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# Environmental Assessment

## Grand Junction City Watershed Vegetation Management Projects

Grand Valley Ranger District  
Grand Mesa, Uncompahgre and Gunnison National Forests  
Mesa County, Colorado

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**SUMMARY**

In 2004 the City of Grand Junction entered into Memorandums of Understanding with the U.S. Forest Service and the Bureau of Land Management in an effort to ensure that resource management of the federal agencies consider and include key objectives for the protection of the municipal watershed, known as the Grand Junction Watershed (GJW), or Kannah Creek Basin (KCB).

The area of interest covers a total of 55,735 acres of National Forest System Lands (NFS), Public Lands (BLM), City of Grand Junction and other private lands. The watershed consists of 26,569 acres above the rim of the Grand Mesa and 29,166 acres lying below the rim. This proposed action relates to those acres below the rim known as the Kannah Creek basin.

Specific land ownership breakdown by acres is as follows (Map 1, Appendix A):

City Property	2,780 acres
Private Property	1,060 acres
BLM	2,560 acres
USFS	52,540 acres

Specifically, the Grand Valley Ranger District is proposing a series of treatments within the City of Grand Junction’s municipal watershed to restore pre-suppression ecosystem functions (including fire) and to modify, reduce and remove a build up of fuels (woody debris) as well as improve vegetative health; improve, repair and restore impacted non-motorized trails; and increase diversity of wildlife habitat.

The project would be involve treating approximately 8000 acres of National Forest System lands, 240 acres of City owned land and 600 acres of Public Lands administered by the Bureau of Land Management. The project sites are located in:

- Township 12S, Range 97W, portions of Sections 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 34, 35, and 36;
- Township 12S, Range 96W, portions of Sections 19, 20, 29, 30, 31, and 32;
- T13S, R97W, portions of Sections 1, 2, 3, 10, 11, and 12.

The Responsible Official for this project will be Connie Clementson, District Ranger of the Grand Valley Ranger District, Grand Mesa, Uncompahgre and Gunnison National Forests.

A Decision Notice (DN) documenting the Responsible Official’s decision will be issued when the environmental analysis of the alternatives is completed and will be sent to those requesting it or those who expressed interest by during the comment period.

## CHAPTER ONE

### INTRODUCTION

#### Document Structure

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

- a. *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.
- b. *Description of Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency's proposed action as well as alternative method(s) for achieving the stated purpose. These alternatives were developed based on any key issue(s) raised by the public and other agencies. This discussion includes design criteria that would be analyzed as part of the proposed action and alternatives to that action.
- c. *Environmental Effects:* This section describes the environmental effects of implementing the proposed action and other alternative(s). This analysis is organized by resource area. 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.
- d. *Agencies and Persons Consulted:* This section provides a list of specialists and agencies consulted during the development of the environmental assessment.
- e. *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Grand Valley District Office in Grand Junction, Colorado.

#### Background

The Kannah Creek Basin, located on National Forest System (NFS) lands and public lands, is an integral part of the City of Grand Junction's watershed system.

Currently, a Memorandum of Understanding (MOU) exists between the City and the Forest Service as well as the City and the BLM which formalizes the partnership and collaboration by ensuring the protection of both the quality and quantity of the City's municipal water supply through the use of the best available Forest Management practices and science.

The US Forest Service, Colorado State Forest Service, the City of Grand Junction and Bureau of Land Management, completed an initial assessment of the watershed area in 2006 and 2007. It looked at the existing vegetative conditions and the relative risk for a catastrophic fire event (which could affect water quality). Other resources conditions that are involved in 'overall watershed health' were also considered (ie, soils, wildlife habitat, etc). As a result of this assessment, a proposed action to meet or move towards forest plan objectives and goals was developed and is presented in this document as the proposed action.

## **PURPOSE OF AND NEED FOR ACTION**

The purpose of and need for action is to restore pre-suppression ecosystem functions and to modify, reduce and remove a build up of fuels (woody debris) as well as improve vegetative health; improve, repair and restore impacted non-motorized trails; and increase diversity of wildlife habitat.

Specific objectives include:

- Design treatments that will limit fire severity and intensity.
- Limit the potential movement and infiltration of ash or soil into city water courses or facilities thereby returning the entire basin to a more healthy and functional ecosystem by maintaining an undisturbed vegetation buffer along stream-courses.
- Modify continuous horizontal and vertical fuel profiles in areas strategically identified so as to gain maximum basin wide protection at the least possible cost across agency and city property boundaries.
- Promote a diversity of age and size classes among all vegetation types.
- Meet the intent of the Federal agencies fuels management programs to reduce fire risk and hazardous fuel build-up within the Wildland Urban Interface (WUI). Most of these areas are within, or adjacent to, an at-risk community as identified in recommendations in a community wildfire protection plan (CWPP) or those areas within 1 mile of the boundary of an at-risk community.
- Reduce impacts of existing authorized trails to water quality, wildlife habitat and overall watershed condition.
- Improve and increase wildlife winter range habitat conditions through a variety of mechanical and prescribed fire methods.

### **Wildland Urban Interface (WUI)**

The Healthy Forest Restoration Act of 2003 authorizes projects that reduce the risk wildland fires pose to the quality of a municipal water supply or to its maintenance. Specifically, HFRA Sections 102(a)(2) and (3) provides for expedited vegetation treatments on NFS and BLM lands in Condition Class 3 in all fire regimes and in Condition Class 2 in Fire Regimes I, II, or III that are;

“in such proximity to a municipal water supply system or a stream feeding such a system within a municipal watershed exhibiting that significant risk

exists from a fire disturbance event would have adverse effects on the water quality of the municipal water supply or the maintenance of the system, including a risk to water quality posed by erosion following such a fire disturbance.”

The Wildland Urban Interface (WUI) identified on the Grand Mesa includes communities-at-risk (as identified in the Federal Register, Vol.66, No. 3, pages 751-754, January 4, 2001) as well as municipal watersheds. The relative risk to these WUI areas varies depending on location, slope, aspect, surrounding vegetation (fuel conditions) and type and density of development. These risk factors must be considered in developing treatment strategies and priorities for these areas, in cooperation with other local partners.

**Forest Plan Direction**

The Forest Plan subdivides the Forest into 20 management areas (MA’s). The analysis area is located in MA’s 4B and 5A. These MA’s and the management direction for each are described in detail in Chapter III of the Forest Plan (III-132 through III-140 and III-165 through III-176).

Specific fire management direction and prescriptions for the portion of the watershed within the Kannah Creek Basin is summarized below for MA’s (4B, & 5A). The majority of the area is in 4B (Wildlife Habitat maintenance and improvement where Livestock Grazing is compatible with wildlife habitat management) and management of suitable timber on slopes under 40 percent.

**Fire Management Direction Summary Table**

<b>Grand Mesa, Uncompahgre and Gunnison National Forest Fire Management Direction Summary</b>								
MANAGEMENT AREA PRESCRIPTION		APPROPRIATE SUPPRESSION RESPONSE				APPROPRIATE PRESCRIBED FIRE MGMT ACTIVITY		
Area	Primary Resource Emphasis	Confine	Contain	Control	Restrictions	Planned	Natural*	
4B	Wildlife Habitat – Mgt. Indicator Species 240,595 acres	Yes	Yes	Yes		Yes	Yes*	
5A	Big Game Winter Range, Non-Forested Areas; 212,754 acres	Yes	Yes	Yes		Yes	Yes*	

- A Natural Ignition fire may be handled as a Fire Use Fire only if **BOTH** of the following are true: 1) A Fire Use Plan exists for the area; 2) Project dollars are available to manage the fire.

## **Management Area Prescriptions**

### **General Forest Direction:**

Fire Planning and Suppression – Provide a level of protection from wildfire that is cost efficient and that will meet management objectives for the area.

Standards and Guidelines – Fire and Fuels

- Fire Planning and Suppression – Confine and control wildfires at Fire Intensity Level I and II. Control all wildfires at Fire Intensity Level III and above.

### **Management Area 4B - Wildlife Habitat Management for one or more Management Indicator Species**

General Direction

- Fire Planning and Suppression – Provide a level of protection from wildfire that is cost efficient and that will meet management objectives for the area.
- Fuel Treatment – Maintain fuel conditions that permit fire suppression and prescribed fire to maintain habitat needed for selected species or species population levels.

Standards and Guidelines – Fire and Fuels

- Fire Planning and Suppression – Confine, Contain or Control wildfires at Fire Intensity Level I, II and III. Control all wildfires at Fire Intensity Level IV and above.

### **Management Area 5A - Big Game Winter Range in non-forested areas**

General Direction

- Fire Planning and Suppression – Provide a level of protection from wildfire that is cost efficient and that will meet management objectives for the area.

Standards and Guidelines – Fire and Fuels

- Fire Planning and Suppression – Confine, Contain or Control wildfires at Fire Intensity Level I, II and III. Control all wildfires at Fire Intensity Level IV and above.

The previous standards/guides and management direction related to fire suppression and from the 1991 plan were recently amended.

A recent Decision Notice (January 26, 2007) amended the current Forest Plan (1991) to allow Fire Use on the Grand Mesa, Uncompahgre and Gunnison National Forests. This “tool” allows natural ignitions to continue to burn under certain pre-approved fire prescriptions and a simultaneous risk analysis in order to benefit ecological conditions or improve fire regimes/condition classes. Under this amendment, Fire Use can be considered within the Grand Junction Watershed as part of an Appropriate Management Response.

Completion of this initiative would concurrently meet the goals and objectives of the 1983 Amended Forest Plan (FS; amended 1991). It would also meet the intent of “A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10 Year Comprehensive Strategy” August 2001 and the 2003 Healthy Forest Restoration Act.

Additional direction in 2003 resulted in the Healthy Forest Restoration Act (HFRA) authorizing projects affecting municipal watersheds and aimed at protection of watersheds from significant adverse effects on water quality within municipal watersheds. This also includes risks posed to water quality by the effects of erosion following a wildland fire event

## **DECISION FRAMEWORK**

The CEQ regulations implementing NEPA require that federal agencies consider three types of actions: 1) **connected actions**, which are two or more actions that are dependant on each other for their utility; 2) **cumulative actions**, which when viewed with other proposed actions may have cumulatively significant effects, and should therefore be analyzed together; and 3) **similar actions**, “which when viewed with other reasonably foreseeable or proposed actions, have similarities that provide a basis for evaluating their environmental consequences together.” (40 CFR 1508.25 (a)).

The scope of actions to be addressed in this analysis is limited to fuels treatment and vegetative enhancement projects within the Kannah Creek Basin on Grand Mesa National Forest and City of Grand Junction. In addition, within the scope of the proposed action will be limited to mechanical or prescribed fire treatments requiring no new roads or reconstruction of any roads or trails. It does consider and provide for such associated actions as trail re-routing, reconstruction and closure of any illegal or social trails determined to impacting resources including sedimentation into streams, ephemeral waterways and other resources impacts.

This EA documents analysis of site-specific, on-the-ground activities. It is not a general management plan for the City of Grand Junction Watershed and more specifically to the Kannah Creek Basin. The environmental analysis documented in this EA is tiered to the Grand Mesa, Uncompahgre and Gunnison Forest Plan Final Environmental Impact Statement (FEIS) and Record of Decision, as amended in 1991 (pages III-88 through III-196). It does not reanalyze the management area allocations already specified in the Forest Plan. This EA is not a decision document. It does not identify the alternative to be selected by the Responsible Official, but discloses the environmental effects of implementing the proposed action and alternatives to that action. The Grand Valley District Ranger is the Responsible Official. Her decision will be stated in

the Decision Notice. The District Ranger will make the following decisions whether or not to:

1. Conduct fuels and wildlife habitat treatment activities, both mechanical and prescribed fire;
2. Complete trail work needed to reduce impacts to the watershed including the closing of those routes that are non-system trails. To re-route or reconstruct trails identified as impacting water quality, wildlife habitat or aquatic/riparian habitat as budgets allow.
3. Close dispersed recreation sites within the project area.

## **PUBLIC INVOLVEMENT**

The Grand Junction watershed project has enjoyed a high level of collaboration and public interest since the 2005, when oil and gas activity on the western slope made municipalities want to be more actively involved in what activities occurred within their watersheds. Because one of the biggest concerns stemming from a review of the Grand Junction watershed was the potential for catastrophic fire events, this effort was initiated in cooperation with the City of Grand Junction, the BLM and the Colorado State Forest Service.

The following list details all of the methods used to ask the public for comments concerning vegetation management activities within the Grand Junction City watershed.

- As required under the NEPA process, (36 CFR 215.3), a legal notice was published in the Grand Junction Daily Sentinel for the GJ Watershed Restoration Project on August 2007. Fifty seven individual letters were sent to interested. August 7, 2007. A total of 2 comment letters or oral recordings were received. A content analysis of the comments is located in the project record.
- The proposal has been listed in the Schedule of Proposed Actions for the Grand Mesa, Uncompahgre, and Gunnison National Forest since August 2007. This document was also posted on the Forest's web site at <http://www.fs.fed.us/r2/gmug/policy/>.
- Two presentations were made to the Grand Junction City Council detailing the proposed initiative, costs and timelines for project implementation and completion. These meeting are televised on the local Cable TV channel.
- At this time, the Forest Service is documenting the effects of the proposals in an environmental assessment (EA). As the 30-day opportunity was offered during the scoping period, a Decision Notice (DN) documenting the Responsible Official's decision will be issued shortly after the EA is completed. The DN will be sent to those requesting it or expressing interest by commenting at that time. A legal Notice of Decision will be published in the Grand Junction Daily Sentinel.

**PROPOSED ACTION**

The proposed action is to:

- 1) prescribe burn approximately 5000 acres of gambel oak, serviceberry, sagebrush, grass and isolated areas of both pinyon/juniper and aspen over an eight to ten year rotation, beginning 2008.
- 2) mechanically treat approximately 3000 acres by using either a roller chopper, hydro-axe or crews to thin, chop or masticate dense stands of pinyon/juniper or oak.
- 3) Pre or post treat with appropriate tools such as herbicide treatments, seeding, etc.
- 4) Close unauthorized camp areas that currently present potential ignition sources within the Basin area.
- 5) re-introduce fire back into fire-adapted ecosystems where possible.
- 6) construct, re-construct and/or re-route trails creating resource impacts within the watershed. Close, decommission and/or rehabilitate those non-system routes deemed appropriate.

This analysis will not include those projects proposed on BLM lands within the watershed analysis boundary.

## CHAPTER 2

### ISSUES, ALTERNATIVES AND DESIGN FEATURES

#### ISSUES

The Grand Junction Watershed interagency interdisciplinary team identified preliminary issues based on scoping efforts as well as professional knowledge about the analysis area. They are listed below and briefly discussed regarding their potential impact and importance during the planning and implementation phase of each project.

##### **Issue 1. Air Quality**

Smoke emissions from prescribed fire implementation will be visible during burn events. Federal Land Management agencies are required by the Federal Clean Air Act to obtain and adhere to a criteria based permit process developed by the Colorado State Air Pollution Control Division (APCD) in order to limit potential negative emission impacts of prescribed burning. These permits are obtained prior to any ignition on a yearly basis with daily reports required during burn events. Initial consultation with APCD has begun and produced early criteria designed to limit or mitigate any negative smoke impacts. As the proposal develops further, more consultation will be required and also become part of the design criteria for project implementation. These mitigations will be outlined in the site specific burn plans for the affected units.

##### **Issue 2. Noxious and Undesirable Weeds**

The treatment in areas of pinyon/juniper may create an increased opportunity for undesirable weeds and plant species such as cheat grass to increase. Those areas that are proposed for treatment will also have a detailed seeding regime included, but infestations may require additional treatment with appropriate herbicide (see Grand Valley District Noxious Weed EA, 2003). Currently the extent of the noxious weeds identified within the watershed is limited. However, monitoring of treated sites, especially in the Pinyon/Juniper community, will be a priority during post treatment years. Seeding of these units with desirable grasses and forbs will also be added as design criteria for each of the P/J sites treated mechanically. Areas of oak treated by fire generally are not as conducive to the establishment of undesirable plant species and therefore will not be seeded post-treatment.

#### **PROPOSED ACTION:**

##### **Alternative 1**

This alternative would be implemented over a 10 year cycle or rotation. Implementation of some mechanical projects in the lower part of the drainage involving City and NFS lands are proposed to begin in spring 2008. These treatments may continue throughout the year as long as resource damage is not occurring (ie. saturated soils, winter range closures, etc.). Implementation of any of the prescribed fire units would be completed only during the spring seasons.

These treatments are described below in detail. Map 2, Appendix 2 outlines specific proposed treatment units. A narrative of these follows.

**A. Prescribed Burning Treatments:**

**Treatment Blocks 1 – 9**

These blocks are located entirely on the Grand Mesa N.F. and encompass approximately 5,300 acres. The dominant vegetation type is gambel oak (oakbrush) with scattered pinyon/juniper, pockets of sagebrush, grass and isolated Aspen. Preliminary plans are to use a combination of an aerial ignition system (helicopter with helitorch or sphere dispenser) and handcrews. Implementation would be in the spring in order to make use of snow cover above the burn and adequate fuel moisture throughout the project. All of the blocks would not be burned within a single spring season, but targeted for completion over several years, conditions permitting to create a variety of age classes of vegetation.

**B. Mechanical Treatments:**

**Units A, B & C**

These units are located on both City and NFS lands encompassing 466 acres. The dominant vegetation is pinyon/juniper of varying densities and with mixed understories (oakbrush, pinyon/juniper, cheat grass, other brush species).

These units lend themselves to mechanical treatment with more gentle terrain (slopes under 30%) and relatively easy access to the project site by either a hydro-ax or roller chopper.

Unit A, Unit B and 77 acres of Unit C would be hand-thinned and piled. Thinning prescriptions would be similar to those outlined in Units D, E, F and G. The remaining 135 acres of Unit C would be either hydro-axed or roller chopped.

Post treatment review of these units for appropriate seeding of species, weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

**Units D, E, F & G**

These units represent both City and NFS Lands. The four units cover 330 acres. The vegetation type, project placement and fire potential are similar to Units A, B & C and will not be further described in this section.

These units were identified as those more suited to hand cutting/piling due to their relative inaccessibility by large pieces of mechanical equipment and lack of road access.

Project specifications would be require removal of up to 40% of both the under and overstory, piling that material onsite and burning the piles as conditions permit (usually with continuous snow cover).

Post treatment seeding is not identified within any of these units due to the minimum overall disturbance of the site however, hand seeding of selected areas may occur where necessary (burn pile sites are examples).

Unit E may not be treated as heavily as the rest of the units due to the number of perennial streams within this immediate site area. This unit would be designed with the assistance of either the Forest Soil scientist or hydrologist.

Post treatment review of these units for appropriate seeding of species, weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

### **Units H, I & J**

These units are on the upper slopes of the Kannah Creek basin covering 928 acres dominated by oak, isolated sagebrush, isolated aspen and encroaching pinyon/juniper at lower elevations. The units are all on NFS lands. These units would be support both mechanical treatments and prescribed fire.

Project details would allow mechanical treatment (hydro-axe or roller chopper) in units H and J.

Accessibility into Unit H may be difficult and preclude the use of some mechanical options therefore this unit may be treated by fire rather than mechanically.

Unit I would be treated with fire after Units H and J are treated so they can be used as barriers to limit fire spread from I implementation.

Post treatment review of these units for appropriate seeding of species, weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

### **Unit K**

This is a small 18 acres unit centered around the Wildrose Campground adjacent to the Lands End Road on NFS lands. This site is predominantly oak and would be treated mechanically. Some hand-thinning/felling may have to occur near facilities.

Post treatment review of these units for appropriate seeding of species, weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

### **Unit L**

Unit L is 20 acres in size and located on NFS lands.

It is proposed to permanently close the access trail into the site, remove campfire rings, remove trash, treat the small cheat grass stand with herbicide and rehabilitate the unauthorized trail system in order to prevent future long term soil erosion.

Post treatment review of these units for appropriate seeding of species, weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

### **Unit M**

Unit M is a 47 acre unit located on NFS lands and is adjacent to the Lands End Road. It is also located in the same vicinity as the old CCC camp.

Herbicide treatment along the road right-of-way (~100' either side of the road) would be applied to reduce the incidence of cheat grass and then seeded.

Post treatment review of these units for appropriate seeding of species, weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

**Units N, O, P, Q & R**

Units N, O, P, & R: These units are located on BLM lands and would be covered under a separate analysis.

Unit Q: Unit Q is 702 acres and located on NFS lands. Unit Q was previously treated in the 1960's but experienced extensive pinyon/juniper regrowth and has a dominant cheat grass understory. It would be treated mechanically.

Prior to mechanical treatment, pre-treatment of undesirable and noxious weeds would be completed to reduce the potential seed spread. It would be laid out to specifically address key wildlife winter range needs. This unit would be seeded at the time of treatment.

Unit Q may require access via a closed trail (located on BLM land] or from Unit P. If the closed trail is utilized, it would be fully rehabilitated and re-seeded.

Post treatment review of this unit for appropriate seeding of species, additional weed control would be completed by an IDT (wildlife biologist, fuels and range scientist).

**C. Trail Reconstruction/Re-routes**

Extensive trail maintenance, re-routes, reconstruction and stabilizing would occur within the Kannah Creek Basin. Specific trail logs and inventories have been completed and those sections requiring work would be addressed over an 8-10 year cycle.

Non-system routes would be reviewed for resource impacts and closed.

All trails within the basin are non-motorized and would remain as such.

**NO ACTION ALTERNATIVE**

**Alternative 2**

NEPA requires the consideration of a "no action" alternative (40 CFR 1502.14d) where none of the activities identified under the proposed action would occur. This alternative provides a baseline for comparison to aid in determining the relevance of issues and effects of the proposed projects.

Under Alternative 2, none of the proposed treatment projects would occur.

## DESIGN FEATURES

If the proposed action is chosen, the following design features would be required during project implementation:

- Stream courses would be protected by leaving a buffer of undisturbed vegetation along their banks where deemed necessary by the Forest Hydrologist.

The main Kannah Creek drainage would have a buffer of 100 feet per side while the small tributaries flowing into Kannah Creek would be buffered 33 feet on each side.

Riparian areas would be not be used as ignition points within any prescribed fire unit.
- Post or concurrent seeding would be take place on any units deemed susceptible to invasion by noxious or invasive plant species.
- No new roads would be constructed.
- Treatment units would be implemented in such a manner as to create the greatest opportunity for vertical and horizontal vegetation diversity and wildlife habitat benefit while meeting the critical need to reduce fuel loading.
- Pre- and post-spray treatments would occur in those areas having noxious or invasive plants, but specifically in those areas with pinyon/juniper and indicators of cheat grass populations. .
- All burn pile sites within the Pinyon/Juniper community would be sprayed and seeded.
- Treatments would not occur during periods deemed critical by wildlife specialists for elk and deer seclusion. Established seasonal closures are from December 15th – April 1<sup>st</sup>.
- Surveys for *Sclerocactus glaucus* would be conducted on City owned treatment units. If found, these areas would be avoided.
- Prior to and immediately following project implementation, mechanical equipment would be washed in order to prevent weed seed from being transported into or out of the area.
- Notices would be posted at existing roads or trail heads at least 2 weeks prior to project implementation is estimated to begin.
- During periods of high visitor use (Memorial Day, Lands End Hill Climb, July 4<sup>th</sup> and Labor Day) suspension of work within the watershed may occur if determined to be a safety concern.
- A silvicultural prescription would be developed for those Units that are to be hand thinned. These sites are all Pinyon/Juniper.
- If wetlands are identified within treatment units during project layout, they will be excluded from treatment. A 100 ft. buffer will be provided to

minimize blowdown of surrounding trees. If water levels are low during implementation measure the 100 ft. distance from the edge of the hydrophytic vegetation along the edge of the wetland.

- No ground based equipment operation will occur in riparian buffer zones except at designated locations (approved by hydrologist or fish biologist or soils scientist) for crossings.
- Build firelines outside filter strips unless tied into a stream, lake, or wetland as a firebreak with minimal disturbed soil. Retain organic ground cover in filter strips during prescribed fires.
- Construction of fire line will include installation of water-bars to dissipate water energy and prevent erosion. Additionally, rake litter and other material or scatter slash over the line, once it is safe to do so.
- Chipped material will be distributed to avoid deep continuous ground coverage. The desired pattern is patchy, mosaic, and discontinuous. Masticated wood “chunks” will be distributed to deep avoid continuous ground coverage. The desired pattern is patchy, mosaic, and discontinuous.
- In areas where the and boulder cover is sparse, operate heavy equipment for land treatments only when soil moisture is below the plastic limit, or protected by at least 1 foot of packed snow or 2 inches of frozen soil.
- Conduct prescribed fires to minimize the residence time on the soil while meeting the burn objectives. This is usually done when the soil and duff are moist.

Additional measures may be implemented during actual project work and would be determined during the life of the project.

### Comparison of Alternatives

ITEM	ALTERNATIVE 1	ALTERNATIVE 2
<b><i>FUELS TREATMENT</i></b>		
<b><i>Thinning, pruning</i></b>	567 acres	0
<b><i>Hydro-Axe*</i></b>	135 acres	0
<b><i>Prescribed Fire</i></b>	5300 acres	0
<b><i>ROAD CONSTRUCTION</i></b>		
<b><i>New Spec Road construction</i></b>	0	0
<b><i>New Temp Road Construction</i></b>	0	0
<b><i>New Temp Road Obliterated</i></b>	0	0
<b><i>POST TREATMENT SEEDING</i></b>		
<b><i>POST TREATMENT SPRAYING</i></b>	47 acres	0
<b><i>TOTAL ACRES TREATED</i></b>	8000 acres	0

\* Hydro-axe or similar piece of equipment would be used for the mechanical portion of the project on both FS and City lands.

## **MONITORING**

A Monitoring Assessment would be conducted by an interdisciplinary team at Year 5 and Year 9 to determine if program objectives are being met and recommendations to continue, discontinue or change the treatments as originally developed. If necessary, an alternative management strategy would be completed and submitted to all partners prior to the end of Year 10.

Monitoring of project progress and effects would be take place per direction outlined within the Forest Plan. Correction of deviances outside the standards of the Forest Plan would be implemented as they are discovered and documented.

## **CHAPTER 3**

### **AFFECTED ENVIRONMENT & ENVIRONMENTAL EFFECTS**

This chapter describes the environment being affected and potential effects created by the alternatives. Past, present, and reasonably foreseeable future activities are considered 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 section addresses: 1) the affected environment; 2) direct and indirect effects; and 3) cumulative effects.

The document tiers to the Final Environmental Impact Statement (FEIS) and Forest Plan for the GMUG National Forests, as amended in 1991 by providing direction for all resource management programs, practices, uses, and protection measures for the Grand Mesa National Forest.

### **Vegetation**

The entire analysis area can be simply characterized as an area of continuous and often decadent vegetation currently under minimal management with regards to restoration or maintenance of its key vegetative ecosystem components. This tends to place the entire drainage at risk of large and catastrophic fire. As a result extensive, long-term negative impacts could affect water quality. Aside from being a high level of concern regarding the health and viability of the city watershed, the area is an important wildlife habitat site as both mule deer winter range and elk calving activities during the spring of each year.

The **Oak Zone** is the second major vegetation type within the analysis area. Its condition is typical of oak stands growing within western Colorado; it grows on steep slopes, is dense, decadent and forms large continuous layers of vegetation susceptible to both fire and disease. It is susceptible and frequently affected by seasonal freeze events once it is leafed out thereby increasing the potential of significant areas of dead stems across the landscape. This condition increases the potential risk of catastrophic, stand replacement wildland fire over the entire area. The understory does support numerous grass and forb species,

however their availability is limited due to the impenetrability of most stands. There are currently no insect or disease issues known within the area. Occasional “benches” within inventoried oak sites do support areas of native grass and sage devoid of oak, are normally less than 10 acres in size and often wet. Scattered pockets of sage exist throughout the zone as well.

The Gambel oak cover type represents 14.3% (8,023 acres) of the watershed and is located at the middle elevations within the Analysis area. The oak is mature and is considered to be in a mid to late seral condition. Stands are decadent and form dense continuous canopies.

**Proposed Action:** The proposed action treats 4,659 acres or 60% of the oak within the watershed through a combination of prescribe burning (units 1 – 9 and I) and mechanical treatments (units H, J, K). Gambel oak will quickly resprout following these treatments. Treatment units will be dominated by sprouting Gambel oak and other shrubs with grasses and forbs in the understory. This early seral stage will persist for approximately 20 to 30 years before it transitions into mid seral conditions consisting of dense clumps of oak that are less than 6 feet in height.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect on Gambel oak.

**No Action:** The majority of the Basin is Gambel Oak. Its current condition and the effect of “no treatment” will result in essentially the same stand condition; an even aged, decadent, closed stand offering few openings, a limited understory which offers minimal use through out most of the year for either wildlife or domestic animals.

As this oak continues to mature, dead fuel loads of 10 hour (1/4” to 1”) and 100 hour (1” to 3”) will begin to increase. If the species is drought stressed, frost killed or later in the growing season, live fuel moistures will drop and stands such as the one in the Basin, become highly flammable.

Without any interruptions in the horizontal fuel profile, wildland fires have the potential to burn a large, if not all, of the available fuel within the oak vegetation type in a stand replacement crown fire.

Establishment of non native grass and weed species (cheat grass, knapweed) can tend to degrade the biological viability and diversity within the area, shorten the fire return interval and increase fire size/severity.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. This should have little, if any, effect on oakbrush.

The Pinyon/Juniper or **PJ Zone** covers 16.5% (9,223 acres) of the watershed and is located at the lower elevations of the Analysis area. The PJ has the greatest variability of stand conditions within the Basin. The vast majority is in a late seral stage where stands are dominated by a mature tree canopy. Low shrubs and perennial grass/forbs are present if tree densities and canopy

closure is low to moderate. At high tree densities understory vegetation is largely absent. Limited areas of early to mid seral stages exist where chaining and/or wildfires have occurred.

While an intensive inventory of the zone was not done, walk through surveys with photo points indicate that three conditions currently exist: PJ with little or no understory (small tress/brush etc), areas supporting dense stands of smaller PJ, oak and downed dead material under mature overstory stands of PJ and small areas of good young PJ a grass/forb understory.

Areas with limited understory generally correspond to slopes greater than 30% and contain significant areas of rock. These stands remain healthy, although slow growing, with occasional mortality in individual or small groups of trees due to pine beetles or mistletoe infection. Dead fuel buildup is limited to small area concentrations from previous tree mortality; however invasion of cheatgrass within openings created by individual tree mortality is occurring.

Areas with an extensive understory generally occupy slopes less than 30%. Over grown oak brush, serviceberry, advanced PJ regeneration and light to moderate amounts of dead material form a dense, continuous, intermixed understory layer with mature PJ in the overstory.

The overstory is further broken down by sites where it is in a healthy, growing condition, to sites where the overstory is declining or dead. Small stands of old growth PJ with variable understory site conditions are scattered throughout the area.

Stand conditions supporting significant understories as described above represent the greatest danger of destruction from wildland fire as well as the greatest opportunity for effective fuels and ecosystem vegetative management.

The final PJ condition is represented by advanced regeneration establishment occurring at the high elevation oak/PJ ecotone (boundary). Advancement of the pinyon and juniper, especially as it relates to encroachment into the sage communities, is not desirable.

In recent years the pinyon component of the PJ has been affected by pinyon ips and pinyon twig beetles. Forest Health Management aerial surveys from 2005 estimated that 6,760 acres of PJ within the watershed were being affected by these insects. Moderate levels of mortality exist within some of the affected PJ stands. Population levels and resulting mortality significantly decreased in 2006 and 2007.

**Proposed Action:** The Proposed Action is to utilize a combination of mechanical treatments and hand felling of trees on 212 acres (174 acres on City and 38 acres on USFS lands) of PJ by hydro-axe. One hundred forty two (142 ac) acres will be hydro-axed and 70 acres hand thinned. This represents approximately 3% of the PJ in the watershed.

Mechanical treatments will result in most of the PJ overstory being removed. Small isolated patches of trees and individual trees will be left to serve as future seed sources, to enhance visuals, and provide for some wildlife habitat.

The treated units will be seeded following treatment to prevent the establishment of noxious weeds. These mechanical treatments will result in the units shifting to an early seral stage where herbaceous species dominate and only remnant PJ exists.

It will be approximately 50 to 70 years until young PJ become fully established again and the sites move into a late-mid seral stage. It will take 150 to 200 years before these sites are once again dominated by mature PJ.

Even though ips population levels have decreased it is important that management activities do not contribute to the potential of these populations rapidly increasing once again. Any activities which release host volatiles including thinning, pruning, and hydro-mowing should be avoided during the months of high beetle activity (May, June, July and August). By confining disruptive management activities to the cooler winter months, mortality to residual trees can be avoided.

An additional 435 acres (392 acres USFS and 43 acres City lands) will be treated by hand felling of trees and piling. Up to 40% of the tree canopy will be removed. Following treatment the units will be seeded to prevent the establishment of noxious weeds. These units will remain in a late seral stage because mature PJ will continue to be the primary factors influencing the site. There will be an increase in herbaceous species in the understory due to the decreased canopies. In the long-term (50 to 70 years) the stand structure may shift from single storied to multi-storied as young PJ become established in the understory.

Herbicides will be used in pre- and post-treatments on PJ units to control cheat grass. The current late seral stand structure of these units will not be affected by these herbicide treatments.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect on PJ.

**No Action:** Under the No Action Alternative, Pinyon/Juniper will continue to become more decadent and less viable as a functioning part of the Basin wide ecosystem. Current general conditions indicate that the entire PJ community is an overmature, closed canopy stand, with continuing build-up of standing dead and downed dead large trees. Advanced regeneration is intermixed as a second story under most of the over-mature areas as well as areas that were once open but have since been “invaded” with PJ regeneration. Cheat grass is advancing into this vegetation type where soils are poor and new P/J regeneration has not yet been established. There is evidence of limited insect and disease in the past, but no known active problems at the current time.

As the overstory continues to decline, heavy fuels (1" to 12" diameter) will increase, regeneration will range from heavy to absent and cheat grass will rapidly colonize any other exposed open ground. These conditions will exponentially increase both the fire hazard and fire risk within the Analysis Area and leave the entire area at risk of a significant large fire producing movement of both soils and ash into critical drainages used by the City.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. This should have little, if any, effect on PJ.

The **Aspen Zone** occupies the highest elevation sites within the basin and is often intermixed with Spruce/Fir located on the top of the Grand Mesa. Generally speaking, the aspen is healthy; however increased natural mortality is occurring within these stands. Numerous diseases, lack of large scale disturbances and drought continue to impact this tree species. The understory within aspen stands is normally a rich mixture of grasses, forb and shrubs. They are generally wetter than surrounding vegetation types and normally resistant to wildland fire spread unless under severe drought or an early freeze.

Maintenance of this zone is desired in order to provide a mosaic of wildlife habitat and a "buffer" to aid in the control or suppression of a large scale wildland fire.

The aspen cover type represents 9.3% (5,255 acres) of the watershed and is located at the very upper elevations within the Analysis area, just under the rim. Within the Basin, aspen is considered the climax plant community, with very few to no conifer species present. Aspen is predominantly in late-mid to late seral stages of development. There is a lack of early seral aspen (seedlings/saplings) due to the absence of active management and fire disturbance. Aspen stands generally date back to past large scale fire activity that occurred in the late 1800s. There is a mix of single-storied and multiple storied stand structures that form continuous forest canopies.

**Proposed Action:** Proposed burn units 1 – 9 and I, and mechanical units H and K contain approximately 651 acres of aspen. This represents 12% of the aspen cover type within the watershed. Prescribed burn treatments are not expected to actually effect very much of the aspen because prescribed fires are planned to be ignited in the spring when these aspen sites are still moist from recent snow melt. In addition aspen does not readily burn except under extreme weather conditions. The aspen will actually help control the spread of the prescribed fires into the upper reaches of the Basin and/or over the rim. Some isolated patches of aspen and the transition zone between oak and aspen may burn. If the aspen does burn in these areas then following the burn the aspen should vigorous sprout. The result would be an increase in aspen age diversity within the watershed. The mechanical treatments are not expected to affect any of the aspen because the isolated patches of aspen will not be treated in order to retain species diversity within these units.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect on Aspen.

**No Action:** The aspen community within the treatment units is limited to approximately 651 acres with the majority being in the highest portions of the burn blocks or immediately along stream courses which will not be treated. Within the Basin, aspen is considered a climax community predominantly in late to mid seral stage of development.

If left alone, the aspen community would continue to age and eventually decline. Regeneration would be suspect without some type of disturbance to stimulate the species to sprout. Overtime, the inter mountain brush species (snowberry, serviceberry, choke cherry and oak) would establish themselves and aspen would eventually disappear from the site.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. This should have little, if any, effect on aspen.

#### Spruce/Fir

The dominant vegetative cover type within the watershed is spruce/fir (24%, 13,708 acres). This cover type is comprised of primarily mature Engelmann spruce, Subalpine fir and some aspen. The majority of the spruce/fir is located above the rim of analysis area. A very small amount of the spruce/fir cover type is below the rim, primarily on north to northwest aspects.

**Proposed Action:** Most of the spruce/fir cover type is not proposed for treatment except for small isolated patches located in burn block 8 (13 acres) and mechanical unit H (51 acres). It is not a management objective to treat these small areas of spruce/fir included in units 8 and H and to extent possible these areas will be avoided during prescribed fire and mechanical operations.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect on spruce/fir.

**No Action:** Within the treatment units, there are approximately 64 acres of Spruce/Fir identified. The management direction is for retention of this small population of Spruce/Fir. Under the “No treatment alternative” this population should remain intact for several decades. There is a significant risk to it, however should a fire start low in the Basin and continue to the rim of the Grand Mesa.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. This should have little, if any, effect on spruce/fir.

**Cumulative Effects:** The vegetation communities within analysis area basically form a continual even aged stand across the entire landscape that is beginning to mature and become decadent. As this process continues, overall dead fuel loads will increase. Small openings may occur as trees and brush die, but these openings will quickly be colonized by either cheat grass in the lower

elevation, poor site types or by an undesirable mix of regeneration in the mid to high elevations.

Any openings created by die-off will also be much too small to have any significant effect on the overall structural or successional stage of the overall area. Stand health and viability will continue to decrease as both fire risk and hazard increase leaving the entire Basin at significant risk of a catastrophic fire and erosion event.

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**Table 3: For the analysis, similar vegetative cover types depicted in the vegetation map were grouped into general cover type classifications.**

<i>Table 3: Vegetation Cover types by land ownership</i>						
<b>VEGETATION COVER TYPES</b>	<b>BLM Acres</b>	<b>USFS Acres</b>	<b>City of Grand Junction Acres</b>	<b>Private Acres</b>	<b>Total Acres</b>	<b>Percent</b>
Unclassified	9	92	14	0	115	0.21
Agriculture Land	1	0	48	44	93	0.17
Barren/Rock*	18	1618	9	2	1647	2.94
Grass/forb*	72	1213	937	294	2516	4.49
Shrub*	21	12807	200	119	13147	23.47
Gambel Oak	23	8014	8	1	8023	14.32
Sagebrush*	212	48	53	66	379	0.68
Pinyon/Juniper*	2083	5834	1066	235	9223	16.46
Riparian/Cottonwood*	27	277	100	38	442	.79
Aspen	33	5212	7	3	5255	9.38
Douglas-fir	0	460	0	0	460	0.83
Spruce/fir*	41	13386	73	208	13708	24.5
Water	0	757	243	0	1000	1.79
<b>Total</b>	<b>2540</b>	<b>49718</b>	<b>2758</b>	<b>1010</b>	<b>56026</b>	<b>100</b>
<p>* <b>Barren/Rock (Barren Land, Rock, Barren, Talus Slopes and Rock Outcrops)</b>                      * <b>Grass/Forb (Grass, Forb, Alpine meadow, grass/forb rangeland, subalpine grass/forb mix, grass dominated.</b>                      * <b>Shrub (subalpine shrub, mesic mountain shrub, greasewood, shrub, snowberry, saltbrush, upland willow/shrub mix)</b>                      * <b>Sagebrush (sagebrush, sagebrush community, sagebrush/grass mix, sagebrush/mesic mountain shrubs)</b>                      * <b>Pinyon/juniper (pinyon/juniper, sparse PJ/shrub/rock mix, PJ oak mix, PJ sagebrush mix)</b>                      * <b>Riparian/Cottonwood (TCW (cottonwood), riparian)</b>                      * <b>Spruce/fir (spruce/fir, Engelmann spruce/fir mix, spruce/fir/aspen mix)</b></p>						

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**Table 2: Acres of Proposed Treatment by Unit, Ownership and Vegetative Cover Type**

	Burn Blocks									Mechanical Units																		
	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
USFS Land	Unclassified outside watershed	43																	24								517	
	Grass/Forb																										182	
	Barren/Rock																1											
	Gambel Oak	690	285	336	502	481	650	296	618	218							268	280	236	16	1							
	Shrub		8						4																			
	Sagebrush																						4					
	Aspen	14	120	101	65	102	66	75	51	28								45			2							
	Riparian/cottonwood				7	16	37	8	5	2		27	1															
	Pinyon/Juniper	67	27	84	49				93	35	29	55	79	32	10	23	82	167		1	12			19	43		2	
	Douglas Fir						1							5														
	Spruce/Fir								13	14								51										
<b>Total USFS Treatment Acres</b>	<b>814</b>	<b>440</b>	<b>521</b>	<b>623</b>	<b>599</b>	<b>754</b>	<b>472</b>	<b>726</b>	<b>291</b>	<b>55</b>	<b>106</b>	<b>38</b>	<b>10</b>	<b>23</b>	<b>84</b>	<b>167</b>	<b>365</b>	<b>291</b>	<b>248</b>	<b>18</b>	<b>20</b>	<b>47</b>				<b>184</b>		
City Land	Unclassified											1	2	1														
	Barren/Rock												0.5															
	Sagebrush												0.5														5	
	Riparian/cottonwood												3															
	Pinyon/Juniper													169	30	10	3										22	
	<b>Total City Treatment Acres</b>													<b>174</b>	<b>32</b>	<b>11</b>	<b>3</b>										<b>27</b>	
BLM Land	Unclassified outside watershed																								6	29		
	Grass/Forb																							1		27		
	Shrub																						1			7		
	Sagebrush																						6	12		29		
	Riparian/cottonwood																						4					
	Pinyon/Juniper																							29	188	152	1	73
	<b>Total BLM Treatment Acres</b>																							<b>33</b>	<b>196</b>	<b>164</b>	<b>1</b>	<b>136</b>
<b>Total Treatment Acres</b>	<b>814</b>	<b>440</b>	<b>521</b>	<b>623</b>	<b>599</b>	<b>754</b>	<b>472</b>	<b>726</b>	<b>291</b>	<b>55</b>	<b>106</b>	<b>212</b>	<b>42</b>	<b>34</b>	<b>87</b>	<b>167</b>	<b>365</b>	<b>291</b>	<b>272</b>	<b>18</b>	<b>20</b>	<b>47</b>	<b>33</b>	<b>196</b>	<b>170</b>	<b>702</b>	<b>192</b>	

A total of 584 acres of National Forest Lands outside of the watershed will be treated. They are in Burn Block 1, Unit J and Unit Q

A total of 35 acres of BLM lands outside of the watershed will be treated within Units P and R.

## Fire and Fuels

### Fire History

Past fire activity records from 1976 to 2005 were evaluated for the analysis area (**Table 5** includes all fires within the analysis area; both above and below the rim of the Grand Mesa) summarizes the number of fires, cause, and acres burned for each year.

Over a 30-year period, the majority of fires within the analysis area were the result of lightning (64%, burning approximately 181.1 acres). Man caused fires (36%, burned approximately 4.2 acres) mostly occurred in the upper portions of the watershed mainly resulting from unattended.

**Table 5: Fire Activity 1976-2005, Grand Junction Watershed**

Year	Lightning Caused		Human Caused			Total Fires	
	# Fires	Acres Burned	# Fires	Acres Burned	Cause	# Fires	Acres Burned
1976	2	0.20				2	0.20
1977			2	0.20	Campfire	2	0.20
1978			1	0.10	Smoking	1	0.10
1979			3	0.30	Campfire	3	0.30
1980						0	0.00
1981			1	0.10	Campfire	1	0.10
1982			1	0.10	Smoking	1	0.10
1983						0	0.00
1984						0	0.00
1985						0	0.00
1986	1	0.10				1	0.10
1987			1	1.00	Equipment	1	1.00
1988			1	0.10	Smoking	1	0.10
1989						0	0.00
1990	4	0.40				4	0.40
1991	2	0.20	1	0.10	Misc	3	0.30
1992			1	0.10	Campfire	1	0.10
1993						0	0.00
1994	2	0.20				2	0.20
1995	1	0.10				1	0.10
1996	2	0.20				2	0.20
1997	1	0.10	1	2.00	Equipment	2	2.10
1998						0	0.00
1999			1	0.10	Misc	1	0.10
2000						0	0.00
2001	1	126.00				1	126.00
2002	3	50.10				3	50.10
2003	1	0.10				1	0.10
2004	3	3.20				3	3.20
2005	2	0.20				2	0.20
Grand Total	25	181.1	14	4.2		39	185.3

%            64%            98%            36%            2%

Fires are classified based on size (A = 0.1 to 0.25 acres; B = 0.26 to 9 acres; C = 10 to 99 acres; D = 100 to 299 acres; E = 300 to 999 acres; F = 1000 to 4999 acres; G = 5000+ acres).

Between 1976 and 2005, 82 percent of all fires on the analysis area have been Class A and 10 percent have been Class B. Together these A and B fires affected 5 percent of the total acres burned. One Class D fire (Deer Creek) in 2001 affected 68 percent of the total area burned between 1976 and 2005.

Fire Risk

Fire risk is the likelihood an area will be affected by fire in a given time period. Fire risk is determined from past fire activity. Fire risk was evaluated for the entire Analysis area. Fire risk is simply the number of fire starts on a per 1,000-acre basis over a ten-year period. Risk ratings are defined as (USFS 2004).

- Low: 0 to 0.49 – projects a fire every 20\_+ years per 1000 acres.
- Moderate: 0.5 to 0.99 – projects a fire every 11-20 years per 1000 acres.
- High: >1.0 – project a fire every 0-10 years per 1000 acres.

The fire risk results for the Analysis area are shown in Table 6. Both lightning and human-caused ignitions were considered.

**Table 6: Fire Risk Analysis (1976-2005) for Analysis area**

<b>Acres</b>	<b># of Ignitions</b>	<b>Lightning Ignitions</b>	<b>Man Caused Ignitions</b>	<b>Fire Risk</b>
<b>58,940</b>	<b>39</b>	<b>25</b>	<b>14</b>	<b>0.24 - Low</b>

The vast majority of fires in the analysis area are caused by lightning. The visibility of the analysis area results in good fire detection and allows for rapid dispatch of initial attack resources. The proximity of the analysis area to the Upper Colorado River Interagency Fire Management Unit (UCR) resources from the West Zone and the Grand Junction Air Center allow for a timely fire response. Most fires are controlled during the initial attack phase while they are small in size without significant fire behavior.

However, even with the ability for rapid fire response, there are times when lightning fires escape initial attack and cause control problems. The 1996 Sink Creek, '01 Deer Creek and '02 Two Creek fires are examples of this. While the majority of fires in the analysis area are lightning caused, human caused fires occur and often are more problematic. This is for two reasons:

- Human caused fires are not usually associated with precipitation events and often occur during the most severe burning conditions. An ignition during a period of sunny, hot, dry, windy weather will tend to exhibit

extreme fire behavior much more rapidly than a lightning fire that ignites under cloud cover with a higher relative humidity.

- Human caused fires often occur at the bottom of topographic features. Fires generally spread uphill considerably faster than fires backing down a slope.

There is a higher probability of a human caused fire escaping initial attack than with a lightning caused fire. Examples of this are the 2002 Dierich Creek, 2004 Brush Mountain, and 2005 Blowout fires. The Blowout fire threatened the Grand Junction and Palisade watersheds and required significant resources to control.

**All Alternatives:** As the population of the Grand Valley and surrounding grows, increased use demands are being placed on public and private lands. These activities will tend to raise the human caused risk of unwanted ignitions throughout these areas.

#### Fire Hazard

Fire hazard relates to how fire behaves – its intensity and rate of spread. This is directly related to vegetation or fuel conditions (type of vegetation, age, structure, density, amount of live and dead material), topography (slope, aspect, elevation), and weather conditions (wind speed and direction, fuel moisture). Fire hazard changes with changing conditions.

Proposed Action: If the proposed action is implemented, it will limit fire severity and intensity by creating a mosaic of treated and untreated areas. It will reduce or limit the potential movement and infiltration of ash or soil into water courses or facilities by maintaining an undisturbed vegetation buffer along stream-courses.

This action will modify continuous horizontal and vertical fuel profiles in areas strategically identified so as to gain maximum basin wide protection at the least possible cost across agency and city property boundaries.

It will also result in an increased diversity of age and size classes among all vegetation types within the Kannah Creek Basin.

Finally, it will meet the intent of the federal agency fuels management programs to reduce fire risk and hazardous fuel build-up within the Wildland Urban Interface (WUI). Most of these areas are within, or adjacent to, an at-risk community as identified in recommendations in a community wildfire protection plan (CWPP) or those areas within 1 mile of the boundary of an at-risk community or identified as a municipal watershed.

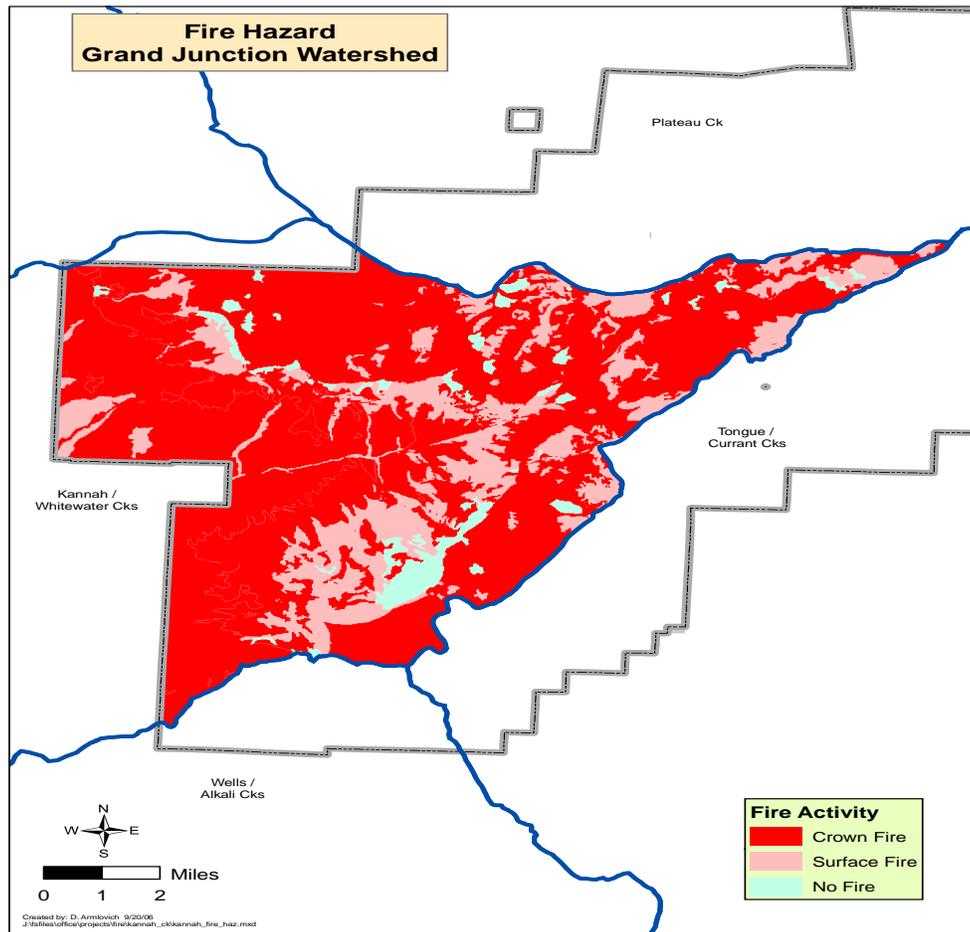
Air quality will be addressed by coordinating the sequence and timing of each individual block within State Air Quality requirement. The completion of units will be dependant on the availability of acceptable burn windows, availability of resources necessary to complete the project and adherence to required air quality standards identified by the Colorado State Air Pollution Control Division.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect on fire hazard.

**No Action:** Fire hazard analysis for the Grand Mesa was modeled for current vegetation conditions (topography is considered to be constant) under 97<sup>th</sup> percentile weather conditions, based on weather data taken from a Remote Automated Weather Station (RAWS) located near McClure Pass. Data was summarized from 1985 to 2003. Modeled weather conditions included wind gust of 20 mph, coming from the west and southwest. The resulting fire hazard displayed for the watershed as predicted crown fire activity is shown in Figure A.

It should be pointed out that based on approximately 22 years of weather data, these conditions have been measured only 3% of the time. Approximately 3100 days of weather have been collected over a 22+ year period. The 97<sup>th</sup> percentile represents approximately 93 days. The 90<sup>th</sup> percentile would represent approximately 310 days.

**Figure A. No Action Alternative: Fire Hazard (97<sup>th</sup> percentile weather, 20 mph winds), Grand Junction Watershed**



The potential presence of fire (risk) and the fire hazard are low for the entire Grand Junction Watershed. Areas above the rim of the Grand Mesa are characterized by spruce/ fir stand, open meadows and aspen. This area has a relatively low risk of developing a large, destructive fire unless the environmental, and therefore fuel conditions, become extreme. When such conditions occur, the potential does exist for the top of the Grand Mesa to support a large, damaging stand replacing fire event.

Areas below the rim, including the KCB, are much more susceptible to the occurrence of large-scale fire events resulting in a shorter fire rotation cycle. The various aspects of the side slopes of the GM, the lack of abundant moisture leading to drier live and dead fuels moistures, the presence of fuel types that are more susceptible to initial ignition and greater rates of spread (PJ, oak and cheat grass) and the presence of adverse slopes which may contribute to non-typical weather micro-climates, make this area a prime candidate for effective fuels treatments.

While lightning accounts for up to 90% of the fires ignited in western US (including the Grand Mesa), increased public and private demands upon public lands are raising the risk and occurrence of man-caused ignitions. Campfires, equipment failures, simple carelessness and arson caused fires are on the increase. Developing areas where naturally occurring fuels have been treated will offer strategic points where fire behavior may be modified or lessened and control efforts initiated. This is the goal of hazardous fuels treatments throughout the United States and the goal of this initiative.

In order to model a fire event that might occur and the ramifications of this type of fire, two scenarios were “run” depicting severe but realistic fire weather/fuel conditions.

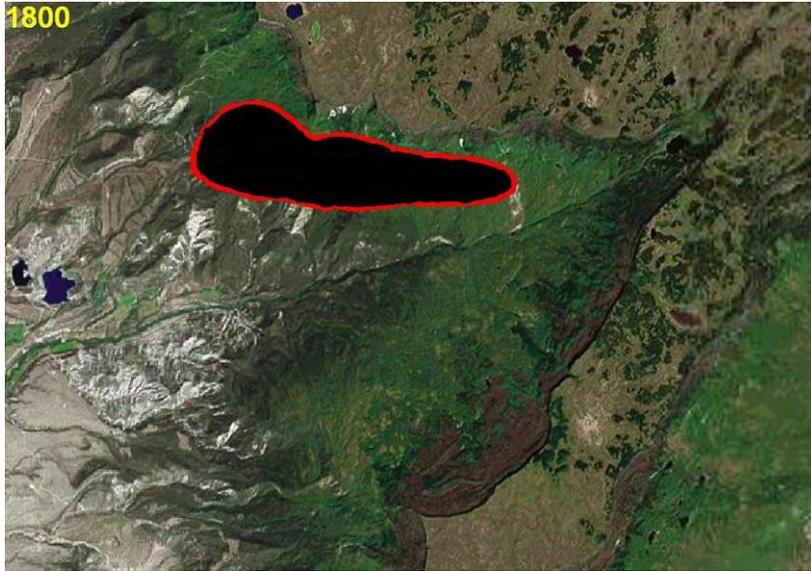
These were designed using human caused fires during high hazard conditions and modeled for ignition during the following conditions:

- July 1<sup>st</sup>
- 10:00 a.m. start
- 100 degree F
- 5% relative humidity
- 20 mph west wind

While the majority of fires do not start under these circumstances, these conditions are not uncommon during the height of the local fire danger. Even with Federal and local fire restrictions in effect, we have not been able to gain 100% compliance with these restrictions. Both the 2002 Dierich Creek fire on Glade Park and the 2003 Brush Mountain fire north of De Beque were multi-thousand acre human caused fires that started while fire restrictions were in place. The two ignition locations were – 1) “Bob’s Knob” mid-way in the analysis area and, 2) The Kannah Creek trailhead at the lower end of the analysis area.

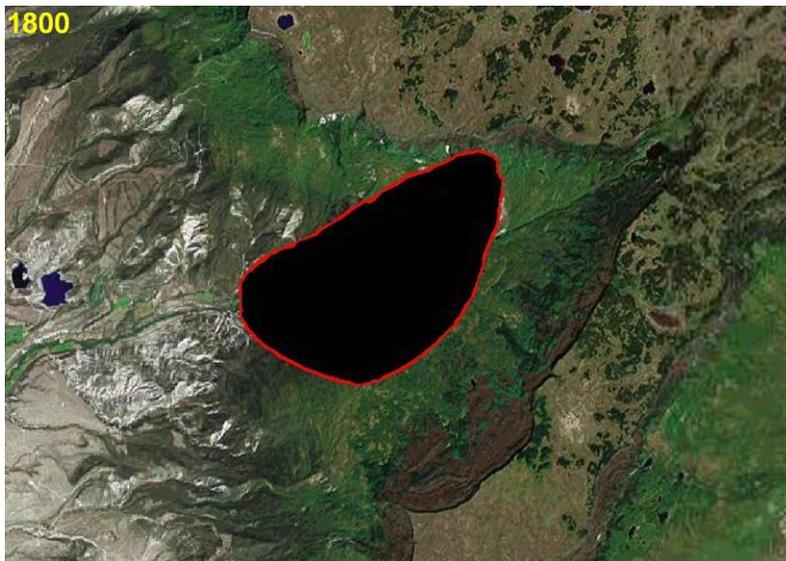
The fires were modeled using the BEHAVE fire prediction system which takes into account fuels, weather, and topography. The fires were modeled in one hour increments. The modeling did not take into account the effects of any suppression actions. In the event of a real fire start under these conditions, most fire suppression actions would be involved in public safety evacuations with fire suppression efforts beginning at the heel of the fire. The majority of the fire perimeter would not be affected. The fire was modeled for the first 8 hours of fire growth, from 10:00 a.m. until 6:00 p.m. These fires would have the potential to continue to grow beyond that time and in future days,

**Bob's Knob Fire**



1800 hrs size: 3,500 acres 1800 hrs perimeter: 63,360 feet

**Trailhead Fire**



1800 hrs size: 6,000 acres 1800 hrs perimeter: 67,056 feet

The Trailhead fire would have a significantly higher impact to water quality in Kannah Creek than the Bob's Knob fire for two reasons:

- The fire is larger in size therefore affecting larger areas of soil.
- The fire would follow Kannah Creek and burn the vegetative buffer between the along the creek.

Each fire would cause both long-term and short-term impacts on water quality. There would be a short-term sediment and a nutrient flush within the impacted watershed. The potential primary impact could be sediment resulting from increased overland flow and channel scour, which may continue for weeks, months or longer. A nutrient flush would include calcium, magnesium, and potassium, which are converted to oxides and deposited as ash on the soil surface. Oxides are low in solubility until they react with carbon dioxide and moisture from the atmosphere, forming bicarbonate salts. As salts, they are more easily dissolved in surface runoff or by leaching. Sediment can also serve as a vehicle for phosphorus, calcium, magnesium, and potassium loss. The more vegetation removed, the higher the intensity and duration of the flush. Most of the nutrients would be flushed during the first runoff, and the levels would decrease dramatically as watershed conditions stabilize.

Some of the nutrients would actually benefit the down-gradient vegetation by offering fertilizer benefits. Changes in implementation timing, quantity, and duration of flow in localized portions of a watershed would result from the fires. This would occur from changes to interception, infiltration, soil moisture storage, possibly snow accumulation, and snowmelt rate. An increase in both the quantity of runoff, and the duration of the runoff period, could occur. This modification would be most pronounced the first year following the burn and would gradually return to pretreatment conditions as vegetation reestablishes.

Both fires have some similarities in how the burned area would respond after the fire. The least impacted area would be the aspen. The lower fire intensity would result in more vegetative material being left to shield the soil. Plant response would be rapid during the following growing season. The sprouting of the oakbrush from the root systems will also begin to provide vegetative cover so that erosion would decrease substantially. The area of PJ would be affected on a long-term basis until some form of vegetative cover is restored. Unless otherwise treated, cheatgrass would invade sites denuded of organic material and establish itself on a long-term basis.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. This should have little, if any, effect on fire risk/hazard.

**Cumulative Effects:** Completion of the Proposed Action as outlined, will result in minor effects to the following activities or conditions currently on going within the Kannah Creek Basin.

- While portions of the Basin are treated, closure or restriction of access to the area by the public will be restricted or prohibited. Advanced notice and signage will be put in place to advise these users.
- Visual setting across the basin will be affected temporarily. Areas that are burned (oak) will remain black for a short period followed by significant green-up. Mechanical treatments were designed and will have contract specifications built into the contract to assure a mosaic of vegetation results from the treatment.
- Smoke production will be very visible from Blocks 1-9. Coordination with the State Air Pollution Control Division, the National Weather Service and the prescribed fire organization have developed parameter to select times and blocks that minimize any negative impacts on air quality within the Grand Valley.
- Cultural resources have been identified and measures will be written into the contract specification to minimize the effects on these including total avoidance and modification of selected treatment option

With the exception of the above listed criteria, the project should have no lasting permanent effects on the Kannah Creek Basin for the foreseeable future.

### **Livestock Grazing**

The Kannah Creek allotment encompasses the entire proposed Grand Junction Watershed project area. This allotment is currently lightly used by livestock. As of the time of this document, 2 permittees are authorized for use of the area by livestock (cow/calf) from July 1 to September 30.

However, because the Kannah Creek Allotment extends to the top of the Grand Mesa and beyond the analysis area has received historically minimal use by small numbers of animals.

Both Management Areas 4B and 5A allow for concurrent uses for both wildlife and domestic stock as long as there is no environmental degradation of available habitat.

### **Proposed Action:**

Prescribed Fire: The immediate short term affects of prescribed fire may not be as positive as fire effects present after the second fire entry into the stand. Understory, pockets of dead oak and some of the live oak will be the general classes of oak brush to be affected. Oak typically either does not burn, completely burns or only partially burns. As a result, the general landscape will, exhibit a mosaic of vegetative conditions over the treated landscape. Overall, crown height of the oak will lower and provide an opportunity for light dependant grasses, shrubs and forbs to establish themselves in a more opportune environment. Within the second growing season, oak sprout will begin to appear and dominate the landscape again providing valuable browse now more available to grazing animal as the result of fire.

The presence of both standing and downed dead oak stems will also begin to accumulate on the forest floor. This will be short term. While this condition will

hamper vegetative response in some areas and possibly increase dead fuel loading, these effects will be both short term and actually aid in using fire in the second entry.

Longer and more indirect direct effect may include the establishment and spread of unwanted or noxious weed populations. Monitoring and isolated treatment (spraying) will take place on areas more prone to weed establishment. Additionally, seeding of desirable grass, forb and brush species will be a design feature required of these areas. Generally, the P/J type is the most susceptible for weed invasion. With the exception of burning debris piles after hand felling of trees is completed, no further burning is planned for this vegetation type.

Mechanical: The mechanical units include both oak and PJ units under 30% slope. The PJ units will be of the most concern from the establishment and spread of noxious weeds or plants. As with pile burning in the PJ type, all mechanical treatment within the PJ zone will be seeded. A seed mix has been established that will be beneficial to these sites and provide the best competition to undesirable plants as can be expected. The following list will be used in the P/J types:

Slender Wheatgrass  
Western Wheatgrass  
Mountain Brome  
Junegrass  
Paloma Indian ricegrass  
Small burnet  
Alsike Clover  
Mountain Big Sage  
Mountain Mahogany  
Paiute Orchard grass

Especially poor sites will be left untreated and create a more of the mosaic pattern desired for both domestic stock and wildlife.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect on livestock grazing. Livestock use on the trails will affect trail condition, especially when conditions are saturated.

**No Action:**

The No Action alternative will result in no change to livestock grazing. As the vegetation becomes increasingly dense (oak and juniper), access in oak will become more limited. In those PJ areas that currently retain a good grass understory, available forage will decrease over time with the increase of the overstory. These changes however should not affect available AUMs since these areas are generally not used extensively within the grazing system.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. This should have little, if any, effect on livestock grazing. Livestock use will continue to travel on the trails which will affect trail condition, especially when conditions are saturated.

**Cumulative Effects:**

Cumulative effects will be similar to that of the no action alternative over time. The increase use by people within the basin over time may effect livestock distribution and may result in some change in utilization.

**Recreation**

The analysis area receives recreation use throughout the spring, summer, and fall months. The primary recreation use occurs in late summer through the late fall, offering a primitive hunting experience. Spring recreation comes secondary to the primary activity of hunting. Those spring activities are limited to horseback riding, fishing, camping, and turkey hunting. A 45-mile, non-motorized trail system comprises the majority of recreation use in the Analysis area. On average, the lower trailhead is accessible 30 minutes from Grand Junction for 9 months of the year.

Dispersed Recreation

The Analysis area is predominately an opportunity for forest users to participate in dispersed recreation activities. The 45 miles of trails provide an early-spring and late-fall opportunity to access the basin by horseback or foot. Other general forms of dispersed camping (i.e. camping by car, trailer, and recreational vehicle) are available along the Land's End Road.

Two key dispersed camping areas exist within the analysis area. The lower dispersed campsite is at the location of the old CCC camp, which is the primary area for accommodating multiple vehicles/trailer/tent combinations and large groups. An upper dispersed campsite is located across from the Wild Rose Picnic ground and is located over 100 yards off of the Lands End Road.

Spring months receive light recreation use in the Analysis area. As trails conditions begin to melt-out, trail users utilize the lower portions of the basin until the higher elevation trails on the Grand Mesa melt-out. Additionally, the area receives light use due to spring turkey hunters starting mid-April thru mid-May. The primary access used in the spring is utilized from the lower Kannah Creek trailhead located on the City of Grand Junction's property and the Wild Rose Picnic Ground located off the Lands End Road. Lower trail sections of the Kannah Creek, Spring Camp, Coal Creek, and Coal Creek Cutoff trail system is utilized by foot and on horseback.

The summer months generate a hot climate within the basin moving forest users to upper elevations of the Grand Mesa. Additionally, the opportunity for lake fishing is limited to some small lakes on the southern edge of the basin. The primary trails used for fishing activities include the Spring Camp, Blue Lake, and Indian Point trails.

The primary use in the basin occurs in the fall during the big game rifle seasons. The geographical area of the basin lies within Game Management Unit 41. Suitable habitat and populations for elk, deer, bear, mountain lion, and game birds provide ample opportunity for hunting activities. General dates for big game hunting opportunities start with archery season in late-August and rifle seasons in early-October thru mid-November. The following table

summarizes the number of participating hunters and recreation days for game management unit 41 during the 2006 season.

**2006 Big Game Harvest Statistics - Unit 41**

Source: CDOW

<b>Species</b>	<b>Total Hunters</b>	<b>Total Harvest</b>	<b>Percent Success</b>	<b>Total Recreation Days</b>
<b>Elk</b>	<b>1,391</b>	<b>326</b>	<b>23</b>	<b>7,157</b>
<b>Deer</b>	<b>1,010</b>	<b>540</b>	<b>53</b>	<b>4,238</b>
<b>Bear</b>		<b>8</b>		<b>25</b>

**Proposed Action:** As the proposed action specifies, some of the dispersed recreation uses may be affected when prescribed fire or mechanical treatment is active within specific areas. This project will slightly affect trail and dispersed recreation users in spring months, specifically during prescribed fire activities. The design parameters sufficiently address public safety measures and will have no effect on the existing recreation use.

Abolishing the dispersed campsite will greatly affect opportunities for dispersed camping within the analysis area, especially during big-game seasons. However, an illegal trail out of the north-end (back side) of the campsite should be closed and rehabilitated to ensure compliance with the Grand Mesa Travel Management decision (1995, amended 2003).

The primary season (fall) for dispersed recreation use in the areas proposed for the fuel treatments will occur during big game hunting seasons (August – November) in Big Game Management Unit 41. The secondary season (summer) for dispersed recreation use occurs in early summer (April – June) in forms of horseback, foot, and mountain bike use. Winter recreation activities are limited due to travel regulations or steep terrain. The proposed action will not likely have a direct effect on the recreational public during these time periods.

Other recreational uses within the area include fishing, small game/bird hunting, scenic/wildlife viewing, and camping activities. Forest users in the immediate area of these treatments would experience the sights and sounds of the fuel reduction activities.

The proposed trail reconditioning, re-routing or reconstruction should have a great benefit to dispersed recreation. With the improvement of trails, the surfaces will be more sustainable and access by the public will provide for an improved recreation experience.

**No Action:** Under the no action alternative, recreation should not be impacted unless a large fire occurs in which case significant impact to recreation access and opportunity will be affected for several years until vegetation re-growth occurs.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. As a result, degraded trail conditions will continue.

#### Developed Recreation

Developed recreation opportunities and amenities in the analysis area are limited to the periphery boundary and non-existent in the interior of the analysis area. The primary developed recreation sites that currently are operated and available for public use include:

1) Wild Rose Picnic ground – current use is minimal with most activity occurring during the fall hunting seasons when the area is utilized as a trailhead for access within the basin. Specific trails accessible via Wild rose are the Coal Creek, Coal Creek Cutoff, and the Switchback Trails.

2) The Carson Lake Day Use Area -- located above the rim and accessed from the Lands End Road (NFSR #100). The facility provides a graveled parking area and toilet to those who seek access into Carson Lake or the Kannah Creek trail system.

3) Lower Kannah Creek Trailhead -- The most notable and heavily utilized developed trailhead is located on the lower portion of Kannah Creek, located on City of Grand Junction property. The trailhead is accessible 9 miles east of U.S. Hwy. 50 and provides a graveled parking area for approximately 15 vehicles and/or horse trailers.

Undeveloped trailheads are located at the Raber Cow Camp along Land's End Road and at the terminus of the Flowing Park Road. Each trailhead provides public access from the rim of the Grand Mesa into the Analysis area on the Deep Creek and Indian Point Trails.

**Proposed Action:** A minor impact to recreation use in the Wild Rose Picnic Area for prescribed fire or mechanical treatment may occur, but it is not anticipated that the project will have any effect on the existing developed recreation uses in the area. The design parameters sufficiently address public safety measures and will have no effect on the existing recreation use.

Several of the proposed fuel treatment units are located within 0-3 miles of a Forest Service developed recreation site or area. There are no anticipated direct effects on developed recreation activities based on the current proposed action. Forest users may encounter fire personnel or equipment at or within any of the three developed sites. Public encounters with fire and/or fuel activities may occur from the Carson Lake Trailhead, Wild Rose Picnic Area, or Kannah Creek Trailhead (City GJ).

The proposed fuel treatment units are located in Management Objective 4B and 5A. Management emphasis for these prescriptions are for Semi-Primitive Non-Motorized, Semi-Primitive Motorized, and Roded-Natural recreational opportunity. A majority of the recreational opportunities in the fuels analysis area comprise the Semi-Primitive Non-Motorized recreation experience. The

sights and sounds of fuel reduction activities would diminish some feeling of solitude and self-reliance for users who seek a primitive experience. As these activities occur intermittently over the lifetime of the proposed project, those seeking solitude or a primitive experience would generally accept a temporary change to their experience. The visual setting would only temporarily modify the setting upon completion of the project and have no long-term effect on future recreational pursuits.

The proposed trail reconditioning, re-routing or reconstruction should have a great benefit to trail use. With the improvement of trails, the surfaces will be more sustainable and there will be less sedimentation will occur into nearby water systems.

**No Action:** Under the no action alternative, developed recreation would not be impacted unless a large fire occurs in which case significant impact to recreation facilities. Access and opportunity will be affected for several years until facilities could be reconstructed.

#### Recreation Special Uses – Outfitter and Guide

Several existing outfitter and guide operations provide public service in the analysis area. The principle outfitter and guide service is Colorado Mountain Adventures, Inc. The permit authorizes several base camps located within the analysis area. Additionally, the permit authorizes 450 summer service days (horseback, summer fishing) and 475 fall service days (big game hunts).

A second outfitter and guide service is Ken’s Anglers. The temporary permit authorizes five service days on Kannah Creek for instructional fly-fishing. As a primitive backcountry area, the clientele served by these commercial operations experience a unique opportunity and setting not found elsewhere on the Grand Mesa.

**Proposed Action:** Several of the proposed fuel treatment units are located in operation areas of permitted Outfitter and Guides. The proposed action would affect the base camp location of Colorado Mountain Adventures, Inc. If the current permit holder requests to temporarily move the present base camp to another location, it would most likely have some impact on the overall operation of the existing outfitter and guide service. Careful coordination with the outfitter guide will be necessary so as not to have long-term financial impacts to the business. Additionally, a prescribed fire or mechanical treatment of the vegetation would temporarily diminish the visual setting at the current Colorado Mountain Adventures, Inc. base camp.

The proposed trail reconditioning, re-routing or reconstruction should have a great benefit to trail use. With the improvement of trails, the surfaces will be more sustainable and access by the public will provide for an improved recreation experience.

**No Action:** Under the no action alternative, Outfitter /Guides should not be impacted unless a large fire occurs in which case the following impacts may occur to the permit holder: financial impact due to inability to operate;

(depending on the location of the fire) limited access to the area may occur; and opportunity for hunting will be affected temporarily until vegetation re-growth occurs. Long-term, the hunting should improve which should result in a positive financial situation.

#### Roadless Inventory

In 2001, a Roadless Conservation Rule established prohibitions on road construction, road re-construction and timber harvesting within inventoried roadless areas (IRAs) on National Forests System lands. In 2005, the RARE II study for IRAs on the Grand Mesa, Uncompahgre, and Gunnison National Forest evaluated the original 29,650 acres of the Analysis area. The evaluation determined that these lands were not suitable for inclusion into the Wilderness Preservation System as it remains the source water for the City of Grand Junction.

**All Alternatives:** The lands determined in the Kannah Creek IRA will not be affected by the alternatives since no road construction is proposed.

**Cumulative Effects:** Cumulative impacts to recreation experiences and opportunities are due to prior, existing and planned vegetation management actions in the cumulative effects analysis area. Prior actions in the analysis area include fuel treatments and grazing management. Those actions are visible in some sections of the analysis area, but no impacts to current forms and levels of recreation are noted. Currently, there are no foreseeable actions planned that would add on to impacts from past or current vegetation management activities.

The proposed trail reconditioning, re-routing or reconstruction should have a great benefit to trail use. With the improvement of trails, the surfaces will be more sustainable and access by the public will provide for an improved recreation experience.

#### **Roads and Trails**

An array of existing roads and trails, both motorized and non-motorized are located within the analysis area. The majority of the motorized roads and trails are found on the top of the Grand Mesa, above the rim. Currently, two full-sized vehicle routes are open to public motorized travel below the rim within the analysis area, half the length of the Lands End Road, NFSR (National Forest System Road) #100, known as “the switchbacks” and the Coal Creek Basin Road, NFSR #101 located approximately half the way up the switchbacks radiating from Lands End Road.

Lands End Road is a two-wheel drive, low clearance route, classified as a Maintenance Level 4 road, providing a moderate degree of user comfort and convenience to the traveler at moderate speeds. Most of NFSR 100 is double-laned and the entire length of the road is aggregate surfaced. The road is not open to ATV use for public safety reasons. It is assumed that the road is used most between July Fourth and Labor Day, with a spurt of high use earlier for the kickoff to summer, Memorial Day weekend.

Lands End Road provides the forest traveler with a fairly comfortable scenic route which is a throughway from the Grand Valley (Whitewater) to the paved State Highway 65. Many use just the upper and flat portion of this route from the highway out to the Lands End Observatory and then back again, avoiding the switchback area. Last traffic records showed a seasonal average daily traffic of 161, with the heaviest impact of the summer occurring within July and August.

The Lands End Hill Climb Event is an annual recreation event occurring typically at the end of August. This is a two day timed motorized race with approximately participants. The route segment used for the event occurs on approximately five miles of the road in the switchback section, beginning at the “Old CCC Camp” and ending just above the Wild Rose Picnic Ground.

Forest Order #01-2005 applies to NFSR 100, closing the route to motorized travel below the Forest Boundary between December 1 and April 1 annually for the purpose of providing big game winter range. The same Forest Order keeps the route closed higher in elevation later in the spring until May 30 and is in place to protect the soft roadbed during the spring thaw. Three seasonal closure gates are in place corresponding to the Forest Order dates. The gates are located below the forest boundary, about halfway up the switchbacks near the Wild Rose Picnic Ground and at the intersection with State Highway 65. The upper two gates are not typically closed in the winter, but closed after the lower gate is open to prevent motorized travelers from reaching higher elevations in spring before the resources, including the road surface itself, are ready.

NFSR #100 below the switchbacks is maintained regularly three to four times a year within a cooperative agreement with the Mesa County Roads and Bridge Department. Magnesium Chloride or an equivalent dust abatement solution is applied once a year at a minimum to most of the length of this section of road through a project agreement, also with Mesa County.

Coal Creek Basin Road #101 exists as an approximate mile of high clearance four wheel drive road classified as a level two maintenance route. Passenger car traffic (sedan) is not a consideration in maintaining this route. This is evidenced by the narrow, rough, rocky, rutted condition of this route, the surface laying entirely on native soil. The likelihood of seeing a single four wheel drive vehicle negotiating this dead end route is relatively rare due to the condition and limited recreational pleasure involved. This route is maintained by Forest Service crews on an irregular schedule due to its location and other factors, with attention at the time of the work focusing on drainage and resource protection only.

Figure B details the current road inventory, use and maintenance levels for roads and trails for the Analysis Area on Forest Service and private lands. Currently, there are 71.4 miles of non-motorized trails, 1.2 miles of motorized trails and 94.8 miles of roads.

**Figure B. Roads and Trails within the Grand Junction Watershed**

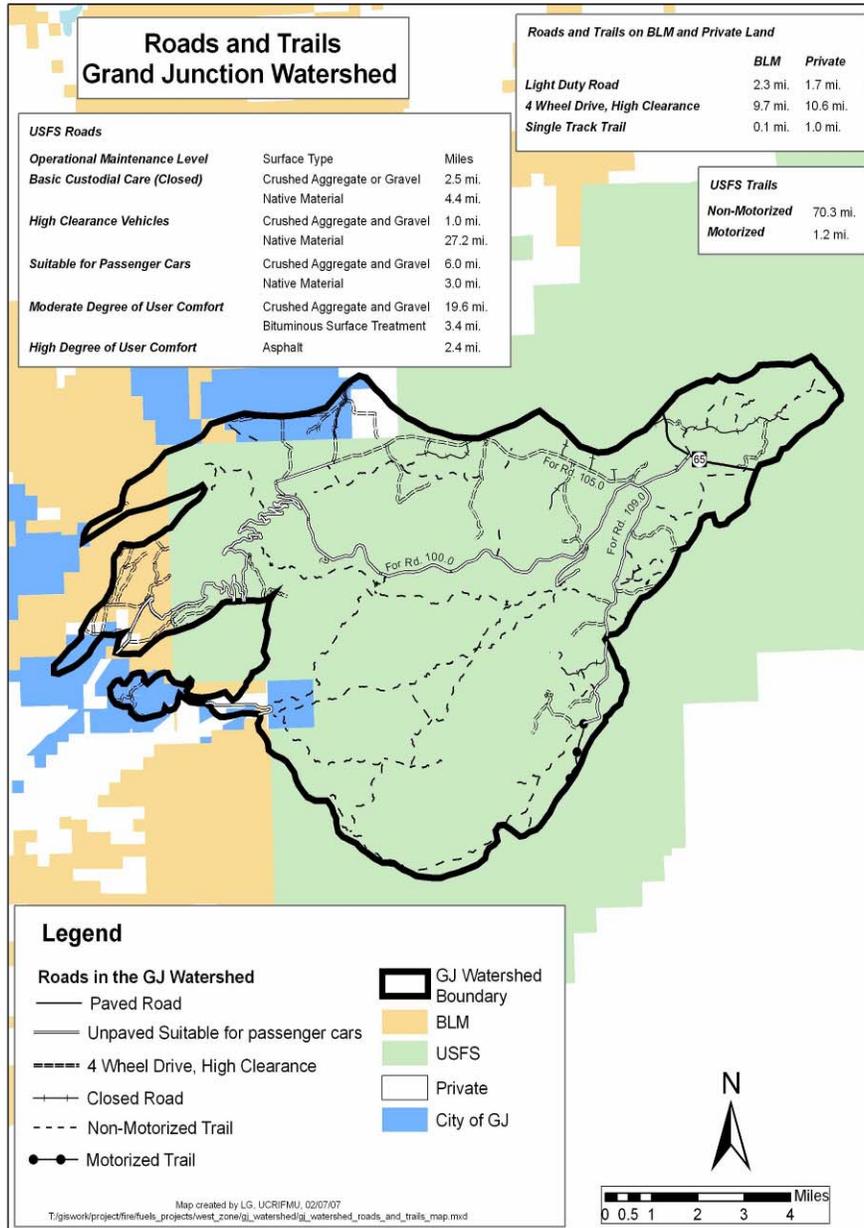
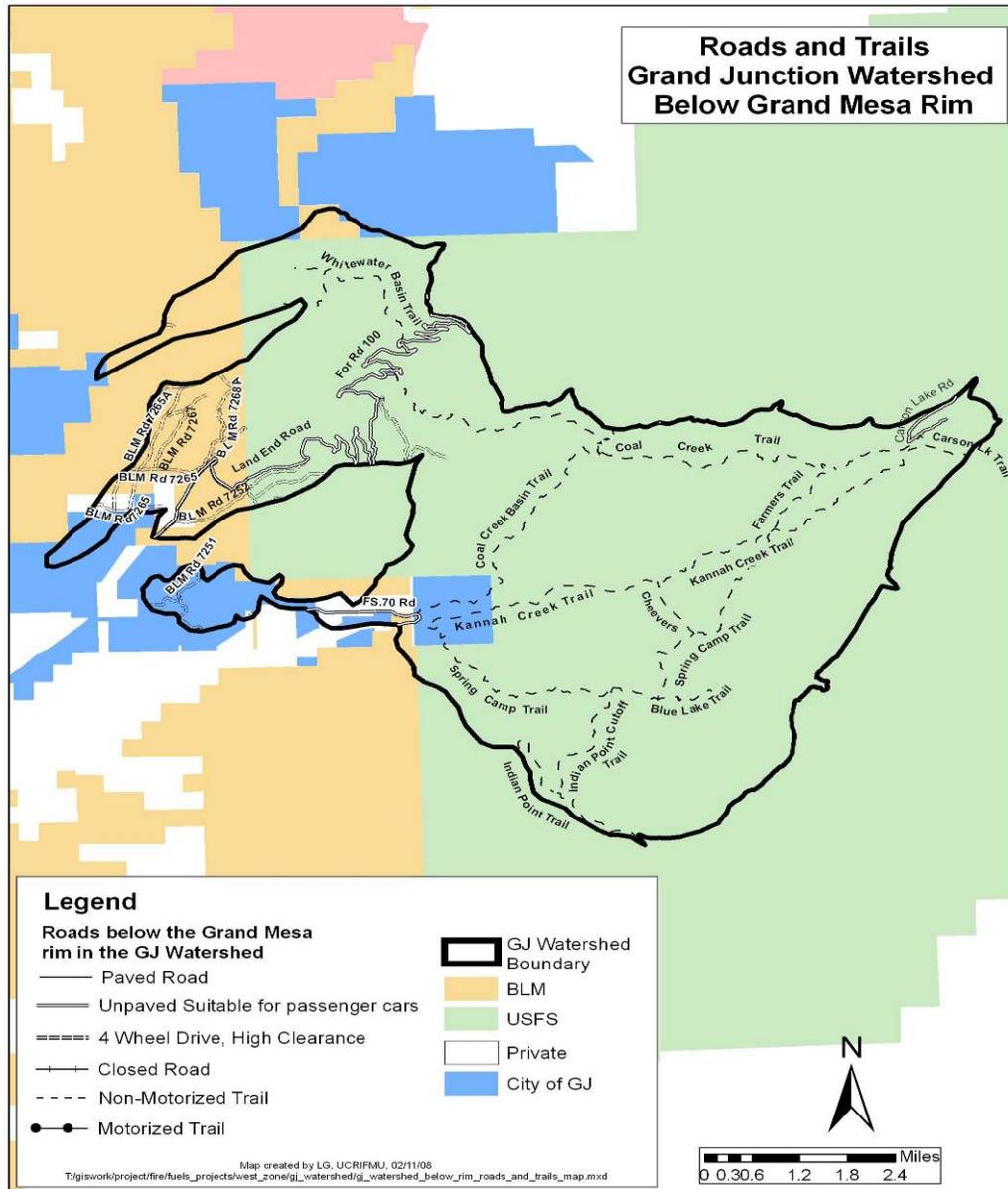


Figure C details the current road and trail inventory for only the area below the rim of the Mesa, but within the analysis area.

**Figure C. Roads and Trails Below the Rim**



**Proposed Action:** During the implementation, some road and trail access could be temporarily interrupted, especially during burning. However, since most activity on these roads and trails are not occurring during the spring, the effects to the public utilizing these routes should be minimal.

The proposed trail reconditioning, re-routing or reconstruction should have a great benefit to trail use. With the improvement of trails, the surfaces will be more sustainable and access by the public will provide for an improved recreation experience.

**No Action:** No change would occur as a result of the no action alternative.

**Cumulative Effects:** Cumulative impacts to roads and trail opportunities are due to prior, existing and planned vegetation management actions in the cumulative effects analysis area. Prior actions in the analysis area include fuel treatments, recreation and grazing management. Those actions are visible in some sections of the analysis area. As use in the area increases, it is anticipated there will be additional impacts to roads and trails.

## **Oil and Gas Exploration**

### Leasable Minerals

The authority for issuing leases for oil, gas, coal and other products was given to the Department of Interior, Bureau of Land Management under the Mineral Leasing Act of February 25, 1920. The Forest Service has consent authority to the BLM leasing NFS lands for oil and gas, and for approving use of the surface lands under the Federal On Shore Oil and Gas Reform Act of 1987. There are two existing leases within the boundaries of the Grand Junction watershed. Industry has nominated additional areas to be made available for leasing. Figure C shows the locations of existing leases and lands nominated by industry for leasing.

The two existing leases overlap with treatment unit Q. Lease COC-068809 is located in section 20, T. 12 S., R. 97 W., 6<sup>th</sup> P.M. Lease COC-069660 is located in portions of section 29, T. 12 S., R. 97 W., 6<sup>th</sup> P.M. and lies just outside the Grand Junction watershed boundary. Both of these leases fall within the boundaries of the Whitewater Unit.

Each of the leases has stipulations attached to them, which are additional terms and conditions that change the manner in which operations may be conducted on a lease. Copies of the leases and stipulations are located in the project record. Lease stipulations specific to leases COC-068809 and COC-069660 are: a) No Surface Occupancy (NSO) for riparian/wetlands, b) NSO for high geologic hazard areas, c) NSO for areas containing >60% slopes, d) Controlled Surface Use (CSU) for moderate geologic hazard areas, e) CSU for areas containing 40-60% slopes, and f) CSU with timing limitations for big game winter range. In addition, lease COC-068009 contains a CSU stipulation for municipal watershed. Figure D displays lease stipulations found in the project vicinity.

**Wells:** Three wildcat wells have been drilled near or in the project area, and all are plugged and abandoned. Well locations are shown on Figure C. Northwest Exploration Company's Lands End Federal #1 is located in SENW section 17, T 12S, R96W., 6<sup>th</sup> P.M. just north of the Lands End road and west of Raber Cow Camp. The Federal 20-1 (company name unknown) was drilled in SWSW section 20, T12S, R97W, 6<sup>th</sup> P.M. near the forest boundary, south of the Lands End road. Dyco Petroleum's Federal C-13593 1-3 well was drilled in the NWSE Section 3, T13S, R96W, 6<sup>th</sup> P.M. south of Flowing Park Reservoir (COGCC database, January, 2008). To date there have been no wells proposed in the two existing leases.

**Proposed Action:** Portions of treatment area Q (Mechanical and Seed) overlap the two existing leases. There would be no effect on the rights of the lease holders caused by implementation of the treatment activities. To date, neither lessee has come forward with proposals to explore or develop their lease.

However, the leaseholders have the right to explore for and develop their lease and can come forward at any time with a proposal. Should a company propose to begin activities on these leases, a site-specific environmental analysis will be conducted which would identify ongoing activities occurring in the area. There could be a situation where communication about timing of treatment activities would need to be coordinated between the Forest Service and the company.

The plugged and abandoned Federal 20-1 well is located on the edge of the watershed boundary in Unit Q treatment area. There could be a metal post or other monument marking the plugged and abandoned well location. Mechanized equipment could run into that marker while operating.

The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect leasable minerals.

**No Action:** The No Action alternative will realize little, if any effect on leasable minerals.

#### Locatable and Mineral Materials

Locatable minerals are minerals covered under the 1892 Mining Law and include gold, silver, lead, tin, copper, and other materials having high value. There are no active mining claims within the treatment area (BLM, LR2000 database search, June, 2007).

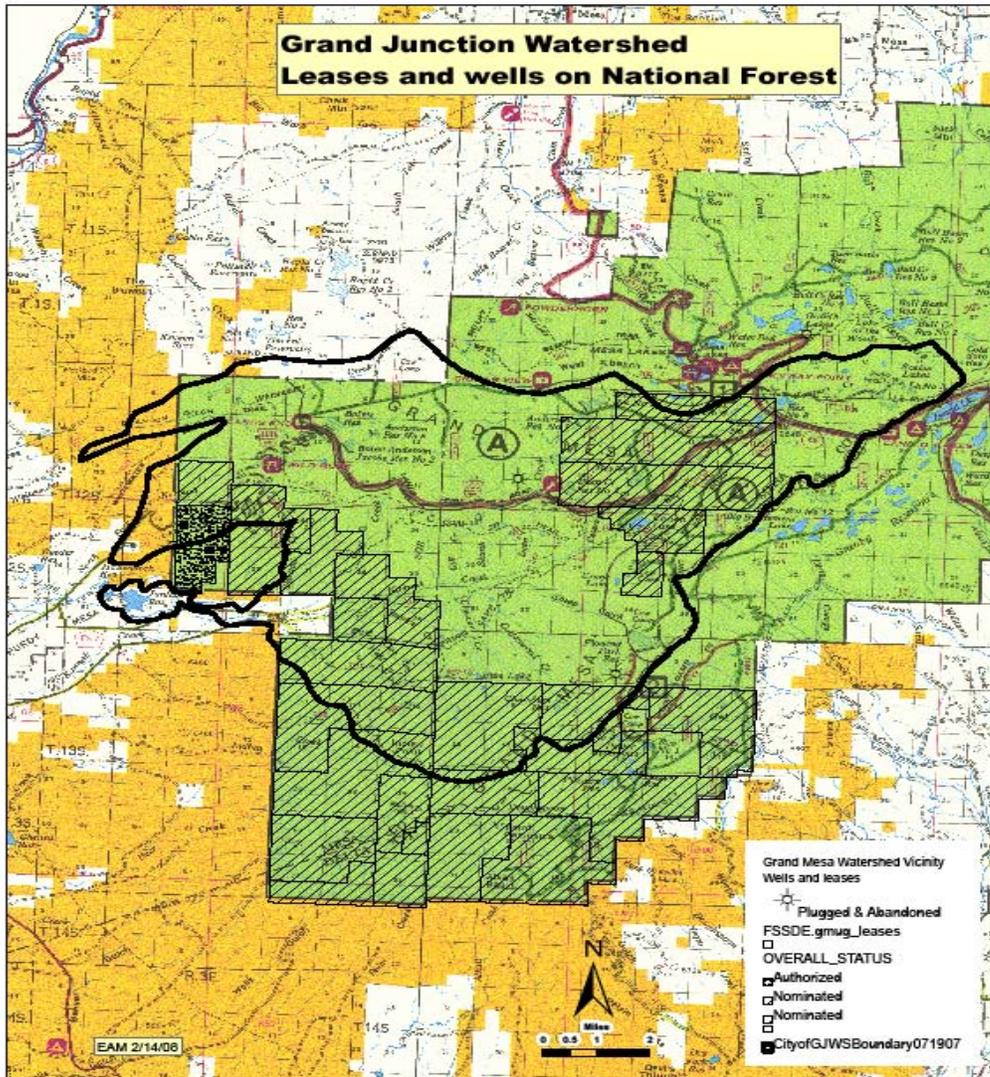
Mineral Materials are common variety items identified and authorized under the 1947 Materials Act and 1955 Multiple Use Mining Act. They include low value materials such as clay, gravel, sand, rip rap and landscape rock. There are no designated mineral material collection sites in the treatment area.

**Proposed Action:** There are no plans to open up sources of mineral materials in the project area. There could be individuals engaged in recreational panning or rock-hounding activities in the project area

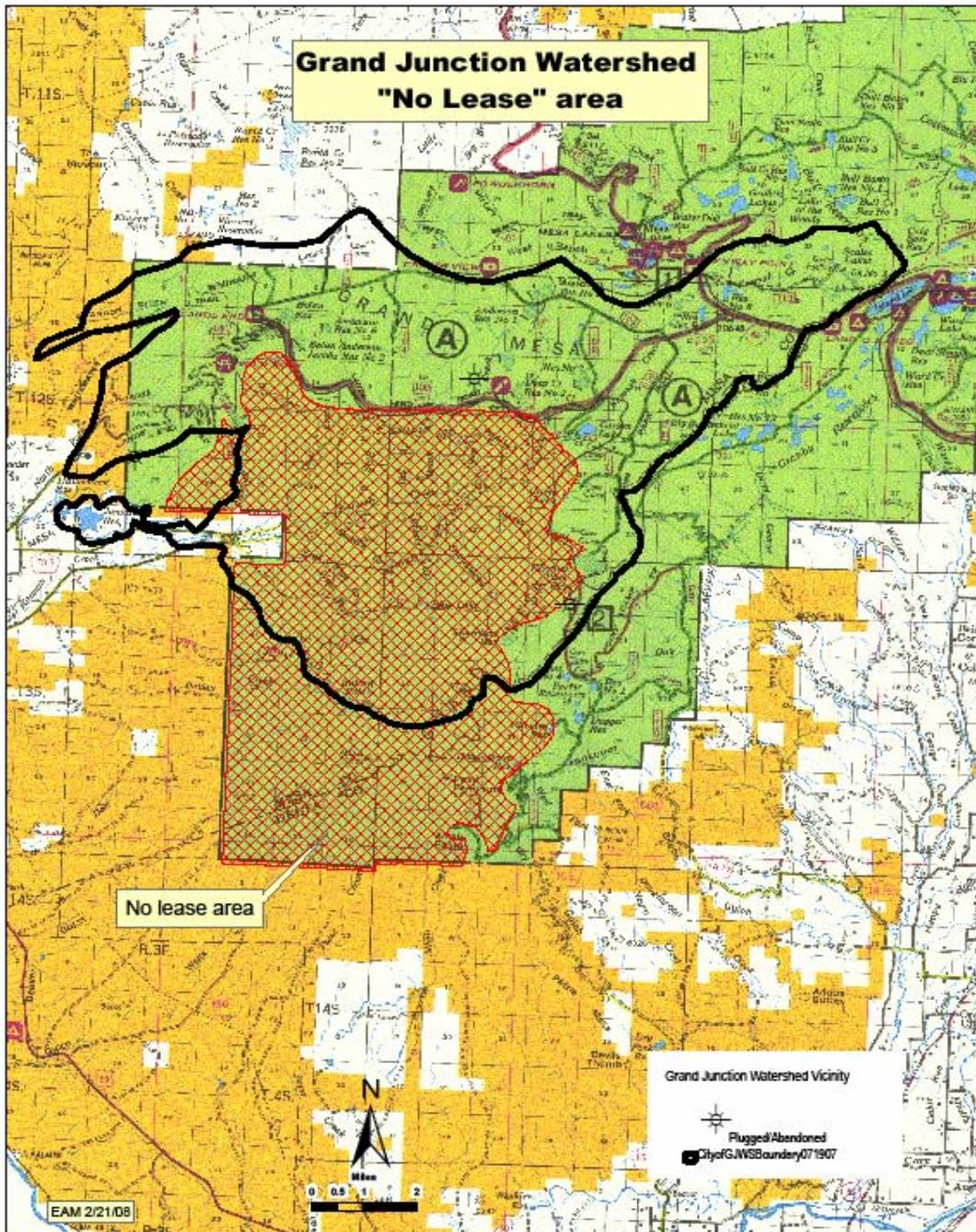
The proposed trail reconditioning, re-routing or reconstruction should have little, if any, effect locatable/mineral materials.

**No Action:** The No Action alternative will realize little, if any effect on locatable/minerals materials.

Figure C. Grand Junction Watershed Leases & Wells on the National Forest



**Figure D. Grand Junction No Lease on the Grand Mesa N.F.**



**Cumulative Effects:**

The cumulative effects will be similar to the action alternative effects.

## **Soils**

### **Current Conditions**

Soils information for this analysis area can be found in the Grand Mesa-West Elk Soil Survey Area. This is an order 3 level soil survey that was conducted in the early to mid 1980's and is part of the National Cooperative Soil Survey. From that information it was determined that there were four dominate soil units. Those include:

#### **Under PJ**

119 -- Clapper - Agua Fria complex, moist, 5 to 25 percent slopes, extremely stony

120 -- Clapper - Agua Fria complex, moist, 25 to 65 percent slopes, extremely stony

#### **Under Oak brush**

149 -- Godding - Kolob family - Delson complex, 5 to 25 percent slopes, very stony

150 -- Godding - Kolob family - Delson complex, 25 to 65 percent slopes, extremely stony

All these soils are considered deep, and mostly fine textured in nature. The soils under the oakbrush have darker surface horizons due to more organic matter accumulation . For the most part on slopes up to 35% all these soils exhibit a low to moderate erosion risk if disturbed. In places where the stones are widely spaced these soils may have a moderate or greater risk for compaction from heavy equipement.

### **Proposed Action:**

**Prescribed Fire:** Generally, prescribed fire does not adversely impact long-term soil productivity because burn severity is usually low relative to wildfire. Adverse fire effects increase as burn severity increases, and the effects are proportional to the amount of surface duff and organic matter consumed. A mosaic of low and moderate burn severity is expected from prescribed fire because timing, fuel moisture, forest floor litter and duff moisture, weather conditions and lighting techniques are considered when planning and implementing prescribed fire. Low intensity fire generally results in a patchy burn. A mosaic pattern of unburned, low, and small areas of moderate burn severity is a typical result.

Expected Prescribed Fire Effects:

- Removal of protective ground cover and slight increase in erosion hazard
- Partial consumption of fine organic material and large downed wood
- Release of plant available nitrogen (ammonia)

The WEPP FuME portion of the FS WEPP interface was used to evaluate potential erosion relating to the use of hand felling of trees and motorized mechanical treatments (see explanation of this modeling procedure described below, under No Action):

Mechanical treatments and Operation of Heavy Equipment: The mechanical activity can disturb the surface soils conditions somewhat, but not excessively. If conducted on slopes above 25%, there is a slight risk that up to 0.5 t/sq mi of erosion could occur (this would mainly relate to a roller chopping device). If a hydro-axe is used, no surface erosion is expected. With the use of heavy equipment during motorized mechanical, there is a slight risk of causing soil compaction if the soil is moist which will decrease infiltration and increase surface runoff. Some Displacement of soil may occur, primarily were equipment maneuvers sharp corners. Compaction can occur where more than three passes are made by heavy equipment, particularly when higher levels of clay are present in the soil and soil conditions are moist or wet. The result of some of the mechanical treatments will be the deposition of wood chips/wood chunks on the surface of the soil. Woodchips/wood chunks will protect the soil from raindrop impact and erosion, but may also reduce soil temperatures and prevent plant growth(especially grasses and forbs) if allowed to accumulate excessive depths.

Hand Felling of Trees: Since the felling of trees would be accomplished mainly by hand, there should be very little ground disturbance, and as a result, no erosion or sedimentation should be expected. However, it is important to retain protective ground cover and fine slash to minimize soil erosion and provide for nutrient cycling, particularly where slash is hand piled and burned.

The proposed treatments are strategically designed and located to reduce the spread of wildfire. Detrimental effects to soil resources, particularly accelerated rates of erosion, are associated with high severity wildfire. The proposed treatments may indirectly protect and adjacent soil resources from adverse direct and indirect wildfire effects.

Proposed actions will reduce the potential for uncontrolled fire from occurring over large areas within this analysis area, preventing the following detrimental conditions from occurring.

- Removal of large areas of protective ground cover, reduction of needle cast potential and associated erosion hazard
- Consumption of litter, duff, large downed woody material and volatilization of soil humus and associated plant available nutrients
- Formation of hydrophobic soil conditions
- Flooding and/or increased sediment delivery to stream channels

The proposed trail reconditioning, re-routing or reconstruction should have a great benefit to trail use. With the improvement of trails, the surfaces will be more sustainable and there will be less sedimentation will occur into nearby water systems.

**No Action:** Under the no action alternative no prescribed burning or mechanized fuels reduction would occur in the project area at this time. There are no direct effects to the watershed resources under this alternative. In the absence of fire, fine woody debris would continue to slowly accumulate and stand density may increase over time.

Under the No Action alternative, there is a higher probability of a large wildfire occurring. The impact a wildfire has on the soil is a complex interaction which can involve heat transfer and a change in soil physical characteristics. Along with the removal of any protective vegetative cover, excessive heating during uncontrolled fires can alter many chemical, physical and biological properties of the soil. These actions can leave the soil in condition very susceptible to high amounts of runoff and erosion. In addition natural erosion, compaction recovery and nutrient cycling processes would continue at current rates in the activity areas.

Uncontrolled wildland fire can result in increased runoff, large-scale erosion, sedimentation and channel scour. This is attributed to loss of the protective vegetative cover, both over story and duff and ground cover, over large areas. Some relatively current publications have documented runoff and erosional situations. Robichaud (2000) has summarized many published observations relating to erosion and sediment losses throughout the Western US. He mentions that soil erosion after wildfires can vary from 0.2 to over 49 t/a/yr (based observations made by Megahan and Molitor 1975, Noble and Lundeen 1971, Robichaud and Brown 1999). He states that nearly all fires observed increase sediment yield and erosion, but wildfires in steep terrain was found to produce the greatest amounts( 12 to 165 t/a/yr)(table 5 In: Evaluating the Effectiveness of Post Fire Rehabilitation Treatments.)

In dealing with the recovery of large wildfires various models have been developed to identify risks and to quantify environmental impacts that could be experienced as a result of the fires. The most current model designed to predict erosion following wildfires is an interface with the WEPP Model (Water Erosion Prediction Project). The Disturbed WEPP developed by Elliot 1997 is a Forest Service interface that brings together some key physical factors relating to the erosional processes on hillslopes following fire and other non-agricultural disturbances (range, roads etc.). This model has been evaluated and compared to actual measurements and has been found to produce reasonable results for a variety of disturbances (Elliot and Roichaud 2001). By using this model Elliot has shown that under many conditions, carefully planned operations with adequate buffers, can result in lower long-term erosion rates than those experienced following uncontrolled wildfire. (Elliot and Robichaud 2001). Most Forest Service BAER teams use the Disturbed WEPP model in the evaluation of impacts to hillslopes after a wildfire (Note: the values produced with the WEPP program should be considered estimates only with an accuracy of plus or minus 50 percent).

In the BAER evaluation process for the Hayman Fire the WEPP program was used to estimate an erosion rate. The first year weighted average erosion rate was calculated to be 43 t/a/y (Grahm 2003). Likewise potential erosion rates estimated during the BAER analysis for the Burn Canyon Fire ranged from 0.04-18 tons/acre depending on slope. For the McGruder fire just east of Cedaredge, the WEPP estimate ranged from 3.4-9.9\_tons/acre.

To get a better understanding of what could happen if an uncontrolled fire were to occur in this analysis area it was decided to use the Disturbed WEPP program to calculate some estimated erosion rates.

The WEPP program allows the use of select local data (soils, climate, slope, vegetation). For this evaluation it was decided to model only a wildfire in the P-J vegetation type. It has been the Forests experience that uncontrolled fire in this vegetation type produces conditions very conducive to increased runoff, erosion and increased sedimentation.

Typically, there is very little vegetation under the Pinion-Juniper canopy originally, and after the canopy burns the soil surface can be rather barren and unprotected. The soil surface is then subject to direct raindrop impact, and concentrated overland flow, which can detach soil particles which can wash away as sediment. Within the Oak brush areas, however, we have observed that the canopy of leaves may be consumed, but often times the duff and litter layers are scorched or lightly burned, leaving quite a bit of material protecting the soil surface. This also protects the root systems, and frequently sprouting occurs within a couple of weeks. This then adds additional protection from raindrop impact.

When the WEPP program was run for this situation, local values for climate and soil conditions were used. Data from Cedaredge was the base, and projected slightly west. This data was expanded out to 50 years to capture a full range of events. This was done through the Rocky Mountain Research Station Climate Generator (Rock Clime), and then expanded through the use of PRISM, both of which are part of the WEPP program. Estimated fire intensity levels were used as suggested in the instructions for the WEPP program, along with ground and canopy cover values. Numerous runs were made for the different slopes conditions. These results are summarized in Table 7.

Table 7. Disturbed WEPP Results for PJ Vegetation

	Wildfire	Unburned/Undisturbed
<b>0-30% slopes</b>	<b>0.16-1.7 t/a</b>	<b>0 t/a</b>
<b>30-50% slopes</b>	<b>1.7-2.5 t/a</b>	<b>0-0.02 t/a</b>
<b>50-80% slopes</b>	<b>2.5-3.2 t/a</b>	<b>0.02-0.03 t/a</b>

Runoff from the Whitewater Common Allotment flows into Whitewater Creek, a tributary to the Gunnison River; with Sink Creek and Hall’s Basin flowing into Big Wash and Watson Creek, which are tributary to the Colorado River. These are all ephemeral or intermittent streams that flow in response to spring snowmelt and summer convective storms. Flood flow generally result from the summer convective storms. Extended periods of no flow are common in most of these streams. The natural flow of Whitewater Creek has been modified by the

Brandon Ditch which diverts water from Whitewater Creek on Forest Service land.

In addition, there are releases of stored water from Sommerville reservoir that contributes to the flow of Brandon Ditch. This ditch is free flowing with the appearance of a natural stream lined with riparian vegetation. The upper watershed condition is very good with adequate vegetative, litter, and rock cover. The lower watershed has been modified to the extent that ephemeral channels are now flowing year round. This has resulted from perennial stream flow diverted to the ephemeral channels, supplemented with irrigation return flows. Significant down cutting has occurred from these diversions, but the channels have stabilized (established a new base level) and riparian vegetation has become established. Land uses within the allotment include irrigated croplands with associated return flows, residential development, extensive recreation, and livestock grazing.

The State of Colorado, Water Quality Control Commission proposed revision of the water classification and standards for the Gunnison River in Regulation No. 35. It included changes to the water classifications for the mainstem of the Gunnison River from immediately above the confluence with the Uncompahgre River to the confluence with the Colorado River. Proposed classified uses are aquatic life warm class 1, recreation E, water supply, and agriculture. Aquatic life warm class 1 are waters that currently are capable of sustaining a wide variety of warm water biota including sensitive species or could sustain biota but for correctable water quality conditions. Waters shall be considered capable of sustaining such biota where physical habitat, water flows or levels, and water quality conditions result in no substantial impairment of the abundance and diversity of species. Recreation E is surface waters that are used for primary contact recreation or have been used for such activities since November 28, 1975. Water supply is surface waters that are suitable or intended to become suitable for potable water supplies after receiving standard treatment. Agriculture is surface waters that is suitable or intended to become suitable for irrigation of crops usually grown in Colorado and which are not hazardous as drinking water for livestock. Physical, biological, inorganic and metal standards have been developed to protect those uses.

Section 303(d) of the Federal Clean Water Act requires a listing of impaired waters of the State. Stream segments that are not fully supporting their designated uses are defined as impaired and are placed on the 303(d) list of Impaired Waters. The current 303 (d) list includes the Gunnison River from the Uncompahgre River to the confluence with the Colorado River for selenium and temperature. It is anticipated that temperature may be deleted from the list in 2008 due to the 2006 Gunnison River basin changes to the Aquatic Life Warm use. Prior to the 2006 hearing the Gunnison River was incorrectly designated as an aquatic Life Cold use. The temporary modification that has been established for un-ionized ammonia and selenium is projected to expire at the end of 2011. A Total Maximum Daily Load (TMDL) for selenium in the mainstem of the Gunnison River is ongoing at this time. The 303(d) monitoring and evaluation list includes the mainstem of the Gunnison because of sediment. The monitoring and evaluation list identifies waters where there is a

perceived water quality problem, but there is uncertainty regarding one of more factors such as the representative nature of the data. It also includes water bodies that are impaired, but it is unclear whether the cause of impairment is attributable to pollutants or pollution.

Proposed classified uses for the tributaries to the Gunnison located within the allotment are aquatic life warm class 1, recreation E and N, water supply, and agriculture. Recreation N are surface waters that are not suitable for primary contact recreation uses and a use attainability analysis demonstrates that there is no reasonable likelihood that primary contact uses will occur in the next 20 years. As with the mainstem physical, biological, inorganic and metal standards have been developed to protect those uses, with changes proposed in Regulation No. 35. The tributaries have the same proposed temporary modification as the main stem of the Gunnison River. These tributaries are included in the 303(d) list for selenium.

Big Wash and Watson Creek are tributary to the Colorado River within the “all tributaries to the Colorado River from a point immediately below the confluence of Parachute Creek to the Colorado/Utah border” reach. These tributaries have aquatic life warm 2, recreation 1b, and agriculture classified uses. Aquatic life warm class 2 are waters that are not capable of sustaining a wide variety of warm water biota including sensitive species due to physical habitat, water flows, or uncorrectable water quality conditions. Recreation 1b waters are potential primary contact waters for which no use attainability analysis been performed or for which no existing class 1 uses have been identified. Neither Big Wash nor Watson Creek are on the 303(d) list.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. As a result, continued sedimentation into water systems will occur and increase over time. Some trails will not be sustainable and may require closing.

**Cumulative Effects:** The no action alternative would have relatively minor cumulative effects on water quality and quantity unless a large wildfire occurs in these watersheds. If a wildfire occurred in this area and did enough damage to the untreated riparian areas and burned the watershed with high severity to expose and damage the soil structure, then the potential impacts on water quality downstream of the project area would increase because erosion and sedimentation would increase.

### **Cultural 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 occupations 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 within 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.

A preliminary inventory for cultural resources has occurred and many such resources were located and recorded. The inventory conditions were considered adequate for the discovery of significant cultural resources. The sites consist of prehistoric lithic scatters, rock features, and wickiup sites. All but a few small lithic scatters are considered eligible to the National Register. The basin was utilized by prehistoric hunters and gatherers who traveled up the Kannah Creek and North Fork of the Kannah Creek drainages to access game and plants. The main Kannah Creek drainage was used as access to the top of Grand Mesa, as it was the only route that didn’t have to contend with the precipitous basalt cliffs under the mesatop. A previous excavation in the Analysis area revealed cultural deposits up to 5,000 years of age, from Archaic through Ute occupations.

Historically, the area has seen mainly ranching activity. Grazing, historically heavy on the Grand Mesa, has gradually reduced in numbers in recent years. So far, two irrigations ditches have been recorded in the basin. Several other historical sites were identified in the project area, mainly dealing with CCC activities (a CCC camp was based along the North Fork from which the WPA and CCC personnel constructed the Lands End Road and the Lands End Observatory) and USFS campgrounds/picnic areas.

**Proposed Action:**

Rollerchopping (this method of treatment is unlikely to be used): Rollerchopping 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 containing 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 bulldozers would crush structures or features. Rollerchopping is considered to be among the most impacting activities 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.

Hydro-axing: Hydro-axing is a mechanical means of treatment that involves 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 hydroaxing. This material can serve as mulch and protect remaining cultural deposits from erosion, in some cases greatly reducing natural erosion, thus benefiting the resource. The hydro-ax can be maneuvered with greater precision than other mechanical methods, facilitating avoidance of cultural resource sites in hydro-ax units. It may also be used to remove 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 should not be operated over any type of significant site feature.

Prescribed Fire (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 temperatures 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, wildfires burn at much higher heat intensities than prescribed burns, depending on the objectives of the controlled burn. Any consideration of the impacts of prescribed burning must take into account 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 continue 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 unforeseen event triggering significant 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, 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 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 hazardous 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 significant 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 PF 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 artifact scatters and visible hearths with them but not always. These structures would be destroyed in a prescribed burn, especially a stand-replacing burn in PF or mountain shrub plant communities.

Hand Felling of Trees: Hand Felling of trees involves hand tools, including chain saws, used to fall small trees and often “lop and scatter” or broadcast the remaining slash. Standing structures of any height (rock circles, cabins or other building remains, corrals) can be damaged by trees falling onto them, but

generally trees that are ‘hand felled’ 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 hand fallen units should focus on identifying standing structures to be protected.

**Summary:** Under the Action alternative, certain design features would be implemented. Flammable cultural resource sites would be avoided by most types of fuel reduction activities including burning, mechanical seeding, rollerchopping and hydro-axing. However, no sites would be “islanded” by avoidance—units would be designed to form a mosaic of treated and untreated areas so that sites do not stand out, to avoid vandalism.

Prescribed burning would be allowed on sites consisting only of chipped lithic artifacts and surface prehistoric remains. Above-ground prehistoric or ethnographic remains (structures, rock art), if found, would be protected from burning. No burning is currently proposed in the zones where such above-ground resources are known or expected but is contemplated only on steep, low sensitivity areas.

Hand felling of trees (on foot with chain saws) would be allowed to occur at any above-ground prehistoric or ethnographic remains, as a beneficial activity in order to reduce the risk of wildfire on such locations. Hand felling of trees and any slash piling would be monitored by the archaeologist to ensure significant features were not impacted and that site features were left in better position than previously for preservation.

The proposed trail reconditioning, re-routing or reconstruction could potentially have an effect on some sites. Survey and avoidance will be utilized for those trails that have been determined to require re-routing thereby mitigating any potential effects (and will be coordinated with the Archaeologist).

**No Action:** Under the No Action Alternative in which no acres would be treated, cultural resources would be subject to natural processes. Buried sites 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 are 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.

Wildfire unchecked by fuel treatment may burn over this area and would likely damage or destroy any burnable features such as wickiups or tree platforms. Even if they survived the burn, 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 and will be conducted, buried sites could have been and might be 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 wickiup and platform sites, which have a limited number of years to endure based on the fragility of the cut poles in the mountainous environment.

Under the no action alternative trail reconditioning, re-routing or reconstruction would not be completed. As users naturally re-route trails socially due to poor trail conditions, there may be effects to some sites that would not have been surveyed if a more 'formal' re-routing strategy were implemented. Illegal trails and impacts would likely to occur.

**Cumulative Effects:**

The cumulative effects of the project on cultural resources include thinning of trees around certain sites which would make them less susceptible to fire and the possibility of easier access to the sites as a result of thinned vegetation. In general, public use of the area will naturally increase due to the increased population of the surrounding communities, increasing the chances of the location of cultural resources.

**Wildlife**

Wildlife Habitat

This analysis discusses wildlife and wildlife habitat found within the Grand Junction watershed (GJW) analysis area.

The Grand Junction watershed analysis area contains a diversity of vegetation and wildlife due to its large size and elevational variations. Vegetation ranges from desert shrubland, PF woodlands, up through the Gambel oak/mountain shrub type, aspen and into spruce-fir forests interspersed with meadows and montane grasslands. All vegetation types contain riparian areas with their associated vegetation, varying with elevation.

Overall stream and riparian health is adequate to robust, considering that the majority of perennial streams within the GJW area are conduits for water movement between reservoirs used by municipalities, and do not function with a natural stream flow regime. Kannah Creek supports self-sustaining populations of native and desirable non-native trout species, and is valued for their recreation opportunities.

Mule deer and elk are the most common big game species in the GJW area, with the moose population growing since their introduction began in 2005. The analysis area lies within Colorado Division of Wildlife's designated Game Management Unit (GMU) 41. This GMU is heavily hunted, and elk and deer numbers remain within the population objectives for elk as determined by the Colorado Division of Wildlife. Hunting season structure and limited license numbers are used to manage the elk and deer numbers. The lower elevations in the analysis area contain winter range for elk and mule deer.

The overall habitat conditions for wildlife are generally good throughout the analysis area, although much of the area is in the mature age class, resulting in less than ideal habitat diversity, based on Forest Plan desired future conditions. Direct and indirect effects: Wildlife habitat

Vegetation treatments could temporarily displace some wildlife species into adjacent areas. Displacement would be limited to units being currently treated and would be on a temporary basis.

Another direct effect of vegetation treatment is the reduction of forage availability for elk, deer and other species. However, summer forage is not a limiting factor for elk and deer populations, and there is sufficient forage and cover habitats for existing wildlife species within the non-treated areas of the GJW analysis area.

**Proposed Action:** This alternative presents the best opportunity to increase and improve the overall vegetative condition and structure; and recondition, harden and improve system trails and thus, improve wildlife habitat in the analysis area. This alternative focuses on the desired resource conditions and specifies the design criteria to apply to ensure resource conditions are being met or are progressing toward the desired outcome.

**No Action:** This alternative would be less likely to improve wildlife habitat and could result in catastrophic wildfire, which would be temporarily detrimental to many species, especially aquatic species.

#### Threatened, Endangered, and Sensitive (TES) Species

A Biological Evaluation (BE) for TES species has been completed for the GJW Area and can be found in the project record. The BE contains a complete description of habitat, life history, and effects. In this section, the potential impacts are summarized and displayed with the remaining specific information regarding the direct and indirect effects of each Alternative being included in the BE.

##### *T & E Species with no habitat in the Project Area: No Effect*

- Mexican spotted owl
- Bonytail
- Colorado pikeminnow
- Humpback chub
- Razorback sucker
- Uncompahgre fritillary butterfly
- Canada lynx

##### *T & E Species with Habitat in the Analysis area, and Effect determination*

Table 8: T&E Species with Habitat in the Analysis area, and Effects Determination

Species	Proposed Action	No Action
<b>Uinta basin hookless cactus</b>	<b>No Effect</b>	<b>No Effect</b>

*Grand Valley Ranger District Sensitive Species*

Table 9: Sensitive Species with Habitat in the Analysis area, and Effects Determination

Species	Proposed Action	No Action
<b>Fringed myotis</b>	<b>NI**</b>	<b>NI</b>
<b>Townsend’s big-eared bat</b>	<b>NI</b>	<b>NI</b>
<b>American peregrine falcon</b>	<b>NI</b>	<b>NI</b>
<b>Bald eagle</b>	<b>NI</b>	<b>NI</b>
<b>Flammulated owl</b>	<b>MAII</b>	<b>NI</b>
<b>Lewis’ woodpecker</b>	<b>MAII</b>	<b>NI</b>
<b>Northern goshawk</b>	<b>MAII</b>	<b>NI</b>
<b>Purple martin</b>	<b>MAII</b>	<b>NI</b>
<b>Boreal toad</b>	<b>MAII</b>	<b>MAII</b>
<b>Northern leopard frog</b>	<b>MAII</b>	<b>MAII</b>
<b>Bluehead sucker</b>	<b>MAII</b>	<b>MAII</b>
<b>Mountain sucker</b>	<b>MAII</b>	<b>MAII</b>
<b>Flannelmouth sucker</b>	<b>NI</b>	<b>NI</b>
<b>Roundtail chub</b>	<b>NI</b>	<b>NI</b>
<b>Colorado River cutthroat trout</b>	<b>MAII</b>	<b>MAII</b>
<b>Wetherill milketch</b>	<b>MAII</b>	<b>MAII</b>

\*MAII = May Adversely Impact Individuals, but is not likely to result in loss of viability in the planning area, nor cause a trend to federal listing.

\*\*NI = No Impact.

Additional information can be found in the BE and is part of the project record for this project.

Management Indicator Species (MIS)

This analysis discusses Management Indicator Species (MIS) and MIS wildlife habitat found within the GJW Project Area.

Two MIS species, the Abert's squirrel and the American marten, were eliminated from analysis in the MIS report because suitable habitat for it was not identified within or immediately adjacent to the Project Area.

The following species were evaluated and analyzed in the MIS report:

**Rocky Mountain elk**

**Red-naped sapsucker**

**Brewers sparrow**

**Merriam's turkey**

**Northern goshawk**

**Colorado river cutthroat trout**

**Rainbow trout**

**Brown trout**

**Brook trout**

**All Alternatives:** The proposed alternative would not result in a defined change in population numbers or trends of any MIS at either the project or forest scale. Additional information can be found in the MIS report which is part of the project record for this NEPA document.

## CHAPTER 4

### **Consultation and Coordination**

Listed below are the agencies, organizations and individuals who were contacted through June 2007 scoping/opportunity to comment letter for the Grand Junction City Restoration Project.

#### **Local Governments:**

Mesa County Commissioners  
City of Grand Junction  
Lands End Fire Department

#### **Governmental Agencies:**

Colorado State Forest Service; Grand Junction  
Colorado Division of Wildlife  
US Fish and Wildlife; Ecological

#### **Tribal Contacts:**

Sothorn Ute Tribal Council  
Ute Mountain Ute Tribal Council  
Uintah & Ouray Tribal Business Committee

#### **Environmental Groups:**

Colorado Wildlife Federation  
High Country Citizens Alliance  
Tout Unlimited  
Western Colorado Congress  
Sierra Club; Rocky Mountain Chapter  
Forest Guardians  
Club 20  
Western Slope Environmental Resource Council

#### **Outfitters and Lodges:**

Colorado Mountain Adventures  
J and D Outfitters  
Mesa Lakes Lodge  
Grand Mesa Lodge

#### **Permittees:**

Harold and Leon Earle  
John L. Whiting

#### **Interested Parties Responding to Scoping:**

Winslow Robertson  
Myron Barker

**List of Preparers**

The following individuals comprise the interdisciplinary (ID) team that conducted the environmental analysis and prepared this Environmental Assessment.

<b>Name</b>	<b>Resource Area</b>	<b>Role</b>
<b>Craig Warren</b>	ID Team Leader	Fuels Analysis Assessment and EA Preparation
<b>Mike Surber</b>	ID Team Leader	Range Analysis/Budget
<b>Julie Grode</b>	Wildlife Biologist	Biological Assessment, Biological evaluation, MIS, T&E evaluation
<b>Sally Crum</b>	Compliance archeologist	Heritage Resources
<b>Carol McKenzie</b>	TMA/Silviculturalist	Structural Diversity, Insects and disease
<b>Cindi Range</b>	Civil Engineering Technician	Roads and Trails
<b>Ryan Fricke</b>	Recreation Specialist	Recreation & Travel Management
<b>Terry Hughes</b>	Soils Scientist	Soils, water, erosion
<b>Linda Bledsoe</b>	Realty Specialist	Water rights
<b>Liz Mauch</b>	Geologist	Leasable & Locatable Minerals
<b>Tim Foley</b>	WZ Fire Management Officer	Fire effects/modeling