	4385	1507	0	8043

In addition, BLM on adjoining lands proposes roller chopping and hydroax treatments are planned. These are detailed in a decision dated, by BLM. These treatments could amount to up to 5,000 acres of treatments in the next five years. They lie in the lower elevations of the same watersheds examined in this EA.

CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the proposed action and alternatives to the proposed action to be considered in this analysis. It includes a description and map of each alternative considered. This section also presents a summary comparison of the effects of the alternatives in relation to the issues, defining the differences between each alternative and providing a basis for choice among options by the decision maker and the public (see table at the end of the chapter.)

Alternatives were developed to respond to the purpose and need. All alternatives are fully compliant with the Forest Plan.

Treatment Options include:

- Roller chopping
- Hydroaxing
- Controlled/Prescription burning (abbreviated Rx Burning)
- Precommercial Thinning
- Commercial Thinning
- Pruning

"Commercial thinning" in this analysis refers to the removal of commercial-size ponderosa pine trees – trees greater than five inches at breast height (DBH) - from a stand to achieve certain forest structure objectives. These objectives are expressed in terms of the types of trees selected for removal and the desired post-thinning stand density. In this proposal, commercial thinning would be accomplished by "thinning from below," which means that generally, smaller-diameter trees are targeted for removal. In thinning from below, the average diameter of cut trees is less than the average diameter of remaining trees. The post-thinning stand density goal in this project is to retain about 60 ft^2 to 80 ft^2 basal area, although 65 ft^2 is the figure used to compute volume estimates for this analysis. In a commercial thinning operation, the main stem is removed for processing into wood products and the top and branches are left in the woods as slash. Commercial thinning timber would be sold under the Ouray District small sales program in several sales to local logging companies based on highest bids received.

"Precommercial thinning" is similar to commercial thinning except that it is conducted in stands where trees are generally less than five inches DBH and thinned trees are not removed from the stand. As in commercial thinning, thinning from below is employed to select the smaller diameter trees for cutting. Post-thinning stand density is generally expressed in terms of tree spacing, for example 14-foot by 14-foot spacing, rather than basal area.

"Pruning" is the cutting of tree branches to improve tree form, wood quality, or, in the case of these proposed actions, to remove "ladder fuels" – flammable material situated close to ground level that could provide the continuous fuels necessary for a ground fire to spread into tree crowns.

Roller chopping consists of a D-9 or larger tractor pulling a large water-filled drum, with 6 to 10 inch cutting blades over the area. Using the blade, the bulldozer pushes over tall vegetation, and the drum compresses and chops it up. The result is that all

vegetation is reduced to withing 2 feet of the ground, and left as scattered woody debis. Regeneration of earlier seral plants, and of grass and forbs results.

A hydroax is essentially a very large mower. Mounted on the front end of a rubber tired loader or on the front of a D-9 Cat, it mows and chops everything in its path. It leaves finely chopped woody debris and reduces everything to within on foot of the ground.

Alternative 1 (No Action)

Under the No Action Alternative none of the proposed treatments would be implemented. Vegetation on the Forest and existing travel routes now closed to motorized use would be left to natural succession and recovery, with associated risk for catastrophic wildfire.

Alternative 2 (Proposed Action)

Under this alternative, several vegetation-altering activities, including commercial and non-commercial thinning, pruning, roller-chopping and hydro-axing,and prescribed burning would be used to create vegetation conditions less conducive to the spread of wildfire and more resistant to large-scale insect and disease mortality. Proposed treatments would be implemented over the five-year period following a decision and would be confined to National Forest lands within the mountain shrub and ponderosa pine vegetation communities. These areas are shown on Map X and activities are described in detail in Chapter 1 under the heading “Proposed Action.” Access to treatment areas would be via existing roads. Road closure would occur following the completion of treatment in accordance with the Uncompahgre Travel Plan Decision.

Alternative 3

Under this alternative all treatments proposed in Alternative 2 would be implemented with the exception of those involving commercial tree thinning.

Alternative 4

Under this alternative treatments proposed in Alternative 2 would be limited to those that fall within the Wildland Urban Interface, as defined in the recently implemented Healthy Forest Restoration Act (cite the legal shit (numer, etc)). Under this alternative some of the vegetation management objectives described under Purpose and Need above would not be met.

Units and Acres Treated by Alternative

Treatment Unit Number	Treatment Method(s)	Acres Treated Alternative 1 (No Action)	Acres Treated Alternative 2 (Proposed Action)	Acres Treated Alternative 2 (No Commercial Harvest)	Acres Treated Alternative 4 (Wildland Urban Interface)
1	Thin, underburn		41	41	41
2	Thin, prune limbs		69	69	69
3	Rx burn		77	77	77
4	Rx burn		73	73	73

Treatment Unit Number	Treatment Method(s)	Acres Treated Alternative 1 (No Action)	Acres Treated Alternative 2 (Proposed Action)	Acres Treated Alternative 2 (No Commercial Harvest)	Acres Treated Alternative 4 (Wildland Urban Interface)
5	Rx burn		111	111	111
6	Roller-choppping		237	237	237
7	Rx burn		101	101	101
8 ##	Roller-chopping		79	79	79
9 ##	Pruning		97	97	97
10	Underburn		203	203	203
11	Underburn		295	295	295
12	Underburn		316	316	316
13	Underburn		551	551	551
14	Fuelwood harvest		68	68	68
15 DELETED					
16	Rx burn		184	184	44
17	Rx burn		186	186	0
18	Roller-chopping/Rx burn		636	636	0
19	Roller-chopping/Rx burn		218	218	218
20	Roller-chopping/ Rx burn		151	151	151
21 ##	Rx burn		50	49	49
22 ##	CommercialThin/Underburn		88	60	88
23 ##	Rx burn		38	38	38
24 ##	Rx burn		27	27	27
25 ##	CommercialThin/Underburn		59	59	59
26	Mechanical Hydro-ax or Roller-chopping		29	29	29
27	Mechanical Hydro-ax or Roller-chopping, Rx burn		22	22	22
28	Mechanical/ Hydro-ax or Roller-chopping Rx burn		60	50	60
29	Commercial Thin/ Underburn		206	100	206
30	Commercial Thin/Underburn		67	25	67
31	Mechanical/Hydro-ax or Roller-chopping Rx burn		157	157	157
32	Mechanical/Hydro-ax or Roller-chopping RX burn		186	186	186
33	CommercialThin/Underburn		406	200	405
43	CommercialThin/Underburn		881	100	532
Travel Management	Road closures		*		
Vista Points	Mechanical		10	10	10

Mitigation Measures Common to All Action Alternatives

SOILS

1. Streamside buffer zones are defined as follows. Minor drainages will have a 50-foot buffer. A minor drainage channel is defined as a channel averaging greater than 2' wide and 0.25' deep, but less than a major drainage channel. Major channels will have a 100-foot buffer. These are defined as channels measuring 5' wide or greater in width and 0.5' deep. Any channel regardless of size that supports perennial flow is considered a major channel.

Limit prescribed burn ignition as much as is practicable within streamside buffer zones. No restrictions will be placed on ephemeral channels (swales) or those which measure less than the definition of a minor channel. The intent of this measure is to avoid burning buffer areas to the extent practical. In addition to ignition restrictions, including factors in the ignition plan like topography, wind direction, fuel types and breaks, etc will protect buffers. Fire that moves into buffers from adjacent areas will generally not be suppressed..

Feasibility and Effectiveness: This practice is highly feasible. This is a design criterion that would be defined in contract specifications or accomplished during unit layout. This practice is closely linked to standard practices defined in the Region 2 Watershed Conservation Practices Handbook. This is a common sense approach to sediment prevent and is effective because it disconnects the disturbance area from the drainage network.

2. Natural springs will be provided the same level of protection from prescribed fire as perennial streams.

Feasibility and Effectiveness: This practice is highly feasible. This is a design criterion that would be defined in contract specifications or accomplished during unit layout. This practice is closely linked to standard practices defined in the Region 2 Watershed Conservation Practices Handbook. The areas surround springs are important riparian areas that are relatively uncommon within the analysis area. Exclusion of activity will protect soil, water and wildlife dependant values.

3. The same protection measures will be provided for streamside zones and springs when conducting mechanical treatments as those applied to prescribed burning, with one difference. All active channels will be protected from physical disturbance. Roller chopping and/or hydroaxing may occur up to the edge of small channels (less than 2 ft wide) but the banks and bed will not be disturbed, except where crossings may be required. No special protection will be provided for ephemeral channels, unless required for other reasons.

Feasibility and Effectiveness: see the statement under #1.

4. Mechanical treatments would only be conducted when soil moisture is below the plastic limit, or protected by at least 1 foot of packed snow or 2 inches of frozen soil. Soil moisture exceeds the plastic limit if the soil can be rolled into 3 mm threads without breaking or crumbling

Feasibility and Effectiveness: This measure is moderately feasible. Certain times of the year soil moisture is generally recognized as being high (spring and possibly late fall). Conditions can change rapidly in response to precipitation that may occur during the normal operating season. If mechanical operations are already underway temporary shutdowns can be difficult to communicate and enforce. Research has demonstrated that this measure is highly effective as preventing detrimental compaction and rutting. This measure is a standard contained in the Region 2 Watershed Conservation Practices Handbook

5. No mechanical treatments will be prescribed on lands with sustained slopes of more than 20%. Short pitches up to 35% may be allowed but not exceeded.

Feasibility and Effectiveness: This measure is moderate to highly feasible. Areas with slopes greater than 20% are easily identified during the planning and layout stages of the project and can be dropped or treatment method changed. For those inclusion that are between 20% and 35% judgment will be needed by operators and contract administrators on what is appropriate. This practice is highly effective as avoidance of soil disturbance on steeper slopes is the most effective practice that can be prescribed. Staying below these thresholds will insure that erosion hazard never exceeds a moderate rating. The 35% threshold is a commonly used standard for mechanical operations in Region 2 of the Forest Service. This measure will be effect assuming that site re-vegetation is successful. Prolong rainfall or an unusually high intensity summer storm could result in some serious erosion on slopes greater than 15% making this measure less than fully effective.

MITIGATION FOR MANAGEMENT OF NOXIOUS WEEDS

A. Require all off road logging and construction equipment to be free of noxious weeds when moving onto the sale area and/or moving between units on the sale area that are known to contain noxious weeds. Specifically, Use CT6.35 - Equipment Cleaning (7/01). The contractor/purchaser has to certify that his equipment is weed free. The Forest Service would reserve the right of inspections prior to the equipment's use and to verify that each piece operating in the woods is clean.

Effectiveness: These measures have been demonstrated to be effective in reducing but not entirely eliminating the spread of noxious weeds. Not all seed can can be washed from equipment. Rubber tire of vehicles can pick up and spread seeds. These measures reduce the chance of weed spread, but must be coupled with monitoring and treatment of any incidental weed patches that do get started.

WILDLIFE

The following measures are essentially design criteria intended to minimize effects on wildlife. Treatments proposed actually provide an opportunity to create mosaics of vegetation which enhance and improve habitat. These measures would be highly effective in terms of providing this benefit. However should they not be implemented the large treatment area proposed, wildlife habitat would be reduced rather than enhanced.

All treatment areas

- Effectively decommission all roads and trails within project areas during treatment in compliance with the Uncompahgre travel plan to improve habitat effectiveness for big game.

Mechanical Treatments

- Manage for age class and patch size diversity of Gambel oak and mixed-shrub communities as described in the Dry Creek/Spring Creek Vegetation Management Strategy.
    - Create 5 to 20 acre patches of early seral habitat in a mosaic pattern within treatment areas.
    - Avoid treating patches of large diameter Gambel oak. Target patches of mid to late seral shrubs with poor growth form and low vigor for treatment.
    - Retain 20 to 50 percent of existing shrub cover on treatment sites to provide cover and mid to late seral habitat.
    - Manage untreated shrub cover within treatment areas to provide mid to late seral habitat. Stands that are retained will be left untreated to develop in to late seral habitat.
    - Retain large diameter ponderosa pine, pinyon pine, and juniper trees growing in association with Gambel oak and/or mixed shrubs.
    - Retain large diameter (12”+ dbh) ponderosa pine snags within treatment areas.

Thinning and Prescribed Burning Within Ponderosa Pine

- Provide structural habitat features and diversity within treatment units to maintain habitat capability for wildlife.
    - Retain 90-225 snags per 100 acres 10” dbh or greater. Snags can be retained as individual trees or in groups or patches.
    - Retain an average length per acre of down-dead logs that are at least 12” diameter of 50 feet per acre.
    - To provide habitat for the Abert squirrel, nesting habitat will be retained at all existing nest tree sites. This includes the nest tree and all mature trees associated with the nest tree group. In addition, retain a minimum of one group of 3-5 large (12”-20” dbh) mature trees with interlocking crowns per 5 acres within the remaining thinning area for nesting habitat.
    - Maintain existing big game hiding cover on at least 60% of each arterial and collector road left open to public travel.
    - Existing snags over 12” dbh within burning units will be protected through pre-urn site preparation and ignition techniques.
- Avoid direct impacts to species and habitats.
    - Limit spring burning to 50% of the affected treatment area each year to alleviate impacts to ground-nesting birds such as the Merriams turkey.

Minimize the use of constructed fire lines where possible. Utilize natural control features or limit line construction to hand lines where feasible.

MITIGATION FOR THE PROTECTION OF HERITAGE RESOURCES

A. Beyond the evaluations and determinations being completed to comply with Section 106 of the National Historic Preservation Act (see chapter 3), if unidentified cultural resources are found during the implementation of proposed activities, project activity will stop in the immediate area while a plan to mitigate any effects or protect the site is formulated. Once the recommended work is completed project activity would proceed.

B. Sites identified as potentially significant will be avoided by flagging and avoiding during mechanical treatments and commercial thinning. The sites will then be hand-treated if needed to blend with their surroundings visually.

C. Culturally Scarred Ponderosa Pine Trees (CST's) will be protected during mechanical treatments and to the extent possible, during underburns. Hand removal of fuels under CST's will be conducted to the extent possible, to reduce the risk of killing them during prescribed burning. However, no measures will be taken to create firelines or physically prevent burning around the CST's.

Effectiveness: These measures serve to completely protect heritage resources.

Alternatives Eliminated from Detailed Study

Only alternatives or specific design elements that were responsive to purpose and need were fully developed and analyzed. Alternatives or design elements that were considered but not fully developed or included in alternatives included the following:

Early in this process the ID Team proposed and alternative in which only proposed treatment units which could be accessed on existing roads and travel ways would be treated. It was thought that this would eliminate several treatment units and would reduce the impact of new road, even though temporary, construction. On further examination of actual access needs the team concluded that no units would be eliminated, and that all can be accessed.

Forest Plan Consistency

No Forest Plan amendment, site-specific or otherwise, would be required for implementation of any of the action alternatives considered in this EA. All are complaint with the Forest Direction and Management Area standards and guidelines of the Plan. Thinning of dense forests, and treatment of low vegetation such a is proposed implements specific objectives set forth for the 7a Management Area in the Forest Plan, and is not inconsistent with direction for Management Area 6b.

CHAPTER 3 - ENVIRONMENTAL CONSEQUENCES AND ALTERNATIVE COMPARISON

Introduction

This chapter describes the environment being affected by the alternatives discussed in Chapter 2 and forms the scientific and analytic basis for the comparisons made between these alternatives. It also considers past, present, and reasonably foreseeable future activities listed in Chapter 2 in the cumulative effects analysis. The impacts for each alternative are discussed for those issues identified during scoping and considered to be factors in the decision being made. For each issue, this chapter addresses: a) the affected environment, b) direct and indirect effects, c) cumulative effects and d) other applicable laws, regulations, policies, and other direction.

Effects are addressed in the same order and organization as suggested by the issues listed in Chapter 1.

Effects on soils and water

Affected Environment

Soils information for this area is found in the published Uncompahgre Soil Survey (1995). This information was gathered in the late 70's and early 80's by the NRCS as part of the National cooperative Soil Survey for the Forest Service through interagency agreements. The level of detail of this inventory is an upper level III-Level IV and was correlated to the family level. Map units are usually complexes of up to three soil families.

The soils in this analysis area have formed from the sandstones and shales that are found on the Uncompahgre Plateau. This landform is a large upwarped plateau and rises gradually to the southwest from the Uncompahgre River valley. It consists of smooth, gently sloping mesa surfaces that are dissected by deep, steep walled canyons. The soil characteristics vary according to the landscape, geology and vegetation. Generally, these soils have sandy loams to loam surfaces that often overlay finer textured subsoils, which include clay loams and clay. The soil depth also varies and ranges from bare sandstone bedrock exposures to areas that are deeper than 60 inches. Another characteristic that varies quit a bit is the amount of coarse fragments that are on the surface of the soil and are contained in the soil matrix. In these areas this can range from less than 5% to greater than 70% by volume and occur mostly as gravel and cobble, with some stones present. The soil survey identifies most of these characteristics, and more on the dominant soils of these landscapes. Generally, this data shows that the gentle sloping mesa surfaces have low potential for erosion, but may be susceptible to rutting and detrimental compaction as a result of heavy equipment operating on them when moist. There may be shallow soils areas scattered throughout the area that would recover very slowly if burned. The steeper drainage and canyon sideslopes generally have large amounts of coarse fragments and exhibit a greater potential for erosion.

The following table was created using the Uncompahgre Soil Survey and interpretations made by a soil scientist. Soil types within the survey area are mosaics and complexes.

The table represents the best attempt to define what limitations are likely to occur within all or a portion of the treatment unit. Impacts to soil health can be avoided by taking the limitations into consideration during the design and implementation of treatments.

Unit Number	Treatment	Soil limitation Issue
1	Thin, underburn	none
2	Pruning	none
3	Underburn	shallow soil/reveg concern
4	Underburn	shallow soil/reveg concern
5	Underburn	shallow soil/reveg concern
6	Roller chopping	rutting potential
7	Prescribe burn	erosion hazard slopes>35%
8	Roller chopping	compaction/rutting potential
9	Pruning	none
10	Thin, underburn	shallow soil/reveg concern
11	Thin, underburn	shallow soil/reveg concern
12	Thin, underburn	none
13	Thin, underburn	shallow soil/reveg concern
14	Fuelwood Harvest	compaction/rutting potential
16	Prescribe burn	none
17	Prescribe burn	shallow soil/reveg concern
18	Roller chopping	compaction/rutting potential
19	Roller chopping	compaction/rutting potential
20	Roller chopping	compaction/rutting potential
21	Prescribe burn	shallow soil/reveg concern
22	Thin, underburn	shallow soil/reveg concern
23	Prescribe burn	shallow soil/reveg concern
24	Prescribe burn	shallow soil/reveg concern
25	Thin, underburn	shallow soil/reveg concern
26	Roller chop or Hydroaxe	compaction/rutting potential
27	Roller chop or Hydroaxe	compaction/rutting potential
28	Roller chop or Hydroaxe	compaction/rutting potential
29	Commercial Thin/burn	shallow soil/reveg concern
		compaction/rutting potential
30	Commercial Thin/burn	shallow soil/reveg concern
		compaction/rutting potential
31	Roller chop or Hydroaxe	compaction/rutting potential
32	Roller chop or Hydroaxe	compaction/rutting potential
33	Thin, underburn	shallow soil/reveg concern
43	Thin, underburn	shallow soil/reveg concern

Microbiotic soil crusts form a prominent feature on the landscape of the semiarid Colorado Plateau. They generally occur where vascular plant cover is sparse because less plant cover provides more surface area available for colonization and growth of crustal organisms. Crust cover is estimated to occur on approximately 5 percent of the high elevation shrub land (above 7,000 feet). (Clements, BLM ecologist, Uncomphagre

Resource Area, personal communication 2002). In general, more stable, fine-textured soils (such as silty loams) support greater crustal cover than less stable, coarse-textured soils (Belnap et al, 2001). Biological crusts tend to be best developed in interspaces between shrubs. Microbiotic crusts protects the soil's surface from wind and water erosion in part because of living organisms that weave through the top few millimeters of these soils, gluing loose particles together and forming a matrix that stabilizes and protects soil surface from erosive forces. The microbiotic crusts of the assessment area may also inhibit exotic plant establishment.

The Uncompahgre Plateau is located south of Grand Junction in west central Colorado. The analysis area includes portions of the following 6th HUB watersheds. The Spring Creek watershed (17,878 NFS acres), Happy Canyon watershed (6,554 NFS acres) and Dry Creek watershed (16,385 NFS acres) are located on the southeast side of the Uncompahgre Plateau, west of Montrose, Colorado. These drainages flow in a northeastern direction to the Uncompahgre River. The Uncompahgre Plateau is a long fault block comprised primarily of Mesozoic sedimentary rocks. The rocks are mostly sandstone, siltstone and conglomerate. Much of the area has a surface layer of erosion resistant Dakota sandstone. A steep escarpment on the west side and a long gentle slope on the east characterize the northwest to southeast-oriented plateau. There are areas of extensive rock outcrop and canyon rims (Draft Uncompahgre Plateau Landscape Assessment, July 2002). Annual precipitation ranges from an average of 19 inches at the Forest boundary, with elevations around 8100 ft up to an average of 26 inches at the hydrologic divide with the San Miguel Basin, which is at an elevation of 9500 feet. The proposed treatment units are scattered along Mesa tops within a few miles of the Forest boundary in an elevation zone of 8100 to 8600 feet, with a corresponding annual precipitation of 20 to 22 inches. Precipitation comes primarily as winter snow.High intensity summer thunderstorms are common. Surface runoff due to a combination of rock cover, shallow soils and groundcover can be significant and is responsible for much of the erosion, sediment production and channel adjustments made in the smaller tributaries. In a Forest wide effort to assess watershed conditions several years ago, these three watersheds were rated as 3 (good) on a scale of 1 to 5. With one being excellent and 5 being poor.

Watershed Characteristics

Watershed	Miles of Stream	Drainage Density	% Watershed in High Erosion Hazard
Dry Creek	51.2	2.0	6%
Spring Creek	57.8	2.1	8%
Happy Canyon	23.2	2.3	3%

Data source – Forest Service integrated resource inventory and GIS data Base

Surface water production off the Uncomphagre Plateau is limited. Perennial stream flow is rare. The majority of the drainage network flows seasonally or for a brief period following runoff or storm events. Spring Creek, with its three distinct tributaries is the

most significant water feature within the analysis area. Flows are perennial through the year, but can be very low from July through September. The persistent drought conditions which have existed over the last several years resulted in flows so low that during the summer of 2003 flows dropped below 1 cfs on the East Fork of Spring Creek. Similar conditions likely occurred on the Middle Fork and West Fork of Spring Creek.

At times large amounts of both large and fine grain sediments are transported to the channel by upland erosional and mass wasting processes. This material, along with reworked bank and bed material, is moved down gradient and ultimately out of the watershed. The episodic events associated with mass wasting and very large flows cause periodic disturbance within the aquatic ecosystem, which creates habitat diversity and provides renewal of sediment and nutrients. The largest sediment producers are relatively high-gradient streams that have cut through resistant caprocks and into the underlying softer units. The source reaches introduce sediment loads to transport and response reaches downstream. The larger order channels are confined within steep walled canyons. Gradients are moderately steep and flood plain development is minimal. The 1st and 2nd drainage features, which have developed on the relatively flat mesa tops adjacent to the canyons, tend to be low gradient intermittent or ephemeral swales.

Stream segments with intermediate slopes “transport” sediment from source reaches downstream without net sediment deposition. Transport reaches in the assessment area occur most frequently as relatively straight or slightly sinuous channels across resistant caprocks at higher elevations, or along subdued terrain at lower elevations. Transport streams are most common along the gently sloping eastern side of the Uncompahgre Plateau**.**

Wider, more sinuous streams with gentle slopes tend to accumulate sediment. These “response” reaches eventually receive the material that is delivered from the upstream watershed. Typical response reaches occur in high order, low elevation streams. On the National Forest within the analysis area response reaches are uncommon and are limited to short reaches in the major drainages near the forest boundary..

The lack of surface water and significant alluvial deposition limits riparian areas to narrow linear stringers along the larger order streams, to areas surrounding groundwater discharge points (springs), sag ponds associated with rotational slumps or landslides and wet meadows. Natural ponds, lakes and springs though scarce are most commonly found where the Dakota Sandstone Formation and the Morrison Formation come in contact.

Water quality of surface waters is heavily influence by local geology, this is particularly true during base flow conditions when groundwater discharge is the primary source of streamwater. The water is of good chemical quality. Waters are moderately high in total dissolved solids (on the order of 400 μS/cm), high alkalinity (205 mg/L HCO3-) and pH of around 7.9 (Miller, 2002). Inorganic nutrients can be greatly influenced by land use practices. Very little nutrient data exists for sites on the Uncompahgre Plateau within the National Forest. Sampling during the early 1980’s detected nitrate levels at less than .2 mg/l in an adjacent watershed. In contrast as part of a national water quality assessment nitrate and phosphorus concentrations in Dry Creek, near its

confluence with the Uncompahgre River, ranked in the upper 25% nationally (Spahr, et al, 2000). Even though these values were relatively high, the nitrate concentration was still well below the State's water quality standard. The State of Colorado currently does not have a phosphorus standard for surface waters.

The only stream or river segment that is influenced by the proposed action, and is on the Colorado Water Quality Control Division 1998 303(d) list of impaired waters is the reach of the Uncompahgre River, that includes both the Spring Creek and Dry Creek tributaries up to the national forest boundary. This reach of the Uncompahgre River is impaired by excess concentrations of F.coliform bacteria and Selenium, both from agricultural sources.

Ground water appears very limited within the proposed project area. Portions of the Dakota and Morrison formations that directly underlie both Spring Creek and Dry Creek are aquifers and are at least partially recharged by surface waters in these drainages. Especially at the higher elevations, in both Spring Creek and Dry Creek, unconsolidated surface deposits have the potential to produce springs and seeps. The unconsolidated deposits are typically confined to small spatial areas.

Environmental Effects

Effects to soil and water resources between alternatives are subtle and of little concern for any of the alternatives. The treatments were stratified by watershed for the purpose of looking at where the activities by treatment type would be occurring. For the purpose of evaluating watershed effects all treatments were generalized into one of three categories.

Watershed	Mechanical Treatments	Thinning	Prescribed Fire
Dry Creek		532	
Spring Creek	1,242	355	491
Happy Canyon	533	2,111	216

Soil Loss – With the exception of prescribed fire, there will be no activity on slopes greater than 35%. The erosion hazard for the treatment areas is low. With the exception of roller chopping and access routes there will be very little soil disturbance and loss of ground cover. Within a few years following all manner of treatments, ground cover densities should increase to more than the current condition. Soil loss effects will be minimal.

Water Quality – There may be some short-term increases in soil movement following treatments, particularly the roller chopping. However, because the drainage density is very low the opportunity for soil to move into the drainage network is unlikely. The greatest potential for sediment delivery would occur should intense rainfall occur during or immediately following treatments.

Some clearing and minor blade work on travel routes may be necessary to provide access for equipment and personnel. No new routes will be built. Existing conditions on low standard roads may be improved with the installation of proper drainage. Some existing routes may be closed and rehabilitated when those actions are consistent with

the Uncompahgre Travel Management Decision. These actions should reduce the affects of travel routes on sediment production.

It is expected that surface water runoff will contain slightly higher nitrate concentrations following disturbances. This is most likely to occur below those areas burned. There may be spikes in concentration levels early in the snowmelt, but since nitrate is generally limiting it would be readily taken up during the growing season by vegetation. These effects would be quickly lost downstream due to dilution by water originating higher in the watershed.

Yield – There will be no short term, long term or a cumulative effect to water yields as a result of implementing the proposed action or any of its alternatives. There is very little precipitation accumulation beyond what is either utilized by vegetation or lost to evaporation within the elevation and vegetation zones where treatments would occur.

Compaction/rutting – The potential for determental compaction and rutting does exist within several of the soil types where activities are planned. Any activity that involves repeated passage over wet soils prone to compaction will result in detrimental impact. Units with the potential for compaction have been identified and mitigation should be required that will prevent operations from occurring when sites are vulnerable. The compaction concern is greatest where roller chopping operations are prescribed, because a greater percentage of the surface area is actually affected. There is expected to be no difference in affects between track mounted versus wheel driven equipment. Equipment that is specifically designed with low ground pressure technology would result in less compaction or rutting (Terry Hughes, GMUG Soil Scientist, personal commuication).

Riparian Function/Wetlands – There is a very low occurrence of riparian areas and wetlands within the areas proposed for treatment. Those that may exist within or adjacent to treatment areas will be fully protected by design criteria incorporated into the project layout and implementation. No physical disturbance of active channels would occur. It is expected that within a period of a few years, ground cover conditions would be enhanced by treatments for areas adjacent to or within riparian zones. This will improved the function of riparian areas in their value of water quality protection and capture of precipitation input for storage and release as late season flows.

Effects of Options for treatment

Roller chopping – this activity will have the greatest physical disturbance to the ground. Generally work is scheduled for periods of the year when the ground is dry or frozen. There are some treatment units which overlay soils with a severe compaction and/or rutting hazard. Should operations occur when soil moisture exceeds the plastic limit, than detrimental impacts may occur.

Roller chopping will result in the top several inches of soil being loosened. This would make the soil more vulnerable to transport by water and wind. There may be an increased potential for surface erosion and sediment production. This would be counter-acted by an increase in surface roughness, created by incorporation of slash into the ground, and also the corregated effect on the ground surface, caused by the

cleated drum that breaks up the slash. Surface flow patterns and existing rills will be modified and the efficiency of runoff will be disrupted.

Where microbiotic soil crust exist within units that are roller chopped there is a high probability that they would be damaged or destroyed. Their benefits are not totally understood. One important benefit is to provide soil protection. This value is expected to be preserved once vegetation is re-established. Ground cover is expected to improve and the benefit provide by the soil crust would be replaced and likly enhanced.

Hydroaxing – This form of mechanical treatment is generally less disturbing than roller chopping. Very little ground cover impacts or soil disturbance occurs. The litter layer over the surface will increase significantly, which will help to promote infiltration and reduce runoff. Hydroaxing could also result in some deterimental compaction or rutting if operations were to occur when soil is wet.

This operation requires a piece of large equipment that may also damage soil crusts. However, the percentage of the ground impacted would be less than that experienced by roller chopping.

Controlled/Prescription burning (abbreviated Rx Burning) – Prescribe fire tends to result in little to no soil disturbance. Fire intensity will be low, as a result the duff layer will only be scorched and not consumed. Burning is likely to increase concentrations of nitrate in surface waters. These increases are expected to decline as water moves downstream from treatment areas due to absorption by biota and dilution from upstream waters. Burning on steep slopes (>40%) over shallow soils (<12 inches) will increase the risk of acelerating surface runoff and erosion. Burning across shallow soils can make the re-establishment of vegetation difficult and may provide an opportunity for invasive plant species to become established.

Precommercial Thinning – There would be very little effect from this treatment. There will be no mechanized equipment used.

Commercial Thinning/harvest of trees – There is only one area proposed for this treatment. Harvesting is likely to be a partial cut. Effects from this one activity will be minimal.

Pruning of trees – No effects to soil or water resources.

Cumulative Effects

Roads, grazing and logging are management activities that have been and continue to be important uses within these watersheds. These activities because they involve manipulation of vegetation and/or soil disturbance have had effects upon water quality, water yields and riparian function. Livestock distribution within the watershed is influenced by vegetative type, water and topography. There are areas within the analysis area, which get heavy use, in some cases season long. This has cause degradation of some plant communities and impacts to soils and riparian areas. The miles of open road on the Plateau is being reduced as a result of travel management decisions. The following table displays the record of timber harvest within the affected watersheds. These data have been compiled from Forest Service records and input into the Forest Service activities database. These treatments are a summary of records from 1960 thru 2002. Activities more than 30 years old have very little residual lasting

effects. Hydrologic recovery will not be completed in the mixed conifer communities until the 6th or 7th decade following treatment. However, the vast majority of recovery occurs within the first 30 years.

Watershed	Acres of Commercial Timber Treatments	Acres of Mechanical Treatment	Prescribed Fire Treatment	Acres of National Forest	% of NFS lands treated
Dry Creek	2,176	217	533	20,580	14.2%
Spring Creek	2,441	0	1134	17,880	19.9%
Happy Canyon	694	0	0	6,550	10.6%

There is likely to be some minor increases in soil loss and sediment to waters flowing off the National Forest. Undoubtedly past management activities have contributed to sediment production. Poorly maintained and/or located travel routes have been a contributor, as has livestock grazing in some cases. However these increases are still considerably less than the natural levels of sediment production generated off the sedimentary geology. Any cumulative effect increase to sediment is not sufficient to degrade the beneficial uses of water or harm the distribution and diversity of aquatic species.

It is expect that within a few years live ground cover and litter will increase on treated sites. Eventhough these treatments represent a small percentage of the basin the proposed action will result in a benefical effect. An increase in forage within treated areas will encourage improved distribution of permitted livestock that will also contribute to improved condition where use is now heavier than desired.

These proposed activities represent a low risk of adverse effect to water quality, yield or riparian function. Two to three years following treatment, conditions are expected to improve, in some cases dramatically. Surface runoff and sediment production should decline and infiltration rates should increase. Because these watersheds are in relatively good condition they should be able to withstand any short-term effects, without degradation to watershed function and health, or impacts to downstream values. Increases in soil loss or detrimental compaction will be prevented with the application of recommended design practices.

Potential Mitigation Measures

1. In any year, no more than 10% of public land in any 6th level Hydrologic Unit Boundary (HUB) watershed will be treated (combination of mechanical and prescribed fire). BLM and Forest Service will coordinate annually to determine treatment opportunities and schedule.

Feasibility and Effectiveness: This practice is moderately feasible. It will require an accurate accounting of acreages and sites burned within different watersheds and coordination between the two federal land management agencies. With an updated GIS coverage and activities tracking capabilities it is becoming more feasible. If implemented it should be highly effective at preventing cumulative effects to soil and

water resources. Because recovery on these sites is expected to be rapid (3 years or less) the 10% schedule is reasonable. This is a common sense approach that may not be tied to hard science but is consistent with a strategy of distributing affects over time and space.

2. Over any 5 consecutive year period, no more than 15% of public land in any 6th level HUB watershed would be treated with prescribed burning. Natural fires (wildfires and fire-use fires) may be allowed to exceed the percentages listed above. Further prescribed burning will not occur within a particular year if natural fires have already exceeded the percentages listed above during the previous 5- year period.

Feasibility and Effectiveness: This practice is moderately feasible. It will require an accurate accounting of acreages and sites burned within different watersheds and coordination between the two federal land management agencies. With an updated GIS coverage and activities tracking capabilities it is becoming more feasible. If implemented it should be highly effective at preventing cumulative effects to soil and water resources. Because recovery on these sites is expected to be rapid (3 years or less) the 15% schedule is reasonable. This is a common sense approach that may not be tied to hard science but is consistent with a strategy of distributing affects over time and space.

3. Islands of untreated vegetation will be retained within roller chopping units in order to accelerate the re-colonization of microbiotic soil crust organisms.

Feasibility and Effectiveness – This could be easily accomplished during the layout of treatment units or as a contract specification. Islands are often left for wildlife security or habitat reasons and these would serve a dual pupose as refugia for microbiotic soil crust colonies. While there is no guarantee that these residual untreated areas would host soil crusts they are likely to in the event that they also occupy the treatment unit. Re-colonization from outside the treatment unit will occur over time naturally. This process would be accelerated by reducing the distances between remnant colonies and areas that need to be re-colonized.

4. To minimize damage to soil microorganisms and preserve organic matter in the surface horizon, burning should only be conducted when the upper 6 inches is moist (soil should form a cohesive ball when squeezed by hand).

Feasibility and Effectiveness: The measure is moderately feasible. It will depend upon an evaluation of soil moisture very near the period when ignition is planned. This may not always be easy or convenient. There could be variability within the same treatment unit depending upon exposure, aspect and soil type. If the soil is moist when burned it is highly effective at protecting microorganisms and organic matter.

5. Spring burning will be postponed until a subsequent year, when the accumulated water year precipitation (October of the previous year to the burn date) is less than 75% of the most recent 20-year average for this period.

Feasibility and Effectiveness: This measure is highly feasible. The data is readily available and the analysis would not be difficult or time consuming to accomplish. Effectiveness would be moderate. The measure is designed to improve the likelihood of

successful site re-vegetation and recovery. While climatic factors are important it is only one contributing factor to the outcome.

6. Mechanically constructed fires lines should be located on the topographic contour to the degree possible and should minimize disturbance to the mineral soil surface. No dozer lines will be permitted within riparian areas or streamside buffer zones.

Feasibility and Effectiveness: This measure is moderately feasible. Depending upon a variety of factors it may not be possible to keep all dozer lines on the contour. It may be feasible to utilize handlines or natural fuel breaks in many cases. Dozer lines are general not needed or utilized for prescribe fire as burning intensity is low. Avoiding the use of dozers in riparian area is highly feasible. This would be a highly effective way of avoiding serious resource damage in environmentally sensitive sites.

7. Avoid treating shallow soils, less than an average of 12” deep over significant areas, and/or rocky soils, as there is a poor potential for vegetation establishment, and a high potential for weed invasion.

Feasibility and Effectiveness: Feasibility is low to moderate. It may be difficult to determine from observation when shallow soils exist. The soil unit mapping characteristics will identify a percentage of the complex where shallow soils may exist, but their precise location is not defined. Some evidence such as very course surface rock fragments, slope position, plant species and plant vigor may be indicative of shallow soils. Effectiveness is moderate as there are many factors, which affect re-vegetation and weed invasion, only one of which is soil depth.

8. Improvements to travel routes needed for access will be limited to brush and windfall clearing; minor earthwork to correct cut slope or fill slope slough; and installation of proper road drainage. All roads now closed will be re-closed as soon as practical upon of termination of their use.

Feasibility and Effectiveness: The amount of work will vary according to the condition of the route and the proposed treatment. Most routes will need no work. A few routes may need spot work to achieve the necessary widths to allow passage. This measure is feasible and will be effective at minimizing the effects to water quality associated with access across steep slopes or near drainages.

9. Highly erodible soils should not be burned on slopes greater than 35%

Feasibility and Effectiveness: This measure is moderately feasible. For those treatment units that include slopes both greater than and less than the 35% threshold, is may be difficult to prevent fire from moving into the steeper areas without undue effort and expense. The effectiveness is also moderate. The 35% threshold is a commonly used standard, but specific site conditions make actually suggest that the threshold be more or less. Also burn intensity is a critically important factor in assessing erosion potential. In the context of this analysis all burn intensities are expected to be low, with some areas of moderate.

Effects on Wildlife Habitats and Species

Existing Condition/Cumulative Actions Considered

Aquatic, Wetland, Riparian Habitats and Species

Fisheries, watershed, and riparian conditions within the Dry Creek and Spring Creek watersheds were evaluated as part of a large scale Horsefly Rangeland Assessment (USFS, 2003). This assessment indicates that the stream channels within the headwaters of these watersheds are primarily B and C-type channels with relatively small riparian areas due to lack of water. Springs are common in this area, and willows are the primary riparian tree species. Beaver use is common, particularly when willow and aspen persist near streams. Beaver dam construction plays an important role in stream channel morphology and stability. These channels are high to moderately sensitive to livestock use depending on the size of riparian areas, stream bank composition, and streambed composition. Those channels that rely solely on vegetation for stream bank stability are most susceptible to disturbance from livestock use.

As the stream progresses downstream of the mesa tops stream channels are characterized as transport and erosional reaches with higher stream gradients and are typically confined by canyon walls or steep forested slopes. Stream channels are composed primarily of coarse material. These stream channels are primarily A and B-type stream channel with relatively small riparian areas due to the presence of dense spruce/fir stands. However, in some canyon areas with adequate exposure willow and cottonwood can persist. In forested areas course wood debris loading is high. Most streams are perennial with sporadic beaver use.

Proper Functioning Condition (PFC) assessments were completed within the analysis area in 2002. This assessment indicated that the majority of streams sampled within the Dry Creek and Spring Creek watersheds were properly functioning. Some reaches of the West Fork of Spring Creek are below the desired condition. Impacts were associated with high cattle grazing use in low gradient alluvial reaches associated with meadow and open park areas. As a result, fish habitat in these degraded areas have poor cover, shallow pool depths, and increased fine sediment loads.

Within the analysis area, the main forks of Spring Creek and Dry Creek, including Pryor Creek and Beaver Dams Creek, provide habitat for fish. These streams support small populations of trout, including brook trout, rainbow, and cutthroat. A pure strain of Colorado River cutthroat trout has been located in the East Fork of Dry Creek. This is one of the few known conservation populations occurring on the Uncompahgre Plateau.

Terrestrial Habitats and Species

Existing vegetative conditions and associated wildlife habitats within the Dry Creek/Spring Creek watersheds are fully described in Volume II of the Dry Creek/Spring Creek Vegetation Management Strategy (USFS/BLM 2003). The Vegetation Management Strategy identifies 48 vegetation/land cover types within the Dry Creek/Spring Creek watersheds, as well as the total acres and proportion of those vegetation/land cover types within those watersheds (Table 3-3, page III.6). These 48 vegetation/cover types are lumped into nine major vegetation types for analysis (pages

III.7-III.9). Existing vegetative conditions on National Forest lands within the Dry Creek/Spring Creek watersheds are also described within the Purpose and Need and Vegetation sections of this EA.

The proposed action occurs within three major vegetation types described in the Vegetation Management Strategy: Mountain Shrubland and Gambel Oak, Ponderosa Pine, and Aspen. Small stands of pinyon and juniper woodland are present within the Mountain Shrubland and Gambel Oak vegetation type but are incidental to the primary vegetation types treated. For this reason the potential effects of management activities and associated species in P/J woodland are not evaluated in this EA. Existing conditions and key apparent vegetation trends for the major vegetation types affected are described in the Vegetation section of this EA

Numerous species of wildlife are associated with these major vegetation types. Vegetation conditions and open road/trail densities have implications on habitat capability and effectiveness for those species.

Habitat Capability and Habitat Effectiveness

Habitat capability is the estimated ability of an area, given existing or predicted habitat conditions, to support wildlife, fish or plant populations. It is a measure of habitat potential based on current or expected vegetation conditions. Existing vegetation conditions have implications related to wildlife habitat capability.

Vegetation conditions are related to habitat capability in terms of structural stages. Structural stages are based on the physical attributes of the major vegetation types including age, tree size, and crown cover. Structural stages can be considered descriptors of ecological succession and range from early succession grass/forb and seedling conditions to mature and old growth forest habitat. Region 2 of the Forest Service has developed and uses the HABCAP computer model to estimate the effects of forest management activities for numerous terrestrial wildlife species. The model is based on concepts described in Managing Forested Lands For Wildlife, and integrates vegetation conditions (as described by structural stages) with habitat relationships of species selected for analysis. Changes in structural stage provide an estimate of the changes to habitat capability.

The Forest Plan includes management standards and guidelines for habitat capability to “Maintain habitat for viable populations of all existing vertebrate wildlife species (FLMP III-26). General direction is to maintain habitat capability at a level at least 40% of potential capability. This standard is maintained or increased under specific Management Area direction in the Forest Plan.

Habitat effectiveness is an indicator of the decreased value of habitat caused by the use of open roads and motorized trails. The ability of certain wildlife species to utilize suitable habitat is affected by disturbance resulting from the use of open roads and motorized trails. Within the analysis area this primarily affects elk, and to a lesser degree mule deer. In general, habitat effectiveness decreases in proportion to the amount of open motorized roads and trails per square mile of habitat.

The Forest Plan includes general direction for habitat effectiveness to “manage public motorized use on roads and trails to maintain or enhance effective habitat for elk. The

objective level of habitat effectiveness for elk within each fourth order watershed is at least 40%" (FLMP III-76). This standard is maintained or increased under specific Management Area direction in the Forest Plan.

In March of 2002 the GMUG National Forests completed the revision of the Uncompahgre National Forest Travel Plan (ROD March 2002). Management of open roads and motorized trails to achieve Forest Plan standards for elk habitat effectiveness is a primary purpose and need of the travel plan revision. Analysis in the Supplement to the Final EIS demonstrates that habitat effectiveness within the Dry Creek and Spring Creek watersheds is currently below Forest Plan standards, and implementation of the travel plan decision will effectively improve conditions to meet the Forest Plan objective.

Threatened, Endangered, Sensitive and Management Indicator Species

The US Fish and Wildlife Service maintains a list of federally designated threatened, endangered, proposed, and candidate species that may occur within or be affected by actions on public lands in Colorado. Similarly, the Forest Service has designated a list of sensitive species of concern that may occur or be affected by management activities on National Forest lands.

A Biological Assessment/Biological Evaluation (BA/BE) was prepared to analyze the effects of the proposed action on these species and their habitats. All species currently listed by the USFWS and USFS were considered in the BA/BE. Based on habitats affected and known species occurrence, it was determined that there are no threatened, endangered, proposed, or candidate plant or animal species within the project areas or affected by the proposed action.

Based on habitats affected and known species occurrence, it was determined that the following sensitive species may occur within the project area or be affected by the proposed action:

USFS Sensitive Species Or Habitat
Potentially Occurring Within The Project Areas
Or Affected By The Proposed Action

Common Name	Scientific Name	Vegetation Type Or Habitats Used
Mammals		
Fringed myotis	*Myotis thysanodes*	Ponderosa pine, P/J, oak, greasewood, saltbush
Spotted bat	*Euderma maculatum*	Ponderosa pine, P/J, desert shrub
Kit fox	*Vulpes macrotis*	P/J, oak
Birds		
Northern goshawk	*Accipiter gentiles*	Aspen
Flammulated owl	*Otus flammeolus*	Ponderosa pine
Lewis' woodpecker	*Melanerpes lewis*	Ponderosa pine/oak
Olive-sided flycatcher	*Contopus borealus*	Spruce/fir and mixed aspen/spruce/fir
Purple martin	*Progne subis*	Aspen

Common Name	Scientific Name	Vegetation Type Or Habitats Used
Amphibians and Reptiles		
No species identified		
Fish		
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*	Perennial streams
Mollusks and Insects		
No species identified		

Management Indicator Species

The Forest Service utilizes the concept of Management Indicator Species (MIS) to evaluate potential effects of management activities upon wildlife populations. MIS for the GMUG National Forests are identified in the Forest Plan on Table II-15. The GMUG National Forests has completed an MIS Assessment for twelve out of the seventeen species identified in the Forest Plan (June 2001). This Forest-wide assessment includes the rationale for the selection of MIS, information on biology, occurrence and distribution, habitat relationships, suitable habitat on the GMUG, monitoring results, available information on habitat and population trend, and source references. A project-level MIS Assessment was written for this area that is tiered to this Forest-wide Assessment.

From the Forest-wide list of 17 species, four species were selected for project analysis based on the following criteria:

1. Species that occur within the project area.
2. Species that are indicative of specific habitats or ecosystems that are affected within the project area.
3. Species whose populations or population trends can be efficiently monitored.

The species selected for this project are:

1. Mule deer, representing early seral stages of ponderosa pine and P/J, and utilizing early to mid seral stages of mountain shrubland and Gambel oak..
2. Elk, representing early seral stages of aspen and mountain shrub, and habitat effectiveness as influenced by open roads and motorized trails within all vegetation types.
3. Abert's squirrel, representing late seral stages of ponderosa pine forest.
4. Black bear, and economically important species utilizing mid to late seral stages of mountain shrubland and Gambel oak.

The cumulative effects analysis area includes all public lands within the Dry Creek and Spring Creek watersheds. Cumulative actions considered include:

1. Past and current timber, fuels, and wildlife habitat management activities described in the Vegetation section of this EA.
2. Current travel management and the desired management condition described within the ROD for the Uncompahgre National Forest Travel Plan.
3. Ongoing livestock grazing practices.

4. Natural events such as wildfires or major insect activity that has altered vegetation structure or distribution.
5. Urban development in the vicinity of Dave Wood road, Sims Mesa, and Government Springs.
6. Management activities of the Colorado Division of Wildlife related to harvest and stocking of fish and game.

Direct/Indirect/Cumulative Effects of No Action, Proposed Action and Alternatives

Potential effects to aquatic habitats and species can result from road reconstruction and vegetation treatments. Road crossings of stream channels can impact both the stream channel and riparian vegetation. Where stream crossings are fords, the stream banks and channel may both be modified to accommodate equipment or truck traffic. Sediment could be added to the stream system through erosion of the exposed stream banks and road surface, by adding fill material to harden the crossing, and from physical damage of the equipment and trucks crossing the stream. Additional fine sediment can impact fish, amphibians, and aquatic invertebrate production by smothering eggs or larvae. Where logs or culverts are used as stream crossings, the structure could act as a barrier to the migration of fish and other aquatic organisms within the stream channel. Improperly installed culverts can create waterfalls at the outlet or result in high water velocities within the culvert that are physically impassible. Burning or mechanical treatments directly within aquatic habitats or stream channels can cause physical damage or affect riparian vegetation.

Direct effects will be entirely avoided by excluding streams, wetlands, riparian areas, and other sites from treatment. Mitigation measures are also included to buffer stream channels and riparian areas from treatment. Design criteria are also included to properly reconstruct, maintain, and decommission roads to alleviate impacts to aquatic habitats and streams. This effects assessment is based on the assumption that all design criteria and mitigation measures described in this EA will be effectively applied during project implementation.

Natural succession or the natural and induced effects of vegetative disturbance affect the existing terrestrial habitat condition and trend. The proposed timber harvest, thinning, burning, and mechanical treatments will have no long term effect on the type of vegetation cover present, but would affect the structural characteristics and arrangement of vegetation within the Dry Creek and Spring Creek watersheds.

As previously described, vegetation structural stages are generally aligned with the ecological succession of vegetation. Structural stages range from early succession grass/forb and seedling conditions to mature and old growth forest habitat. Region 2 of the Forest Service has developed and uses the HABCAP computer model to estimate the effects of forest management activities for numerous terrestrial wildlife species. The model is based on concepts described in Managing Forested Lands For Wildlife, a joint publication of the Forest Service and Colorado Division of Wildlife (1984). The HABCAP model integrates vegetation conditions (as described by structural stages) with habitat relationships of species selected for analysis. It also utilizes a weighted average factor of open road and motorized trail densities to estimate habitat

effectiveness for elk. As previously described, habitat effectiveness is directly influenced by the density of open roads and motorized trails.

This effects assessment is based on the determinations of the BA/BE and MIS report which are part of the project record for this EA. Direct, indirect, and cumulative effects are based on the assumption that all design criteria and mitigation measures described in this EA will be effectively applied during project implementation.

No Action

Under the No Action alternative, none of the proposed vegetation treatments or road decommissioning would occur within the project area. Existing habitat conditions for aquatic and terrestrial species would be unaffected by management activities. Mosaic objectives described within the Vegetation Management Strategy would not likely be achieved under this alternative. Natural disturbance processes would continue to influence habitat condition, trend, and arrangement of vegetation within the watersheds in a random fashion. Current habitat capability and effectiveness for fish and wildlife is anticipated to persist on the landscape in the short term. Habitat capability for species utilizing early to mid seral mountain shrubland and Gambel oak habitat would continue to be below desired levels. Without active management, habitat conditions on big game winter range and transitional range will continue to decline, reducing capacity for elk and mule deer.

Implementation of the decommissioning specified in the Uncompahgre National Forest travel management plan would need to occur independently from the proposed action to comply with that Record of Decision (3/02). Without implementation, elk habitat effectiveness will continue to be below GMUG Forest Plan standards (FSEIS, 2001). Seasonal use areas and key elk habitats including security areas and calving areas will continue to be impacted by open roads and motorized trails.

This alternative will have no effect upon any federally listed species or their habitat. The same is true for any Forest Service sensitive species or habitat. As previously described, the No Action alternative will adversely affect mule deer and elk by perpetuating degraded habitat conditions that provide low forage value. The lack of road decommissioning will also maintain reduced habitat effectiveness for elk on the Forest. Abert's squirrel and black bear habitat capability will be unaffected by the No Action alternative. Both species utilize mid to late seral habitat that would not be impacted by the lack of active management.

Proposed Action

As described in the Watershed section of this EA, the anticipated environmental effects of implementing the Proposed Action are short term and limited in scope. No significant changes to water yield are expected to occur within the Dry Creek or Spring Creek watersheds. The project area is located within a low precipitation zone and the proposed vegetation treatments will have negligible effects upon water yield. Mechanical treatments and burning have the potential to expose soil or reduce vegetation cover on treatment sites but the effects are expected to be minor, localized, and short term. Specific mitigation measures are included as design or operation criteria to further reduce the potential of increased erosion and sedimentation.

This analysis demonstrates the potential for adverse impacts to streams, wetlands, and aquatic habitats are insignificant. Based on the anticipated effects to watershed, there will be no direct, indirect, or cumulative adverse impacts to any aquatic, wetland, or riparian habitats or species. None of the proposed actions will result in water depletion that causes adverse effects to endangered fish in the upper Colorado River basin. No activities are proposed in or near the known population of Colorado River cutthroat trout that could affect this species.

The Proposed Action contributes most to the achievement of the mosaic objectives described in the Vegetation Management Strategy. Implementation of the Proposed Action will occur primarily in the ponderosa pine and mountain shrubland and Gambel oak vegetation types. This in combination with similar actions on BLM lands will achieve the mosaic objectives for all seral stages of mountain shrubland and Gambel oak. The proposed action will maintain the current age class distribution of ponderosa pine forest habitat, while enhancing understory shrub and herbaceous vegetation. Design criteria are included as mitigation measures common to all alternatives to maintain structural habitat attributes within the ponderosa pine forest type. Minor treatments are proposed within the aspen vegetation type. There will not be any treatments within the other major vegetation types present within the analysis area.

The direct effects of mechanical treatments within the mountain shrubland and Gambel oak vegetation type will be to convert dense stands of mid to late seral shrubs to open stands of early seral. The shrubs treated will resprout from their roots, and grasses and forbs within the understory will respond by increasing density and vigor. The combination of young shrubs and increased herbaceous production will increase browse and forage production and availability to big game animals. Several of these treatment areas are located on winter range or transitional range between winter and summer range. The existing condition of this habitat is identified as one of the factors contributing to mule deer decline on the Uncompahgre Plateau. This activity will enhance big game winter range condition and capability within the project area.

Project design criteria are included as mitigation measures common to all alternatives to maintain habitat for other mid to late seral dependent species while improving browse and forage conditions within these treatment areas. The mosaic treatment will provide an interspersion of cover and forage, and increase edge habitat. Large diameter oak and patches of mid to late seral mountain shrub and Gambel oak will be left untreated on the site and managed for retention. All large diameter conifer trees and snags will also be retained. This will maintain forage, cover, and nesting habitat for black bear, turkey, cavity nesting and migratory birds.

Commercial tree harvest will maintain the current age class while reducing the density and crown closure of ponderosa pine stands treated. Abert's squirrels prefer dense uneven-aged stands of mature ponderosa pine with groups or clumps of mature trees for nesting. Reducing stand density will reduce habitat capability for this species. Mitigation measures are included to retain existing nests and provide minimum nesting habitat conditions to maintain species viability. Snags and other wildlife use trees must be retained within the stands to maintain habitat capability for several sensitive and MIS species.

Prescribed burning would not change the current age class or density of the overstory trees, but will reduce the density of understory brush and regeneration. Gambel oak, serviceberry, and mountain mahogany found in the understory will be top-killed and resprout from the roots. Understory herbaceous vegetation will increase in cover and productivity. In combination, this will provide increased browse and forage vigor and availability for big game. Precommercial thinning will remove smaller trees that provide vertical structure and hiding cover. Thinning and underburning can result in even-aged stands of widely spaced trees, reducing structural diversity and cover.

Burning can also impact snags and other wildlife trees within treated areas that are used for nesting or denning. Snags, down logs, and decayed trees within the ponderosa pine type are limiting on the Plateau. These structural habitat features are critical to bats, owls, and other cavity nesting species. Advanced site preparation and ignition techniques are vital management actions to protect these features and maintain habitat capability for these species. If the specified mitigations measures are effectively implemented, there will be no impact to these species.

Two aspen sites are proposed for treatment to alter the current structural stage. Unit 7 is a mixed aspen/conifer stands that is proposed for burning. Burning is likely to initially reduce the density of understory brush and tree seedlings/saplings, as well as down wood. Larger trees, especially the conifer trees, will likely persist. Most of the smaller diameter aspen is expected to be top-killed and regenerate from the roots. Snags and other fire “damaged” trees would likely increase following burning. The effect will be to maintain the current age class of the stand while reducing density of the understory. Species associated with this vegetation type include the olive-sided flycatcher. The initial treatment may impact individuals nesting within the site, but will not cause a trend toward federal listing or loss of population viability. Following treatment, habitat capability will be initially reduced until the site advances to a mature condition again. Mature mixed aspen/conifer habitat is abundant within the Dry Creek and Spring Creek watersheds, as well as the remainder of the Uncompahgre Plateau.

The second aspen site is Unit 14, a mature stand of aspen forest that is rapidly dieing and appears to be naturally regenerating. This site will be designated as a public firewood harvest area, and eventually most of the sound dead wood will be cut and removed. Following treatment, this stand is expected to regenerate to an early structural stage. Species associated with the existing habitat type include the goshawk and purple martin. Site-specific surveys of the area determined that this aspen stand is not occupied by either species. Mature aspen habitat is abundant within the Dry Creek and Spring Creek watersheds, as well as the remainder of the Uncompahgre Plateau. Therefore, the proposed action will have no impact on either of these species.

Mechanical treatments, commercial logging operations, and prescribed burning conducted in the spring of the year have the potential to impact ground nesting birds or other animals nesting or roosting in and around the vegetation being treated. Direct mortality can occur to adults, eggs and/or young. These activities may impact individuals but are not likely to cause a trend toward federal listing or result in a loss of species viability. Project design criteria are included as mitigation measures common to all alternatives to alleviate impacts to species and maintain habitat capability for population viability. Included is the protection of nest trees and nest tree habitat,

retention/recruitment of down logs and snags, retention of live tree and shrub cover, and restricted timing/extent of burning operations.

The Proposed Action includes decommissioning of roads specified in the Uncompahgre National Forest travel plan that are associated with the project areas. Implementation of the travel plan is vital to restoring habitat effectiveness for elk and mule deer. The objective of reducing the density of open road and motorized trails is not to increase populations of elk and deer on the Plateau, but to provide conditions suitable and favorable to use of preferred habitats. The disturbance resulting from use of roads and motorized trails displaces elk and deer from preferred habitats, and reduces use up to one half of a mile from those routes (FSEIS, 2001). The physical closure of roads associated with the Proposed Action will result in an immediate and long-term improvement in habitat effectiveness within the Dry Creek and Spring Creek watersheds.

Alternative 3 – No Commercial Harvest

The effects of Alternative 3 upon aquatic habitats and species are identical to those described in the Proposed Action. Analysis demonstrates the potential for adverse impacts to streams, wetlands, and aquatic habitats are insignificant. Based on the anticipated effects to watershed, there will be no direct, indirect, or cumulative adverse impacts to any aquatic, wetland, or riparian habitats or species. None of the proposed actions will result in water depletion that causes adverse effects to endangered fish in the upper Colorado River basin. No activities are proposed in or near the known population of Colorado River cutthroat trout that could affect this species.

The effects of Alternative 3 upon terrestrial habitats and species are identical to those described in the Proposed Action for the mountain shrubland and Gambel oak, and aspen vegetation types. The exclusion of commercial harvest/thinning of ponderosa pine will have the effect of retaining higher stand densities favorable for Abert's squirrels. All existing nests and potential nesting habitat would be retained on the site, providing the highest available habitat capability. Precommercial thinning and prescribed burning would have no effect upon habitat conditions for the Abert's squirrel.

The effects to other species associated with the ponderosa pine vegetation type will be the same as those described in the Proposed Action. Precommercial thinning and prescribed burning would reduce cover within the stands and increase browse and forage production. Some species will be vulnerable to direct mortality from spring burning. Mitigation measures are included to maintain habitat capability and alleviate direct impacts to those species.

Elimination of commercial harvest/thinning would not preclude full implementation of the planned road decommissioning. All acres of commercial harvest and thinning are scheduled for prescribed burning or mechanical treatment. The physical closure of roads associated with the project areas will result in an immediate and long-term improvement in habitat effectiveness within the Dry Creek and Spring Creek watersheds.

Alternative 4 – WUI Treatments Only

The effects of Alternative 4 upon aquatic habitats and species are identical to those described in the Proposed Action. Analysis demonstrates the potential for adverse impacts to streams, wetlands, and aquatic habitats are insignificant. Based on the anticipated effects to watershed, there will be no direct, indirect, or cumulative adverse impacts to any aquatic, wetland, or riparian habitats or species. None of the proposed actions will result in water depletion that causes adverse effects to endangered fish in the upper Colorado River basin. No activities are proposed in or near the known population of Colorado River cutthroat trout that could affect this species.

The effects of Alternative 4 are very similar to the Proposed Action with the exception that all, or portions of five units would not be treated because they do not lie within ½ mile of private land containing structures. The primary vegetation types deleted from treatment are mountain shrubland and Gambel oak, and ponderosa pine. Affected units within the Spring Creek watershed are located in big game winter and transitional ranges. This is a core area for big game habitat restoration that would preclude enhancement of habitat capability for these species. Forage values for big game will also remain low within the ponderosa pine stands deleted from treatment.

Implementation of the planned road decommissioning would be reduced in the Spring Creek watershed that would also reduce habitat capability for elk and mule deer by reducing habitat effectiveness. Cumulatively this would perpetuate habitat conditions and capability at current undesirable levels.

Effects on Vegetation

Timber:

There are two geographic areas within which commercial thinning is proposed: Sims Mesa and Transfer. The vegetation cover type of all stands proposed for commercial thinning in these areas is ponderosa pine. Most ponderosa pine stands on the Uncompahgre Plateau, including those proposed for treatment here, share certain structural characteristics that result from a common history. Historically, ponderosa pine forests consisted of widely-spaced large-diameter trees with groups of trees of multiple age classes dispersed between larger trees. These large dominant trees were old, having survived numerous low- or moderate-intensity fires. Grasses and forbs dominated the openings between tree groups (Romme and Others, 1999).

TABLE X
Select Data For Ponderosa Pine Commercial Thinning Units
Dry Creek And Spring Creek Project

Geographic Area	Thinning Unit	Treatment Polygon	Acres	Origin Date	Existing Basal Area	Cut Basal Area Per Acre	Cut Volume (Board Feet Per Acre)
Sims Mesa	240	22,33	46	1889	130	65	295,843
Sims Mesa	241	25,33	79	1879	100	35	194,354
Sims Mesa	242	33	83	1906	83	18	70,875
Sims Mesa	244	29	102	1911	105	40	469,394
Transfer	258	43	171	1915	81	16	113,277

SIMS MESA

High-grade timber harvest and fire suppression have combined to create stands in the Sims Mesa area that are less structurally complex than pre-settlement forests. The old large-diameter trees that were present in the mid-nineteenth century were removed in timber harvest during the first half of the 20th century. The lack of fire, which historically acted during its periodic occurrences as a thinning agent killing patches of small trees, has resulted in the unchecked passage of ponderosa pine seedlings and saplings into larger diameter classes. As a consequence, current stands are relatively dense and are characterized by a narrow range of relatively young age classes. In the Sims Mesa area, trees that comprise most of the stand stocking are between 60 and 100 years old, an age range that post-dates the last major fire on the Uncompahgre Plateau around 1879. This age range corresponds to trees between 8 and 20 inches DBH. Most of the area lacks any trees in the 1 inch to 9 inch diameter range, although about one third of the area has stocking (up to 120 trees per acre) in the seedling size class. The general lack of stocking below 9 inches may reflect the poor regeneration environment provided by dense overstory canopy.

There are five ponderosa pine stands located on Sims Mesa that are considered for treatment under this analysis. The Sims Mesa stands are located in the Spring Creek watershed and total about 310 acres. The stands are drained by Happy Canyon and Dolores Creeks. Elevation is about 8,200 feet and stands are situated on low-gradient slopes that average less than 8 percent. Soils are of the Delson, moderately-deep Sharrott families complex characteristic of slopes from 3% to 6%. Water erosion hazard is low. The most recent timber activity occurred in a 1958 selection cut.

These five stands were inventoried in the summer of 2003. Based on the results of this inventory, the four listed above in Table X are stocked at levels above the desirable level of about 65 square feet per acre.

Based on road access, the thinning units in the Sims Mesa area can be considered as two groups. The first group consists of units 240, 241, and 242, totaling about 208 acres. Access to this group exists via the Sims Mesa road, a county-maintained road that originates at Highway 50 and runs southwest about 9 miles through Montrose and Ouray counties to the National Forest boundary where it becomes NFSR 574. No temporary road construction would be needed to access timber in these units. About 562 thousand board-feet of ponderosa pine sawlogs would be removed from this group of units in a commercial thinning.

Unit 244 is about 102 acres with an estimated 469 thousand board-feet of ponderosa pine sawlogs of thinning-size trees. Access to this unit would be via the Government Springs road, a county-maintained road that originates at Highway 50 and runs southwest about 11 miles through Montrose and Ouray counties. It ends about a mile from the National Forest boundary. Public access does not currently exist to this unit, but the Forest Service is currently seeking temporary access. Commercial thinning would occur only if the Forest Service can acquire access.

TRANSFER

Harvest first occurred in this area in the 1890's when most of the original large-diameter ponderosa pine was cut. The forest stands that exist today are single-storied and even-aged. They originated as ponderosa pine plantations between 1913 and the mid-1920's and are among the oldest plantations on the Uncompahgre Plateau. Limited non-commercial and commercial cutting occurred in this area in the 1980's in response to a mountain pine beetle infestation. Current stocking level in this unit moderately exceeds the desirable level of about 65 square feet per acre of basal area. There are no trees

There is one ponderosa pine commercial thinning unit located in the Transfer area. The unit is about 171 acres in size and is located in the Dry Creek watershed. The Unit is drained by Cushman Creek. Elevation of this unit is 8,000 feet and slope is about 3 percent. Soils are of the Chilson-Delson, moderately deep Beenom families complex. Low-gradient slopes and low water erosion hazard characterize this soils grouping. An estimated 113 thousand board-feet of ponderosa pine sawlogs would be removed in commercial thinning. NFSR 508, the Transfer road, provides access to this unit. No temporary roads would need to be constructed to access this unit.

Effects on vegetation

Under Alternatives 2 and 4, commercial thinning would result in more-open, single-story stands of larger diameter trees; however, groups of trees would remain unthinned at densities at least equal to the Forest Plan standard to provide habitat for the Abert squirrel and to maintain horizontal and vertical diversity. Where they exist, snags would be retained in accordance with the Forest Plan standard. Estimated post-thinning average stand diameters would range from about 15.5 to 23.5 inches while average cut tree diameters would range from about 8.3 to 14.5 inches. With the removal of the smaller trees that occupy the lower crown positions, most ladder fuels would be eliminated, reducing the probability of low- and moderate-intensity fires spreading from the ground to the main tree canopy. Thinning would also reduce inter-tree competition for nutrients and water, of particular importance during the current drought. Because stand density is positively correlated to mountain pine beetle susceptibility, the stand density reductions resulting from implementation of Alternatives 2 and 4 would be improve stand resistance to bark beetle attack.

Under Alternative 3, no commercial thinning would occur and ladder fuels in the form of low canopy trees would remain with the potential to link ground fires to upper canopy fuels. Without the tree density reduction resulting from commercial thinning, ponderosa pine stands would remain at higher risk of beetle-caused mortality, particularly considering drought-induced physiological stresses these stands are currently experiencing.

<u>Existing Condition</u>: Treatments within the two watersheds are proposed within three major vegetation types: mountain shrub community, ponderosa pine, and limited aspen.

The mountain shrub community is mostly deciduous, tall shrub-lands co-dominated by Gambel oak and a variety of associated shrub species including mountain mahogany, serviceberry, big sagebrush, and lesser amounts of rabbitbrush, snowberry, and

manzanita. It is located primarily between 6,500 and 9,500 feet. At lower elevations it transitions to pinyon/juniper, at mid elevations transitions to ponderosa pine and at higher elevations transitions to aspen. The primary disturbance regime in mountain shrublands has historically been relatively frequent, intense fires. Because many of the shrubs are vigorous sprouters after a few years in a grass and forb stage the shrubs would again dominate the site. As a result of fire suppression the overstory in mountain shrublands has become more decadent and dominant than would be expected historically. The understory has become less abundant and diverse. As a result available forage in this cover type is of lower quantity and quality than it is capable of producing. This is having negative effects on wintering big game populations, particularly mule deer (Dry Creek/Spring Creek Vegetation Management Strategy, 2003).

The ponderosa pine community is found at elevations of 7,000-9,000 feet with associated species including pinyon pine, Utah, or Rocky Mountain Juniper and aspen and Douglas-fir. Historically the ponderosa pine type experienced frequent fires with the intensity dependent on vegetation conditions. Occasionally high intensity fires would return a stand to early seral grass/forb conditions. Moderate intensity fires would occur in stands with denser understories of shrubs or dense stands of young trees, resulting in some overstory removal and subsequently more open stands. Frequent, low intensity fires maintained a diverse mix of open stands with grass and forb understories (Dry Creek/Spring Creek Vegetation Management Strategy, 2003). Mountain pine beetle has had the greatest insect-induced impact on ponderosa pine stands. At endemic levels, beetles kill occasional trees or small patches or trees, preferring trees greater than 8 inches in diameter, in more dense stands. These types of outbreaks usually affect areas less then 2.5 acres for about 10 years. Currently ponderosa pine stand structure across most of the Uncompahgre Plateau is heavy on the sapling/pole stage (21%) and mature stands (79%). 55% of the stands have canopy closures greater than 40 %. The majority of ponderosa pine stands have a relatively uniform stand structure, are relatively dense with small trees and have an existing tree density that is approximately seven times greater than prior to 1900. The clumping pattern of the pine stands has largely been lost and there are few large green trees and snags (Romme, 1997). Most of the ponderosa pine are between 101 and 140 years primarily due to harvest activities that occurred before establishment of the National Forest and the lack of regeneration since the turn of the century. Almost all stands have had some type of timber harvest during the past 120 years, with shelterwood, and selection harvest being the most common harvest methods. Many of the stands have also been commercially or pre-commercially thinned. Several ponderosa pine plantations were established in the 1960's and 1970's, as well as in the 1910's. Most of these are in need of thinning.

The aspen community is found at elevations of 8,000-9,500 feet with common associates including snowberry and serviceberry. Aspen may occur as pure stands or seral stands in both ponderosa pine and spruce/fir types. The historic fire regime in aspen is mixed. Low intensity fires are thought to have started in adjacent more flammable ponderosa pine communities before burning into the aspen. Thin barked aspen are vulnerable to even low intensity fire. These fires would have thinned or killed aspen trees and stimulated sprouting of aspen clones. A large stand replacement fire

that burned around 1879 established many of the aspen-dominated stands found on the Uncompahgre Plateau today (Dry Creek/Spring Creek Vegetation Management Strategy, 2003). Aspen forest over 110 years old have a high susceptibility to decline from pathogen-related mortality. On the Uncompahgre Plateau 62% of aspen stands are mature, 36% are sapling/pole and only 2% are grass/forb/seedling. In locations where aspen is a seral tree species, Engelmann spruce and subalpine fir, at higher elevations, and Douglas-fir and ponderosa pine, at lower elevations, are encroaching into the stands. In the absence of fire, or other disturbance, encroachment by conifers will eventually replace aspen.

Noxious and Exotic Species

- Noxious weeds

Approximately 94 acres of noxious weed populations have been inventoried on the National Forest within the Dry Creek and Spring Creek watersheds. The species identified in this inventory include houndstongue (*Cynoglossum officinale* *L*.), Canada thistle *(Cirsium arvense)*, spotted knapweed (*Centaurea maculosa)*, Russian knapweed (*Centaurea repens)*, and yellow toadflax *(Linaria vulgaris).* Only fifty-five acres of noxious weeds have been inventoried within the project area. Spotted knapweed is one species that is not found within the project area, and houndstongue and yellow toadflax are more prevalent than the other aforementioned noxious weeds. A map and table displaying the infestations can be found in the project file.

The worst site found in the project area is an area of about 3 acres in the West Fork of Spring Creek. On this site average canopy cover (acc) of Canada thistle is 8.65% and acc for houndstongue is 3%. It is difficult to conceive of any treatment in the proposed action, which would result in a density of noxious weeds this high. Ground disturbance proposed in these actions is simply too low.

Current inventories do not show noxious weed populations in the area along the transfer road where thinning and under burning is proposed. However, there are rumors that some oxeye daisy (*Chrysanthemum leucanthemum)*, does exist along a ditch, which runs through this area.

As long as ground disturbance in each treatment is kept to a minimum, noxious weeds should not advance into the ecosystem because treatments are designed to affect the canopy cover of woodlands and leave grass and forb cover only slightly disturbed. The native grasses and forbs of these ecosystems provide an element of competition that the makes the project area somewhat resistant to noxious weeds encroachment. This is because native vegetation presently fully occupies the space that is available in these sites and as long as the vegetation is healthy it is difficult for weeds to become established, grow and reproduce. The cultural practice of seeding sites where the soil is exposed is recommended. Seeding rates should be 15 pounds per acre and contain 40% western wheatgrass, 20% bottlebrush squirreltail, 20% Letterman needlegrass, 10% mutton grass and 10% Rocky Mountain penstemon. Any machinery used in these projects should be clean and free from weed seed. Based on experience with other projects of this kind forage-producing plants and other succulent vegetation that is found on the floor of the woodland

should response with a flush of growth when the canopy cover of the woodland species is thinned. This growth will dominate the site for 2-3 years and then dominance will slowly decline as the woodland species re-establish.

- Exotic species

Very few exotic species are known to occur n the site. Cheatgrass is one exotic but it is uncommon in the project area. Resource conditions and current land uses create a set of conditions that are not conducive to the spread of this species.

It could be argued that Kentucky bluegrass is an exotic but most managers have accepted it as a naturalized species. It is found in every habitat and every ecosystem on the Uncompahgre Plateau.

Effects of the No-Action Alternative:

Under the No-Action Alternative no treatments to vegetation would be implemented. No thinning or harvest of ponderosa pine would occur, no roller-chopping/hydro-axing of oakbrush would occur, and no underburning of ponderosa pine/aspen would be implemented. The implications to each of these vegetation types from the No-Action Alternative are as follows. The mosaic objectives developed in the Vegetation Strategy would not be met with subsequent lack of benefits from those objectives. In the mountain shrub community stands would continue to be dominated by middle to late age oakbrush with reduced diversity and productivity in the understory and encroachments of pinyon-juniper. In the ponderosa pine vegetation type the majority of stands would remain in the pole and mature seral stages with little natural diversity within each stand, including a lack of natural clumping, lack of understory, lack of regeneration, and limited understory production. In addition the stands would continue to be more susceptible to insect and disease. The plantation ponderosa pine stands planted in the early 1900's and the 1960's-1970's would not be thinned and would become more decadent and unproductive. Within the aspen stand slated for treatment the slash and debris on the ground, as well as the conifer encroachment, would remain and regeneration would not be stimulated.

Cumulative Effects of the No-Action Alternative: Under the No-Action Alternative the landscape in this area would continue to be dominated by later seral woody species and a lack of diversity. Mountain shrub communities across the landscape would continue to be older seral with limited productivity; this would continue to have negative impacts on wildlife species such as deer and elk. Ponderosa pine stands on a landscape scale would continue to be overly dense and unproductive and would be susceptible to stand replacement fire on a large scale due to the increasingly dense understory and ladder fuels. Pinyon pine trees, and ponderosa pine stands would also be more susceptible to Ips beetle and mountain pine beetle attacks across the landscape. Aspen stands would continue to become decadent, eventually being replaced by more shade tolerant conifers.

Effects of the Proposed Action:

The overall impact of the Proposed Action will be to shift the current vegetation mosaic (distribution and arrangement of vegetation types and age classes) toward the mosaic objectives specified in the Vegetation Strategy. The only significant deficit will be in

those areas where vegetation has been set aside to mature, which in some cases may take over 100 years. If unplanned events occur such as massive insect kill or wildfire, the adaptive management part of the strategy requires that planned activities be adjusted to new conditions in order to continue moving the vegetation toward the mosaic objectives.

Many of the mosaic objectives were designed to create conditions which favor perpetuation of healthy populations of the greatest number of native plant and animal species in these two watersheds. By reestablishing the age class structure and arrangement conditions under which most of these species existed, managers believe they can best meet the needs of most of the species--both those which are now well understood, as well as those of whose status we are unaware (Kauffman et al 1994). Broader measures of vegetation such as diversity and vigor should also undergo moderate improvements across these areas of the watersheds as the mosaic is brought closer to pre-settlement conditions. Both diversity and vigor should also improve on the local scale where treatments are planned for restoring either a native herbaceous understory, or browse stand condition within a given seral stage.

Some of the acreage will be treated to meet vegetation mosaic objectives that are driven by the need to promote improved fuels arrangement for management of fire and protection of adjacent private structures or power transmission lines. In these areas, the earlier vegetation seral stages will be maintained on the landscape at unnaturally high levels, and the older seral stages are maintained at unnaturally lower levels, although both should be within the historic range of variability. Plant species associated with the earlier seral stages should experience localized moderate beneficial impacts to their populations. Conversely, species associated with later seral stages should experience localized, moderate negative impacts to their populations. Both diversity and vigor should improve on the local scale where treatments are planned to improve fuels arrangement.

Any large patches will be created with undulating boundaries, natural shapes, and islands of untreated vegetation to reduce the apparent size to the observer. These will generally be created to restore a more natural landscape mosaic. For the most part, the proposed projects will help erase effects of past vegetation management which often occurred in large blocks. These blocks will be broken down into smaller patches with more varied seral stages.

Over the longer term (5-25 years) treated areas should function similarly to the seral stages they simulate. Normal successional processes should occur with the slow increase of woody plants. Herbaceous palatable species should maintain dominance and vigor longer than they did under the old chainings, because of improved grazing practices. The treated areas should respond to natural disturbances such as fire, drought and disease as would their comparable seral stages. Because of the greater heterogeneity of seral stages across the landscape, natural disturbance events will probably be smaller in scope.

Under the Proposed Action approximately 2,000 acres of mountain shrub would be thinned, hydro-axed, or roller-chopped followed by prescribed burning. Much of this mountain shrub community has scattered ponderosa pine and/or limited pinyon-juniper

within it. By treating these stands with a mechanical treatment followed by a prescribed burn the scattered ponderosa pine will be more resistant to future disturbances (wildfires and pine beetle outbreaks), a portion of the encroaching pinyon-juniper will be removed, and the mosaic on the landscape will be enhanced by creating some areas with early and early-mid seral mountain shrub. The ecological function of the residual ponderosa pine will be enhanced by creating areas in which natural regeneration may occur and by creating stands in which fire can function at a more appropriate intensity. In addition, over time the structure of the residual pine stands will have an opportunity to become clumpy as pockets of regeneration mature. The openings created by the mechanical treatment and prescribed burns will also contain grasses and forbs, adding diversity, groundcover, and improved habitat to the area.

Under the Proposed Action over 2,900 acres of ponderosa pine will be commercially thinned and/or understory burned to reduce crown closure and/or understory fuels while increasing potential pine regeneration and the amount of grasses, forbs, and young shrubs in the understory. The commercial thinning will require some skidding of material, which will result in disturbance/mortality of some undestory species such as grasses, forbs, and shrubs, however, this disturbance should be minimal and the response by understory species to a more open environment should be rapid. Treatment of these stands will also increase the diversity of pine stands across the landscape by moving some of the stands to a later seral stage (understory reinitiation and increased growth of residual trees). By thinning/understory burning the residual pine trees will have less competition for available resources and should subsequently be more resistant to mountain pine beetle and other diseases. The stands will also be more resilient to fire disturbances by reducing fire intensity and increasing fire survival of the residual trees. The stands may be more productive as well, both from a timber standpoint as well as from a habitat and livestock standpoint.

Under the Proposed Action 170 acres of ponderosa pine plantation will be pruned with minor pre-commercial thinning as well (much of this acreage was thinned 3 years previous). Following pruning/thinning portions of these stands may be understory burned. The proposed action will reduce the crown density, remove some ladder fuels, and reduce the amount of litter and debris on the surface, allowing increased regeneration of grasses, forbs, and young shrubs in the understory. In addition the proposed action may remove some pockets of trees (through prescribed burning), allowing regeneration of pine to begin; from an ecological standpoint this may improve stand structure. Ecologically, trees within the stands would have reduced competition and less fuel buildup, enhancing their resiliency to both insect and fire disturbances.

Under the Proposed Action approximately 170 acres of aspen would be understory burned to remove conifer encroachment, regenerate aspen, and reduce fuels on the surface. Portions of these stands have already been thinned through fuelwood harvesting over the past several years. The proposed action should regenerate pockets of aspen within these stands and reduce the extent of conifer encroachment, resulting in improved age-class structure, increased stand health, increased resistance to insect and disease, and the longevity of these stands on the landscape. In addition grasses, forbs and young shrub regeneration should be enhanced by opening up the stands and reducing the amount of debris and decadent growth on the surface. Aspen tends to be

more fire resistent as well; by treating these stands the landscape will have more resiliency to fire disturbances. Approximately 10 acres of Aspen/Spruce/Fir will be mechanically thinned to enhance views from vista points in the area. The ecological impact of this treatment on 10 cumulative acres is negligible.

Noxious and Exotic Species:

As long as ground disturbance in each treatment is kept to a minimum, noxious weeds should not advance into the ecosystem because treatments are designed to affect the canopy cover of woodlands and leave grass and forb cover only slightly disturbed. The native grasses and forbs of these ecosystems provide an element of competition that the makes the project area somewhat resistant to noxious weeds encroachment. This is because native vegetation presently fully occupies the space that is available in these sites and as long as the vegetation is healthy it is difficult for weeds to become established, grow and reproduce. The cultural practice of seeding sites where the soil is exposed is recommended. Seeding rates should be 15 pounds per acre and contain 40% western wheatgrass, 20% bottlebrush squirreltail, 20 percent Letterman needegrass, 10 percent mutton grass and 10 % Rocky Mountain penstemon. Any machinery used in these projects should be clean and free from weed seed. Based on experience with other projects of this kind forage-producing plants and other succulent vegetation that is found on the floor of the woodland should response with a flush of growth when the canopy cover of the woodland species is thinned. This growth will dominate the site for 2-3 years and then dominance will slowly decline as the woodland species re-establish.

Exotic species

Very few exotic species are known to occur n the site. Cheatgrass is one exotic but it is uncommon in the project area. Resource conditions and current land uses create a set of conditions that are not conducive to the spread of this species.

It could be argued that Kentucky bluegrass is an exotic but most managers have accepted it as an naturalized species. It is found in every habitat and every ecosystem on the Uncompahgre Plateau.

Cumulative Effects of the Proposed Action Alternative:

By treating the mountain, shrub, ponderosa pine stands, ponderosa pine plantations, and the aspen stands in this area the landscape as a whole will be significantly healthier. There will be an increase in both vegetative and seral diversity on the landscape which will 1)increase the ability of the landscape to provide a variety of habitats, 2)increase the resiliency of the landscape to insect, disease, and wildfire disturbances, and 3)improve the overall health and productivity of the area. When combined with the proposed/approved treatments on BLM lands lower in the watershed the impact will be a healthier, more resilient, and more productive vegetation component on the entire Spring Creek/Dry Creek landscape.

Mitigation Measures for the Proposed Action:

In Wildland Urban Interface treatment areas a large amount of the vegetation would be moved to earlier seral conditions to reduce fire intensity and resistance to control. This will result in a lack of older seral conditions in those areas. To mitigate, areas

outside of, but adjacent to the WUI zone should contain a significant amount of older seral juxtapositioned as near to the early seral WUI treatments as reasonable.

Harvesting and thinning operations could damage residual vegetation, including shrubs, grasses, forbs and trees. Stipulations designed to reduce or eliminate this damage should be included in the contracts for these treatments.

Effects of Alternative 3:

The impacts from Alternative 3 are identical to those in the Proposed Action for the mountain shrub, aspen communities, and pine plantations. The differences relate to the commercial harvesting/thinning in the mature ponderosa pine stands, which impacts approximately 925 acres of pine. Alternative 3 precludes commercial harvesting/thinning although pre-commercial thinning and the understory burning of the stands could still be implemented. By eliminating the commercial harvesting/thinning the negative impacts of skidding material on the residual trees and understory vegetation would be eliminated. Age and structure of these ponderosa pine stands would remain similar with minimal age classes, limited stand structure, and a lack of appropriate clumping. The pattern of ponderosa pine on the landscape would be continuous, fairly dense stands lacking openings and an appropriate mosaic. The effect of not harvesting or commercial thinning is that these 925 acres may be left in a closed canopy state; pre-commercial thinning could mitigate some of this closed canopy but, due to cost constraints, could not mitigate all of it. In addition pre-commercial thinning to the level that is needed in some of these stands would result in a large amount of debris left on the surface, which would limit understory response from grasses, forbs, and shrubs and could also contribute to an intense, severe, wildfire. In addition, implementing a prescribed burn in an unthinned, ponderosa pine stand, or a stand that was pre-commercially thinned without removal of the material, would be difficult without scorching and killing many residual trees. This type of undestory burn, with lots of debris on the surface, could also damage soils. On a landscape scale the ponderosa pine stands would be less productive, both from a timber standpoint as well as a habitat standpoint. The stands would also be less healthy due to the lack of thinning in the denser stands; individual trees would still be competing for water and nutrients and would be more susceptible to insect and disease outbreaks.

Noxious and Exotic Species:

See discussion under the Proposed Action

Cumulative Effects of the Alternative 3:

Cumulative impacts of Alternative 3 include less healthy ponderosa pine stands across the Uncompahgre Plateau. Significant work has been done in many areas of the Plateau to bring ponderosa pine stands into a healthier, more productive, and more resilient condition that is within the ecological function of ponderosa pine. By not treating these stands with an appropriate harvest or thinning to reduce densities they may be more at risk to insects, disease, and wildfires, than treated stands in other locations. Overall the landscape would be healthier than with the No-Action Alternative due to the other treatments in ponderosa pine and other vegetation types but would not be as healthy as with the Proposed Alternative.

Effects of Alternative 4:

The effects of Alternative 4 are similar to the Proposed Action with the exception that all, or portions of, 5 units would not be treated because they do not lie within 1/2 mile of private land containing structures. The 5 units are all of Units 17 and 18 and portions of 16, 19, and 43. A total of 1,528 acres of treatment would be foregone, all of it outside of the Wildland Urban Interface. The vegetation which would not be treated consists of an oak/ponderosa pine mix (851 acres) and a ponderosa pine/mountain shrub mix (675 acres). The effects of not treating these stands include not meeting the mosaic objectives identified in the Vegetation Strategy and subsequently not realizing the benefits of those objectives. The 1,528 acres that would not be treated represent 25% of the total acres in the proposed action so eliminating them could make the overall project approximately 25% less effective. The untreated stands that would remain on the landscape contain varying amounts of ponderosa pine which would not be thinned or restored in any way. The extensive mountain shrub community in the understories of these stands would remain, compromising the ability of the ponderosa pine to regenerate and competing for limited water and nutrients. This would result in a continued decline in stand vigor, health, and resistance to insect and disease. The negative impacts from harvesting/commercial thinning would be eliminated in these stands.

Noxious and Exotic Species:

See discussion under Proposed Action.

Cumulative Effects of Alternative 4:

Overall the landscape would not be as healthy or productive if treatments of these stands are foregone. These stands could be focal points for insect, disease, and fire initiation, which could then spread to other areas. The intent of the Vegetation Strategy is to treat these watersheds from bottom to top to enhance overall ecosystem function (migration, ecosystem health, ecosystem processes, etc.) and reduce existing and potential fragmentation of the ecosystem. By not treating this band of vegetation in the mid-elevation of the watersheds the treatments in the lower watershed, primarily on BLM land and lands along the USFS boundary, would be separated, or fragmented, from treatments in the upper watershed, primarily Spruce/Fir and aspen on high elevation USFS lands.

Effects on Air Quality:

Affected Environment:

The Black Canyon of the Gunnison National Park, 15 miles to the northeast, is the only Class 1 air-shed in the vicinity of the proposed project. Communities and subdivisions within, or in the vicinity of, the project area include Beaver Hills, Pinyon Hills Estates, Pinyon Ridge, several tracts and individual home sites along Dave Wood Road, Government Springs Road, and Sims Mesa Road, the city of Montrose (10 miles north-northeast), Colona (8 miles east), Oak Grove/Spring Creek Mesa (3 miles north and east), and scattered subdivisions and residences within the Uncompahgre Valley. Transportation corridors within the project area include Dave Wood Road, Highway 90. Government Springs Road, and Transfer Road. Highway 550 is eight to 16 miles east

of the project area. Major drainages include Happy Canyon, Spring Creek, and Dry Creek (all within the project area), and the Uncompahgre Valley to the east. Air quality in the proposed project area is generally good. Air quality currently meets state established standards.

Environmental Consequences of the Proposed Action: Alternative 2

The mechanical aspects of the proposed action will have little impact on air quality, with any impacts being localized to within 300 feet of the equipment. Localized impacts will be fumes from the machine engine and dust generated by the operation. Chainsaws will have little impact on air quality, with any impacts being localized within 100 feet as fumes generated by the saw engine.

Pile burning of thinned trees, broadcsast burning of mechanical treatments, or prescribed fire in other areas, will produce a low to moderate amount of smoke in the immediate vicinity if inversions may trap smoke in area drainages. The amount of emissions and impact depends on the quantity of debris being consumed, the fuel moisture, and by meteorological conditions such as wind speed, wind direction, stability, and dispersion. Computerized smoke modeling will be completed as part of the burn plan development and will identify the optimum atmospheric conditions (stability, dispersion, and wind direction) to burn under to avoid smoke impacts. Any negative impacts to air quality will generally be short term (<5 hours), and by scheduling the burn under appropriate atmospheric conditions smoke will move away from sensitive areas and receptor sites and disperse quickly. When burning piles, atmospheric conditions can be limiting and generally not more than 200 piles (100 tons) will be burned in any single day to limit smoke production and to allow for adequate dispersion of smoke. When broadcast burning, atmospheric conditions are generally good to excellent so that larger acreages can be burned; 500 acres a day or more is possible. During the late-fall to early-spring time period there is a moderate to high chance of nighttime inversions trapping smoke in adjacent valleys. During these seasons, smoke impacts due to inversions can be mitigated by beginning burning as inversions break in the morning (~1000) and concluding burning prior to inversions setting up (~1400). In addition, burning during wind events will increase dispersion. Burning during precipitation events can also reduce smoke impacts.

Forest Service will obtain an approved state smoke permit prior to implementing any burn. Conditions of the permit will be complied with to avoid negative smoke impacts. If negative smoke impacts do occur, the burn boss will immediately modify the burn to reduce or eliminate the impact.

Under the proposed action, smoke will be a more common feature in the environment, particularly in and adjacent to the Uncompahgre Valley. However smoke will be managed; appropriate scheduling of prescribed burns can control the amount, duration, and frequency of smoke. Smoke columns will be seen rising southwest of Montrose several times each year and on some occasions there will be a haze in isolated areas within the Uncompahgre Valley which could temporarily restrict the views in those locations.

Environmental Consequences of No Action: Alternative 1

Under the No Action Alternative air quality in the area will generally be very good most of the time, probably better than at many times in pre-European history. However,

during severe fire seasons, smoke from fires in the Spring Creek/Dry Creek areas may be unmanageable and may persist for days or even weeks at a time in and adjacent to the Uncompahgre Valley. Due to the limited extent of the Spring Creek/Dry Creek Project, smoke from other locations, particularly to the south and west, and as far away as New Mexico, Arizona, and Utah, are all likely to impact the Uncompaghre Valley and Plateau regardless of whether this small area is treated or not. For example, during 2002, the Missionary Ridge Fire had a large impact on the Uncompahgre Valley and the Aspen Fire in Arizona had a lesser impact in 2003.

Environmental Consequences of No Commercial Harvest: Alternative 3

Under Alternative 3 with no commercial harvest the smoke will not cause any adverse conditions than on the proposed alternative but would be longer in number of days required to burn due to the amount of fuels that would be consumed in the standing trees that could possibly be burned if not removed during harvesting or thinning of the stands.

Environmental Consequences of Treating only WUI: Alternative 4

Under Alternative 4 Wildland Urban Interface (WUI) The amount of acres treated with Rx Burning would not be affected and so the air quality would not change from the proposed Alternative.

Effects on Cultural/Heritage Resources

Cultural Resources in this analysis consist of the significant archaeological and historical sites or structures left behind by Native American or Euro-American/other past occupation of an area. Such sites are at least 50 years old and have been determined to be significant and eligible for listing on the National Register (NR) of Historic Places as defined in 36 CFR 60. In general, these sites may be valued either for their association with history, Native American culture, or for their scientific research potential. A variety of identification methods may be used to locate sites in a project area depending on the types of sites that are expected and the field conditions. The Forest consults with the State Office of Archaeology and Historic Preservation to determine NR eligibility of any sites identified in a project area; and consults with Native American tribes to identify traditional cultural places or concerns.

Cultural resources may be affected in different ways by different kinds of land management actions. Impacts to sites are considered to be significant or “adverse” effects if they alter or destroy the characteristics that made the site significant. Causing damage or loss of artifacts or features, and sometimes significantly changing the setting of the area immediately surrounding a site, may produce adverse impacts. The Forest consults with the State Office of Archaeology and Historic Preservation to determine effects to cultural resources.

Generally, most Forest Service actions are designed so that any eligible sites are avoided by actions that could impact them; thus projects have no effect on the sites. In the discussion that follows, the effects discussed would be hypothetical effects to sites that *had not* been protected through project re-design, or to sites that may have escaped identification because of, for instance, very heavy vegetation. Field inventory is effective in identifying sites in most cases and all inventories conform to SHPO

standards for site identification. However, if an area selected for treatment is likely to contain certain kinds of significant sites but has environmental conditions that significantly limit location of the cultural resources, this information is considered in determining the potential impact of the project and the appropriate mitigation and monitoring measures.

Effects of Options for Treatment

- Roller chopping: Roller chopping involves disturbance of the ground due to the movement of the heavy equipment and to the uprooting of trees and shrubs. Any action that disturbs the ground would damage the soil matrix containg artifacts and features, destroying the locational associations that are vital to recovery of scientific data from archaeological sites. Most sites found in upland areas are not buried very deeply; the depth of the soil disturbance from roller chopping is much greater than the depth of many archaeological sites. Of course, heavy equipment such as bull dozers would crush structures or features. Roller chopping is considered to be among the most impacting acitvities to cultural resources of all types. Soil erosion, another form of ground disturbance that impacts intact sites, is another concern after use of heavy equipment and disturbance of the vegetation. Because vegetation is left mixed in the top layer of soil after chopping, erosion is reduced. It is fairly easy to design and conduct a chop to avoid crossing or chopping over sites but often it is then necessary to hand-treat the remaining patch of vegetation so that the sites blend with the surroundings and to reduce hazardous fire fuels.
- Hydroaxing: The hydo ax is a mechanical means of treatment that involved a light degree of ground disturbance due mainly to the weight of the vehicle and equipment used. Rutting has been observed when the equipment was used in damp or fragile soil. This rutting could disturb artifacts and features. Finely chopped vegetation material is scattered thickly over the ground during hydro axing. This material can serve as a mulch and protect remaining cultural deposits from erosion, in some cases greatly reducing natural erosion, thus benefiting the resource. The hydro ax can be maneuvred with greater precision than other mechanical methods, faciltiating avoidance of cultural resource sites in hydro ax units. It may also be used to removed specific trees/shrubs within some sites without driving over them, thus reducing fuels on the site itself. For these reasons, the hydro ax is considered to be very lightly impacting to cultural resources, but because of the rutting, the equipment shoud not be operated over any type of significant site feature.
- Controlled/Prescription burning (abbreviated Rx Burning): Many factors influence the effect of fire on cultural resources. The materials found in the site vary in the degree of damage they may sustain during burning (for instance, some stone tool materials may crack, shatter, or warp at lower temerataures than others, and wooden features would of course be destroyed by any direct exposure to fire). The fuel, soil moisture, weather and other conditions influence the degree of heat reached during a burn. Generally, widlfires burn at much higher heat intenisities than prescribed burns, depending on the objectives of the controlled burn. Any consideration of the impacts of prescribed burning must take into account that

facts that based on the fire regimes, most areas have been burned many times since the archaeological materials were deposited, and the damage from wildfire that could occur if hazardous fuels are allowed to contniue to build up, would certainly be worse than that caused by a controlled fire. A final consideration in assessing the effects of fire is that of soil erosion. As stated before, the soil matrix containing archaeological sites is critical to the site's value, so erosion protection is important. Removal of vegetation by burning results in erosion; this could significantly damage a site that was undamaged by the burn itself. Again, this threat is much greater during wildfire and is the leading cause of loss of cultural resources during wildfires. Prescribed burning follows standards for soil protection, which also protects the cultural resource. However, there is always a small risk that a burn could be followed by a serious cloudburst or other unforseen event triggering singificant erosion to cultural resources.

The project locality contains prehistoric artifacts made mainly of quartzite and chert, which sustain minimal damage from heat, although a very large amount of hot fuel burning directly upon these rock types could shatter, pot,if fracture, discolor, or even warp or melt them. When present, high damaging heat is generally limited to the upper 5-10 cm of the soil and the surface; fire above the surface in shrubs and trees will not create heat that penetrates deeply into the soil. Therefore, buried materials would not be impacted. However, large tree root systems burning below the ground surface can introduce high heat deeply into the soil. This mainly occurs when the roots were dead/dry prior to the burn--standing snags or stumps. Large, piled fuels would have the greatest potential to damage artifacts and thin, dispersed fuels the least. Even when some surface artifacts are damaged from burning, many Native American or prehistoric archaeological sites retain their value since most of the deposit is buried, but this is not always true. Some sites contain hearths visible on the surface; such features could be physically damaged and any data obtainable from the charcoal, if present, such as carbonized seeds and macrobotanical remains, could be destroyed by reburning, but this scenario would be quite rare due to previous natural fires. Overall, prehistoric sites are not avoided during controlled burning but are treated to reduce hazard fuel buildup.

However, historical and ethnographic sites contain more materials that are damaged by heat—glass, ceramic, wood and bone artifacts and features. Wooden structures, such as cabin remnants, sawmill slab piles, corrals, and wickiups (Native American habitations from the 1800s) would be destroyed by any level of direct burning. Wickiups, shelters made of cut branches leaned in a conical fashion against a standing live or dead tree or forming a free-standing framework, are a rare and signficant type of site. They represent base camp areas where Native Americans spent more than a few days, but were used for shorter periods than large winter camps in the valley floor would have required. Wickiups are usually found in pinyon-juniper stands but may also be found in oak and mountain shrub vegetation with ponderosa pine; they have rarely been found in dense, mature pure oakbrush stands. They are usually found today in remote areas that have not been treated with any kind of vegetation treatment before. Wickiups sometimes have artifacts scatters and visible hearths with them but not

always. These structures would be destroyed in a prescribed burn, especially a stand-replacing burn in pinyon-juniper or mountain shrub plant communities.

- Precommercial Thinning and Pruning: Thinning involves hand tools, including chain saws, used to fall small trees and often “lop and scatter” or broadcast the remaining slash. Pruning involves the hand removal of low-hanging limbs and does not impact the soil/disturb the ground. Occasionally fuel-wood gatherers are encouraged to gather the thinned wood to remove it from the forest. This results only in additional pedestrian traffic and light, rubber-tired vehicle use which must be restricted to existing roads. These activities do not impact the soil matrix and do not adversely affect most cultural sites. Standing structures of any height (rock circles, cabin or other bulding remains, corrals) can be damaged by trees falling onto them, but generally trees that are “precommercial” are small enough that they would not harm sites or structures by falling.

Slash may be piled and burned, in which case the pile would create high heat (see prescribed burning, above). If slash piling is not proposed, inventory in precommerical thinning units should focus on identifying standing structures to be protected. Units to be pruned need not be inventoried.

- Commercial Thinning/harvest of trees: The effects of harvest of trees or commercial thinning are include all of those discussed for Precommerical Thinning, with the addition of skidding and decking of the cut trees, which are generally of larger diameter (if for saw timber) than those in thinnings. Skidding or dragging of trees requires heavy equipment, which may be rubber tired or track-laying and which may dig into the soil surface especially under wet conditions (see hydro-ax, above). While being dragged, tree trunks create skid-trails, or deep goudges in the ground and piles of moved soil. When falling, large trees impact the ground hard and impale limbs into the soil. The depth of some skid trails may be greater than most upland archaeological site deposits. Following cutting, skid trails are often rehabilitated to prvent erosion by pulling slash over the trails and or placing dirt waterbars on trails on slopes; these actions all may distrub the ground to some depth. Harvest also may require creation of flat clearings for piling of and loading of logs, and temporary roads; these areas are created by and for heavy equipment and result in hevy ground disturbance. All of these impact the soil much more than precommercial thinning. Inventory for tree harvest or commercial thinning should identify all types of sites in order to exclude them from the treatment or recommend appropriate mitigation.

Concern exists for the protection of Native American/culturally scarred peeled ponderosa pine trees (CST’s). Generally, such trees are mature and do not have low-hanging limbs, but if they did, pruning would not harm them, and they are too large to be thinned precommercially. Sanitizing removal of insect-infested or at-risk trees, which may sometimes be part of a thinning prescription, may apply to some CST’s, in which case analysis must balance the needs of the health of the forest and the CST(if it is living), and the need for protecting CSTs and their setting as historical properties. This is a case-by-case consideration. CST’s may need to be identified as “special” to prevent fuel-wood gatherers from cutting them for fire wood.

Because wildfire would also damage or destroy CST's, most fuel treatments to reduce hazardous fuels are compatible with the CST sites, with hand thinning/pruning of brush and ladder fuels prior to prescribed burning being optimal and careful use of hydroax being also very good in protecting these cultural properties. It is expected that the majority of such trees would survive controlled ifres and even some wild fire, and that all of them would have survived many past fires already.

Existing condition: The project area has been inventoried for cultural resources and several were found. The inventory conditions were considered adequate for the discovery of significant cultural resources. All of the sites found are peeled ponderosa pines or culturally scarred trees (CST's) , which belong to the late historical and modern period of Native American occupation and are considered eligible for the National Register. No other prehistoric/native American sites were found, suggesting that the project locality was not heavily used by Native Americans for activities other than the use of the ponderosas. Historically, the area has seen mainly ranching and logging activity. The project area was probably a focus for logging in early years due to the proximity of the timber to the growing communities near Montrose. Grazing, historically heavy on the Uncompahgre Plateau, has gradually reduced in numbers in recent years. Both activities generally left only minor temporary sites such as camps, small trash scatters, portable sawmilling locations, and structures that are generally not eligible for the National Register. No historical sites were identified in the project area.

Effects of Alternatives:

Under the No Action Alternative in which no acres would be treated, cultural resources would be subject to natural processes. Buried sites (none were found) would generally remain intact except for whatever natural erosion might be present, and for mixing of the soil due to rodent and insect activity. In mountainous areas where sites on not buried very deeply, rodents and insects can create considerable soil disturbance. In areas where people often visit, surface artifacts and features may be subject to unauthorized collection or vandalism; in this project area there is little concentrated visitor use.

Wildfire unchecked by fuel treatment may burn over this area and would likely damage or kill the culturally scarred trees (CST's) which have been determined eligible for the National Register. Such mature ponderosa pines may survive fire (and have survived past fires in the project area) but when growing in thick oak or other brush, with thick duff on their roots, or with ladder fuels introducing fire to their upper crowns, they are often killed in intense fire conditions. Even if they survived, the forest settings around them would be altered and subject to subsequent accelerated erosion and potential introduction of exotic plant species and other changes.

Although surveys conforming to state standards have been conducted, buried sites could have been missed. Under the No Action alternative, these sites would be subjected to an unknown level risk of intensive burning from wildfires but would otherwise be subjected only to natural decomposition. This decomposition includes wickiups sites, which have a limited number of years to endure based on the fragility of the cut poles in the mountainous environment.

Under Alternative 2, CST (culturally scarred trees) sites found within treatment units would be treated. The recorded CST's are in units proposed for prescribed burning which would consist of underburning below a mature pine overstory. The CST's would be under a risk of being damaged by the burning if heavy fuels have accumulated directly below them; this is a fairly low risk due to the underburning prescription. One potentially eligible historic site would be avoided by underburning. One potentially eligible prehistoric site on the boundary of one of the burning units would not be damaged by the prescribed fire treatment and would allowed to be burned, but would be protected from any fire-line or other ground disturbing fire control work (none is proposed).

Although surveys conforming to state standards have been conducted, sites could have been missed. In particular, units 26-30 in the Sims Mesa area were surveyed less intensively due to heavy brush vegetation and are scheduled for mechanical treatments and prescribed burning. These units are not considered as sensitive for cultural resources, including wickiups, due to topography and lack of water. These units have been logged previously a number of times. There is a slight risk of burning undiscovered *historical* sites in these units and a very slight risk of burning undiscovered ethnohistoric sites such as wickiups; burning generally does not adversely affect surface prehistoric/Native American sites.

There is a slight chance that the prescribed burning would damage undiscovered wickiups sites in several other units that contain P-J and oak; all the mechanical treatment units were surveyed and no such sites were located within them. As stated previously, most historical EuroAmerican sites in this locale are not significant. The units that would be mechanically treated or commercially logged have a greater risk of impacting undiscovered sites through ground disturbance than burn units. Therefore this alternative carries a moderate risk of impacting undiscovered/open prehistoric sites that cannot be located for protection in advance. If the mechanical treatment is done by hydro ax and the soil is dry, damage to any undiscovered archaeological sites would be very low and benefits to the sites in terms of protection from erosion and fire would be gained.

If treatment is by rollerchopping, there is a strong potential for damage to any undiscovered archaeological site that may be involved with the treatment. However, the chances of sites being in this area are low due to lack of water, and to heavy brush that was not economically useful to historical or Native American inhabitants.

In summary, due to low site sensitivity and avoidance of the few cultural resources identified, Alternative 2 would have minimal impact on cultural resources. The chance exists that undiscovered sites would be treated and impacted but this chance is considered very slight.

Under Alternative 3, impacts to cultural resources would be similar to those described under Alternative 2, except that no harvest would take place. Any other treatments proposed would take place in these units. The units to be commercially harvested have been surveyed to state standard and no sites were found in them except culturally scarred trees, which would be protected from marking for harvest. Not harvesting these units would make no difference in the protection of these CST sites. Underburning and

in some case mechanical treatment would still occur. The chance of there having been undiscovered sites in the areas to be harvested is very minimal, so there would be no change in this aspect of the proposal. This alternative would have no effect on cultural resources other than that described under Alternative 2 for mechanical treatment units with low ground visibility.

Under Alternative 4, units 17-20 would not be treated as they are not WUI units. Rollerchopping and underburning these would not take place. A number of CST sites are found in these units, which would have been somewhat protected from fire during rollerchopping and which would be more exposed to destruction in wildfire. No other sites were identified in these units so no other differences in effect between this alternative and Alt. 2 would occur. These units were adequately surveyed with a very slight possibility of undiscovered sites, so there is only a slightly lower risk of damaging undiscovered sites, through not implementing the rollerchopping. Therefore, this alternative would have no impact on cultural resources other than that described under Alternative 2 for mechanical treatment units with low ground visibility.

Cumulative Effects Discussion

Cumulative effects include sites damaged naturally through erosion, wild fires, and other treatments. These impacts to cultural resources are difficult to quantify and vary from case to case. Most of the project area has been logged and some of it has been chained or re-planted with trees previously. Illegal off-road vehicle use, which is increasing throughout the state, is also accelerating erosion ot surface archaeological sites. Because all identified sites in the project area will be protected, the action alternatives would not greatly increase cumulative impacts to known cultural resources. Some minor resources, such as historic artifact scatters, could become more scarce due to fires and treatments; these features are not generally significant. Prescribed burning of pinyon-juniper and oak-pinyon-juniper stands throughout the Uncompahgre Plateau could result in fewer remaining wickiups if intensive inventories are not conducted or the vegetation conditions are too dense to identify and protect them. This resource type is considered at risk statewide due to ongoing decomposition and vegetation treatments.

Potential Mitigation Measures

Sites identified as significant will be avoided by flagging and avoiding during mechanical treatments and commercial thinning.

CST's will be protected during mechanical treatments and to the extent possible, during underburns. Hand removal of fuels under CST's will be conducted to the extent possible, to reduce the risk of killing them during prescribed burning. However, no measures will be taken to create firelines or physically prevent burning around the CST's.

Effects On Recreation/Visual Resources

Issues addressed in this section include:

Effects on Dispersed Recreation
Effects on Trails and Trailheads

Effects on Recreation Special Uses Effects on Visual Resources
Effects on Travel Management
Effects on Hunting (opportunity and experience)

It should be noted that no alternative considered would affect the system of open designated routes for motorized recreation use. The road decommissioning proposed implements site specifically, the decisions made in the Uncompahgre Travel Plan with regard to which routes are to be open to which uses. Effects of vegetation treatments in terms of recreation, experiences of people using these areas and associated effects are discussed below.

Existing condition:

The areas affected by proposed treatments are characterized as roaded natural, semi-primitive motorized recreation opportunity, with some limited semi-primitive non-motorized in areas farthest from existing roads. Treatment areas were selected in part to be near road access.

Recreational use of the area consists of dispersed camping, viewing natural features, forest products gathering, hunting, and motorized and non-motorized recreation along designated routes, including ATV riding, full size vehicle driving, hiking, mountain biking, horseback riding, snowmobiling, cross-country skiing, snowshoeing.

There are designated foot, horse, cross-country ski, mountain bike, 4wd, ATV and motorcycle routes within treatment units, as portrayed in the Uncompahgre Travel Plan Decision Map, in the project file. There are also routes identified in the Uncompahgre Travel Plan, for decommissioning.

Currently there are three recreation special use permits authorized in the proposed project area. There is one for day hikes, a recreation event for a mountain man rendezvous and a snowmobile grooming permit funded through a state grant.

In terms of visual resources, treatment areas are in inventoried visual quality objectives of modification and maximum modification. Physiography of the Uncompahgre Plateau offers low to moderate diversity in terms of scenery. Distant vistas of the San Juan Mountains are the primary focal point of scenic opportunity. Natural vegetation patterns are continuous areas of mountain shrub, with intermixed stands of Ponderosa pine and some aspen. An overlook and three vistas exist in the project area.

Elk and deer hunting represent the most concentrated and intensive recreation use of the area with ATV use in the summer and snowmobiling in the winter representing a significant protion of recreation usage in the area.

Hunting is primarily by the general public without the use of outfitter guide services. Elk and deer are the primary fall hunting species with turkeys being hunted in the spring and early fall. Distribution of animals depends in part on the existing cover and forage, which would be altered by treatments.

Effects of Options for treatment

All Options

Under all of the options for treatment, safety and user conflicts may exist along haul

routes for removal of commercial timber, and ingress and egress routes to each unit. The limited volume of timber produced under these proposals (see “Timber” section under “Vegetation” of this chapter) reduces but does not eliminate, this concern. Specifically, NFSR 536, the Spring Creek Rim road and NFSR

510, Davewood road, are used heavily in the summer and winter by recreationists. Access to treatment units by equipment and workers does increase traffic to a very small degree. There is a potential for conflicts in the winter on groomed snowmobiles.

Roller chopping

Roller chopping temporarily reduces the visual attractiveness and applicable usage of an area for most all recreational uses and activities. Equipment overruns vegetation knocking it down to ground level.

Recreationists passing through these areas would not have the feeling of being in the Forest, but would know they were in a substantially altered environment. Semi-primitive motoized and non-motorized areas would relfelct more of a roaded modified character until full regeneration occurred. The recreational experience would be diminished after treatment. Over a period of recovery, vegetation would regrow, and within 2 to three years, new, low, vegetation would cover down debris from sight, producing the appearance of a regenerated forest.

During treatment, over a period of a few days, equipment in the treatment areas, and traffic coming and going to the site, would further reduce the attractiveness of the general area for recreation. Visually, treated areas are temporarily reduced to a condition of maximum modification. Treated areas, if not broken up by retention of islands of vegetation, can take on the appearance of very large openings in the landscape. This is a temporary effect, lasting three to five years, which can be substantially mitigated by leaving patches of tall vegetation interspersed in treatment areas and vegetative strips along road and trail corridors

Trails, roads or routes going through chopped areas would be obliterated by woody debris, and would be unusable, not only for smaller motorized vehicles such as ATV’s and motorcycles, but also for hikers, horses and mountain bikes. Hiking trails would similarly be obscured and difficult to find, and difficult to walk following treatment. Dispersed camping sites would similarly be affected. In addition, winter travel along designated routes and cross-country could be interfered with if operations take place in winter Hunting opportunity and experience will be altered by removal of hiding cover, and through promotion of enhanced forage production. Large open areas provide better opportunity for hunters to acutally see game at greater distances. On the other hand game tend to move to cover during hunting seasons. In a period of three to five years regeneration of these areas to new growth, and to growth high enough to provide hiding cover, will make these treatment areas much better habitat than they currently are, hence drawing larger numbers of animals for hunters to pursue. See discussions of effects on wildlife and wildlife habitat under that section of this EA.

Hydroaxing

Hydroaxing produces much the same effect as roller chopping above, but does not leave crushed vegetation, but rather leaves shredded and releatively evenly dispersed

vegetative debris. A hydroax is very much like a very large lawn mower. Effects of creating openings are similar to roller chopping in terms of the experience of recreation users, and use of the treated areas. Recovery of vegetation is very similar to roller chopping.

Controlled/Prescription burning (abbreviated Rx Burning)

Prescribed burning has very little effect on recreation opportunity. While some of the effects of lowering

vegetation discussed above does occur, regrowth is rapid. The appearance of having been burned (black) disappears very quickly (1 year). Vegetation regrowth is very attractive for game and becomes a concentration area for animals. The greatest impact on recreationist from Rx buring would occur during the burning treatment, when smoke would deteriorate visuals. Since Rx burning would likely occur outside of hunting season, there should be no effects with this use. Travel routes are not harmed or obscured by burning as they are in roller chopping and hydroax treatments.

Precommercial Thinning/Commercial Thinning/harvest of trees / Pruning of trees

Thinning/harvesting of trees does have an effect on the recreation experience of users of the area. Sites are altered in their appearance. For one to three years after treatments, sites appear disturbed, and are less attractive for camping, hiking or recreational travel. Travel routes, dispersed campsites, and travel can be obscured and partly obliterated or damaged by down woody debris, and through skidding.

Fuelwood harvesting treatment for Unit 14, while providing for forest products gathering, will have a large visual effect for recreationist using the NFSR 510, Davewood road, the staging area and the Cut-off trail to NFSR 536, Spring Creek road.

Effects of Alternatives:

Under the Alternative 1, No Action, patterns of vegetation and associated visual quality, and associate recreation opportunities and use would remain the same as it is. There would be little to no change over time in these terms. Certain routes identified for decommissioning would be decommissioned using a less intensive method, and compliance with Uncompahgre Travel closures would rely on voluntary compliance on the part of users. Typically this has not been successful in terms of eliminating use on routes, and routes are perpetuated.

Under the Proposed Action, Alternative 2, the effects described in the preceding section would be applied to acres treated under the proposed action. For a period of 3 to five years, altered landscapes would be less attractive for recreationists, especially in Unit 14 where the effects will be highly visible to a large number of people.

Dispersed use, camping, ATV riding, motorcycling, Nordic cross-country skiing, snowshoeing, snowmobiling, horseback riding, viewing scenery and hiking do occur in these areas during summer and winter. These uses may be eliminated from the areas during treatment and may be diverted to other areas as the treatment areas heal. Experiences for the recreation users and opportunities will be lost during the treatment and may decrease during the recovery period. Some user conflicts along haul and

ingress and egress routes may occur during the treatment period, especially on high usage routes.

Within five years, the Forest would appear natural and use would resume. Hunting opportunity and likely success would improve substantially over time, as result of treatments improvement of habitat. Visually, the several thousand acres of treatments within the Dry Creek watershed in particular will attract notice. Large areas will appear to be substantially altered for a period of time.

Under alternative 3 there would be very little overall difference from the Proposed action, as the number of acres of commercial harvest proposed (and eliminated from Alternative 3) is small. Proposed thinning would have essentially the same effect on visuals, recreation, trails and travel routes, recreation special uses and hunting opportunities as the proposed action.

Under Alternative 4 only acres within the true Wildland/Urban interface would be treated. There would be very little overall difference from the Proposed action concerning effects on visuals, recreation, trails and travel routes, recreation special uses and hunting opportunities. These areas by their very definition are most near to development, and are all in roaded natural ROS, and in modification or maximum modification VQO. Treatments will extend the apparent influence of human management and alteration of the environment in areas most near to existing development. This is where it is seen by more people, but also in the areas where it has the least effect in terms of changing broad undisturbed natural landscapes. The decommissioning of roads within treatment areas will reduce the dispersed impacts of motorized use. Once natural healing of treated vegetation areas occurs, recreation quality will be enhanced as it would be in alternatives above.

Cumulative Effects Discussion

Cumulatively, the effect of federal land management activities, and private land development in the Dry Creek and Spring Creek watersheds has altered the character of these areas in terms of recreation opportunity and experience, and visual appearance. Similar vegetation treatments on the lower elevation BLM land in these watersheds will call itself to the attention of recreationists, and overall will for a period of several years present the appearance of altered environments. In the context of the broader Uncompahgre Plateau, this is not significant, and is a short term effect. Treatments proposed will in time produce a more natural mosaic of vegetation, with diversity and appeal to recreationists and hunters.

Potential Mitigation Measures

1. Following roller chop, hydroax, or thinning/harvesting treatments, a cat/bulldozer with a hand crew would need to travel all existing summer and winter routes as designated in the Uncompahgre Travel Plan, and as updated, and reopoen them for functional use at the designated level. If the designated level is non-motorized and on a single track, appropriate equipment/labor should be used so as not to created a higher level of travel management than designated. All trail/travel route and trailhead structures damaged during treatment will be repaired or replaced immediately by the contractor or timber/fire/wildlife force accounts. This should be made part of the contract.

Effectiveness: Reopening routes in this manner mitigates the access problem that treatments would cause after the treatment was completed, however, would not mitigate the effect of treatments themselves during the treatment period nor on the immediate and short term experience of recreationists passig through treated areas. Time will heal that.

2. Following roller chop, hydroax, or thinning/harvesting

treatments, a cat/bulldozer with a hand crew would need to travel all existing routes and reopen any prominent dispersed campsites and overlooks/vistas. .

Effectiveness: Same as #1, except for campsites.

3. Opportunities to enhance overlooks, vistas and

viewsheds should be incorporated into the treatment areas where they exist. Specifically the overlook in Unit 12 and associated veiwshed to the west should be enhanced and protected.

Effectiveness: Enhancing these areas will help increase visual experiences in treatment areas where visuals are impacted.

4. Coordination with District trails' coordinators should be accomplished to avoid treating an area after trail maintenance or reconstruction is completed. Specically on the NFST 116, Spring Creek Rim trail where a grant have been applied for reconstruction work in 2004.

a. Effectiveness: Coordinating the timing of other projects with the treatments will reduce and eliminate redunancy and duplicate costs.

5. Coordination with the District special uses coordinator should be accomplished to avoid treating an area during an auhtorized special use service being provided.

6. On heavily used roads, restrict timber hauling and heavy equipment ingress and egress to weekdays and nonholidays. Signage should be in place along road corridors to infom traveler of uncoming log trucks and heavy equipment.

Effectiveness: Hauling only on weekdays and usingsignage will help to reduce the potential user conflicts onheavily used travel routes.

7. Restrict all treatment to implementation outside of the spring/fall turkey and fall big game hunting periods.

Effectiveness: Treating areas outside of hunting seasons will reduce the number of conflicts with recreaitonists during a very high use period.

8. If winter hauling occurs, plowed roads should have at a minimum 6 inches of snow base left on the road and coordination should be made with the District Recreation specialists and Uncompahgre Valley Snowmobile Club concerning grooming concerns.

Effectiveness: Allowing 6 inches of snow to remain on the road will allow use on winter travel routes to continue to occur and reduce user conflicts with recresationists snowmobiling and cross-country skiing.

9. Trail and travel cooridors should retain a minimum of 50 foot buffer to reduce visual effects.

Effectiveness: Maintainng a buffer area along trails and travel cooridors will help recreationists to feel that they are still in a forest area.

10. Leave islands of vegetation interspersed throughout roller chop or hydroax treatment units for visual diversity. Effectiveness: From any distance, these islands will provide breaks in the continuous openings, and substanially mitigate this visual effect. In a short time revegetation will occur and treated areas with a diversity of stand structure provided by these islands and leave areas will no longer attract the eye as unnatural treated area, but rather will present a landscape with some interest.

Effects on Grazing Management

Existing Condition

The project area is a very small part of four large grazing allotments. Table XX is a display of the current situation on each grazing allotment.

Table XX
Current Situation of Grazing Allotments, which include the Project Area

Allotment	Permitted Number.	Permitted AUMs	NFS Acres	NFS Suitable Acres	SEASON	Ac/AUM	Management
Roubideau	531c/c 6 horses	3341	25279	23474	6/3-10/25	7.0	12-p deferred rotation
Spring Creek	430 c/c	1986	16885	16060	7/1-10/15	8.1	5-p rotation
Dave Wood	270 c/c, 15 bulls and 50 yearlings	1508	9244	9200	6/1-10/15	6.1	5-p deferred
Government Spr.	36 c/c	175	1710	1040	6/20-10/10	5.9	Season long
Totals		8351	53118	49774			

* The reader should note that the project area is a very small part of a much larger grazing allotment.

A grazing decision for the Horsefly landscape was made April 28, 2003, whereas, a grazing decision the Roubideau allotment was made September 27, 1996. Most of the treatments are in the Horsefly grazing landscape. One of the proposed treatments, i.e., the one along the Transfer road, is in the Uncompahgre Rangeland Initiative landscape. More specifically, this one is located on the Roubideau allotment. The analyses contained in the Horsefly is adopted and made part of this assessment.

Monitoring and resource inventories have assessed the conditions of each allotment. In this assessment land is divided by acres into two categories. One category is acres moving toward desired conditions and the other is acres not moving toward desired conditions. The kind of vegetation, the frequency and canopy cover of rangeland are ingredients which are taken into account to determine if the land is classified in either the moving toward or not moving toward desired conditions. Table XXI is a summary of current resource conditions taken from the Forest Service Infra database.

Table XXI
Status of Rangeland Vegetation by Allotment

Allotment	Acres Moving Toward Desired Condition.	Acres Not Moving toward Desired Conditions
Roubideau	25179	100
Spring Creek	14485	2400
Dave Wood	9244	0
Government Spr.	1166	544
Totals	50074	3044

Effects

The effects on grazing management of the proposed action and alternatives 3 and 4 would be the same. Although there are differences in the treatments, in each case the response of the vegetation would be similar. The treatments outlined in alternatives 2-4 are relatively benign because they affect the canopy of the woody component of the landscape and have little or no impact on the plants that provide forage for grazing animals.

Moreover, the project area, which is part of a much larger grazing area, is already being managed under the guidelines of Horsefly Livestock Grazing and Uncompahgre Rangeland Initiative EAs. These guidelines are in place to assure that land and resource conditions continue to improve until all areas of the national forest reach a satisfactory condition.

- Forage Production

Present production averages 600 pounds per acre. It would increase for a 2-3 year period by about 200 pounds per acre and then taper off as woodland species re-establish. After a time, forage production levels will return to the levels that currently exist. A temporary increase in forage production on this landscape would benefit native and domestic ungulates.

- Vegetation Composition

CFI (cover frequency index) increase for grass/forb components 2-3 years and then taper off as the woodland re-establish. Meanwhile, CFI for woody species would drop for 2-3 years and then gradually increase with the reoccurrence of the mature woodland. Monitoring data is lacking for this assertion; therefore, it is based on professional judgment.

Table XXI indicates there are 2944 acres that are not meeting or moving toward desired conditions on the Government Springs and Spring Creek Allotments. Some of this acreage is close to the project area. Treatments proposed in this EA coupled with updated management stipulated in the annual operating instructions and allotment management plans would effectively change the status of these acres. Instead of not meeting desired condition these would be upgraded to meeting or moving toward desired conditions. This would be made possible by opening up some lands on each allotment, which are presently hard to access by grazing

livestock due to the density of the shrub and forest canopy. As these lands are opened up the grazing pressure on other lands in poor condition would be given the opportunity to recover in time. Thus a greater percentage of the allotment would begin to move toward desired conditions and classified as such.

- Displacement of Permitted livestock

This is not anticipated. Livestock grazing will continue under the guidance of the Horsefly and Uncompahgre projects. Implementation of these decisions is presently underway. Implementation is expected to improvements in rangeland conditions throughout an area, which covers some 119,000 acres. Treatments proposed are designed to impact the canopy cover of woody vegetation only, whereas, the impact on grasses and forbs are expected to be somewhat minimal. Management guidelines in annual operating instructions and allotment management plans are designed to meet the physiological needs of plants used as forage. No other measures are necessary to assure survival and replenishment of these plants.

Removal of brush canopy and other treatments would make it easier to move livestock across the landscape, which would then make efforts to manage the vegetation with livestock grazing more effective. Livestock could be gathered and moved to fresh unit or removed from the allotment at the appropriate time before use became excessive. Additionally, cattle that before were not easily found or escaped could be gathered and kept out of the treatment areas, which would remove the possibility of repeated use of the vegetation, which we know has potential to result in range deterioration.

Effects of Options for treatment

Roller chopping, Hydroaxing, Controlled/Prescription burning (abbreviated Rx Burning), Precommercial Thinning, Commercial Thinning/harvest of trees, and Pruning of trees all result in similar effects on the herbaceous plants that grow on the woodland floor. As woody biomass decreases production of herbaceous biomass from grass and broadleafs increase. Unlike BLM lands, understory vegeation is well represented on these sites and can be expected to response accordingly when temporarily released from competitive forces brought about by the dominance of woody plants. Consequently, more forage would become available on a short term basis. As mentioned previously production of these species may increase by 200 pounds per acre bringing the total production up to 800 pounds per acre total. Exact amounts are nearly possible to predict because of the factors like weather, micro-changes in soil type, yearlong use by wildlife and so forth.

Existing condition:

Previously stated.

Effects of Alternatives:

All action alternatives would result in the same effect. Effects of the no action alternative are specified under existing conditions.

Cumulative Effects Discussion

Improved range conditions because of the temporary increase of forage production,

which is expected from the project.

Potential Mitigation Measures

Follow instructions in the annual operating plan (AOI) and new allotment management plans. AOIs are issued every year and always include guidance to the permittee concerning salting, herding, range improvement maintenance, stocking rate, etc. **NO** other mitigation is necessary to protect treated areas from the effects of livestock grazing.

All treatments should be implemented at times, which avoid conflicts with established livestock grazing practices. For example, roller chopping and hydroaxing projects should be done in grazing units after livestock grazing has ended for the season.

Any range improvements damaged by these actions should be repaired immediately.

Effects on Wildland Fuels/Fire Behavior

Affected Environment:

As discussed previously under Purpose and Need there are numerous vegetative indicators showing that the two watersheds do not meet the desired vegetative mosaic. Several of these indicators also point to fuels, fire regimes, and potential fire behavior that are not centered on the historic range of variability. These indicators include: 1) lack of some age classes (primarily early and late/old growth) and an abundance of other age classes (primarily early/mid and mid seral), 2) patch sizes that are often larger than desired, resulting in a very homogeneous vegetation with little diversity, and 3) high densities of woody species. Each of these vegetation conditions results in a continuous, heavy fuel load across much of the landscape. Future fires could potentially burn with high severity and cover large acreages; over the past two fire seasons several wildfires in the area have burned large expanses with high severity, including Burn Canyon (31,000 acres), Missionary Ridge (72,000 acres), Coal Seam (12,000 acres), Bucktail (~3,000 acres), and Hamilton (2,000 acres). The existing fuel conditions, combined with increasing development on private lands throughout this vegetation zone is dramatically increasing the risk to life and property from these kinds of wildfires. In addition, the large, intense wildfires are creating major soil erosion problems as well as opportunities for weedy species to invade. Large fires also negatively impact wildlife habitat, forage, recreational opportunities, and other values due to their unusual size and intensity.

Environmental Consequences of the Proposed Action: Alternative 2

By creating the proposed vegetation mosaic across the landscape in the two watersheds, the intensity and size of fires, as well as their resistance to control can all be modified substantially. This is particularly important in the wildland urban interface where human life, property, and infrastructure are present, but is also important in more remote locations where extensive severe fire impacts to natural resources can be reduced.

Within the wildland urban interface, creating a landscape of numerous patches of various aged vegetation will result in a landscape where fire behavior will change dramatically as it moves into adjacent patches. Within the ponderosa pine and the

mountain shrub vegetation types this change in fire behavior will be different under different weather and moisture conditions. For example, during the most severe fire seasons, dense ponderosa pine stands burn with high intensity and a high resistance to control (direct attack with air tankers only and indirect attack with dozers/burning out). Under these severe conditions patches of grass and grass/shrub make ideal locations in which to control the fire due to lower resistance to control, and increased safety of firefighters. During average or below average fire seasons, the grass and grass/shrub patches may be the only areas which burn (average of 3-4 foot flame lengths) and the adjacent stands of pinyon/juniper with little understory often can be used to help control fire spread. By creating a network of 'tiled' patches adjacent to subdivision and powerlines firefighters can quickly and safely connect the patches in front of a wildfire either by using the grass and grass/shrub patches during severe seasons or the dense stands during average/below average seasons. These options are particularly important where wildland urban interface and powerlines are present. Within more remote areas, similar but less frequent patches can be utilized to modify fire intensity, fire spread, and resistance to control. In these locations severe fires will obviously have less direct impact on human life and property, while the natural resources and ecosystem can benefit from fire as a natural process as long as fire intensity and size are within the HRV.

In ponderosa pine/shrub stands proposed for thinning the threat of a wildfire moving into and through the crowns will be reduced, if not eliminated, by reducing density of trees/acre and with spacing between crowns. Fire generally will not spread through the crowns if the spacing is greater increased. However, as the crown is thinned and the under-story of native species, fuels on the surface will increase, primarily in the form of grasses and forbs. These grasses and forbs will create a patchy and somewhat continuous fuel bed through which surface fires can readily burn, however, these fires are generally much easier for firefighters to control than crown fires.

As wildland urban interface and powerlines are protected by the proposed treatments and a more appropriate mosaic is created in the remote areas it will be possible to allow fire to play a more natural role through less aggressive suppression, increased fire use for resource benefits, and more natural prescribed fire implementation. Over time this more natural management of fire will help to maintain a healthy, resilient vegetative mosaic.

<u>Environmental Consequences of No Action</u>: Alternative 1

Under the No Action Alternative the density, continuity, and fuel loading would be similar to current conditions or even increase, resulting in potentially large, intense wildfires that have a very high resistance to control. These kinds of fires, coupled with the increasing amount of development on private lands within these watersheds, would almost certainly result in the loss of portions of subdivisions at some point in the future. Also, the resource impacts from these large intense fires are significant and include large amounts of soil erosion, invasion of the area by weeds, loss of habitat, loss of forage, loss of miscellaneous improvements, changes in recreational use, etc. In addition, the safety of firefighters in compromised by a lack of safe locations from which to control the fire. The financial impacts of controlling these large fires, rehabilitating the burned area,

and loss of productivity over time are also substantial and are borne by the taxpayer and local users.

Environmental Consequences of No Commercial Harvest: Alternative 3

With this alternative there would less acres treated and some of the acres that would be treated would have the possibility of have a greater chance of mortality during the Rx burn treatment due to the closeness of the crowns and stocking density. This would cause pockets of openings with little or no standing tree coverage.

Environmental Consequences of WUI Treatment only: Alternative 4

The results of treating only the WUI area would be less acres to be treated and the acres would need to be treated with other funds. The acres would be treated but my be at later time.

Monitoring

During timber sale preparation, the district silviculturist will work with field crews to assure proper implementation of stand prescriptions. The most important prescription elements include the selection of leave trees and retention of Abert squirrel groups and snags. The district small sales forester will assure that the timber sale purchaser complies with timber sale contract provisions, particularly with respect to soils concerns. Finally, the Ouray district silviculturist will monitor areas commercially thinned under this analysis to assess the existence of unusual beetle activity.

Irreversible and Irretrievable Effects

The term "irreversible commitment of resources" describes the loss of future options. It relates primarily to nonrenewable resources, such as minerals or cultural resources, or to factors such as soil productivity that are renewable only over long periods of time. For all alternatives there are no irreversible commitments of resources.

The term irretrievable applies to the loss of production, harvest, or use of natural resources because of management decisions. Under active management, irretrievable resource commitments are unavoidable, because managing resources for any given purpose necessarily precludes the opportunity to use those resources for other purposes. With the implementation of any of the alternatives, a variable portion of one primary resource (standing dead trees) would be irretrievably lost to either use as either a natural resource for the production of commercial forest products or as a component of wildlife habitat, particularly cavity dependent species.

The analysis revealed no significant irreversible or irretrievable commitment of resources associated with implementing the alternatives that are not already identified in the Forest Plan EIS.

Prime Farmland, Rangeland, and Forestland

Adverse effects on prime farmland, rangeland, and forestland not already identified in the Forest Plan EIS are not expected from implementing the alternatives. There are no prime farmlands within the project area.

Floodplains and Wetlands

The proposed alternatives would have no impact on floodplains or wetlands as described in Executive Orders 11988 and 11990.

Environmental Justice

With the implementation of any of the alternatives, there would be no disproportionately high adverse human health or environmental effects on minority or low income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to timber harvest or contractors implementing treatment activities.

Consumers, Civil Rights, Minority Groups, and Women

The proposed alternatives would not adversely affect consumers, civil rights, minority groups, or women. Timber sale and other contract provisions include non-discrimination requirements.

The proposed alternatives would not have a disproportionately high or adverse human health affect on any identifiable low-income or minority population.

CHAPTER 4 LIST OF PREPARERS AND INDIVIDUALS AND ORGANIZATIONS CONTACTED

Interdisciplinary Team (IDT):

Christopher J James, Fisheries Biologist
John Moore, Forester/Range Conservationist
Craig Grother, Wildlife Biologist
Jeff Burch, ID Team leader
Blake Patton, Fires Specialist
John Almy, Hydrologist
Holly Enist, Recreation specialist
Robert McKeever, Archaeologist
Terry Hughes, Soil Scientist
Tim Garvey, Silviculturist
David Armlovich, Geographic Information Systems specialist
Daniel Huisjen, Fire Ecologist

Literature Citations:

Hoover, R.L., and D.L. Wills, ed. 1984. Managing Forested Lands For Wildlife. Colorado Division of Wildlife in cooperation with the USDA Forest Service, Rocky Mountain Region, Denver, Colorado. 459 pp.

USDA Forest Service, 2003. Environmental Assessment for the Horsefly Rangeland Assessment. Norwood and Ouray Ranger Districts, Grand Mesa, Uncompahgre, and Gunnison National Forests. February 2003.

USDA Forest Service, 1991. Amended Land and Resource Management Plan for the Grand Mesa, Uncompahgre, and Gunnison National Forests. Rocky Mountain Region, USDA Forest Service. 1991.

USDA Forest Service, 2002. Uncompahgre National Forest Travel Plan. Grand Mesa, Uncompahgre, Gunnison National Forests. Delta, CO. March 2002.

USDA Forest Service, 2001. Management Indicator Species Assessment for the Grand Mesa, Uncompahgre, and Gunnison National Forests, Version 1.0. June 2001.

USDI Bureau of Land Management and USDA Forest Service, 2003. Dry Creek/Spring Creek Vegetation Management Strategy, Volumes I & II. Uncompahgre Field Office BLM, GMUG National Forests. September 2003.

USDI Bureau of Land Management, Uncompahgre Field Office, et al, 2003.Dry Creek/Spring Creek Vegetation Management Strategy.

Kauffmann, MR, RT Graham, DA Boyce, WH Moir, L Perry, RT Reynolds, RL Bassett, P Mehlhop, CB Edminster, WM Block, PS Corn. 1994. An Ecological Basis for Ecosystem Management. USDA Forest Service, General Technical Report RM-246.

Romme, W.H.; Floyd, L.M.; Hanna, D.; [and others]. 1997. Landscape condition analysis for the south central highlands section, southwestern Colorado and northwestern New Mexico. Unpublished Draft Final Report to USDA Forest Service. San Juan National Forest, Durango, CO: 110 p.