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Environmental Assessment

Hayman Fire Roads Management Project

Pikes Peak, South Park, and South Platte Ranger Districts
Pike and San Isabel National Forests
Douglas, Jefferson, Park, and Teller Counties, Colorado

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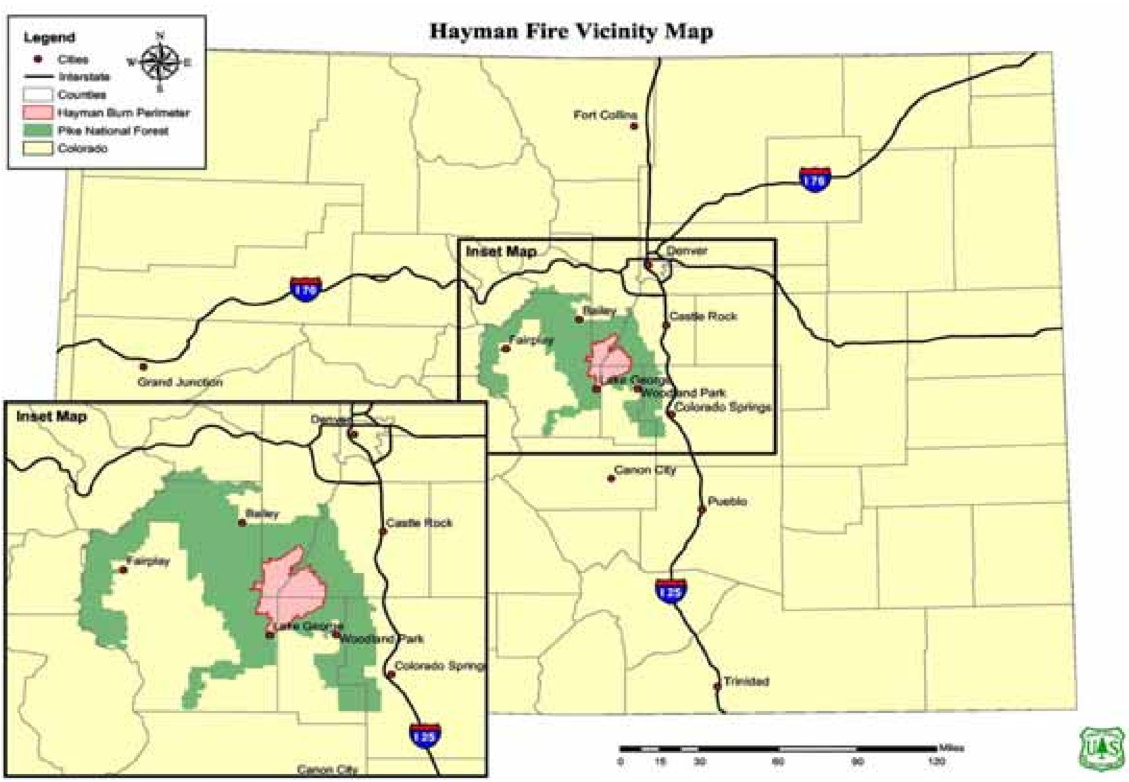
CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Introduction and Background

The Hayman Fire Roads Management Project coincides with the perimeter of the Hayman Fire. The Hayman Fire perimeter encompasses approximately 138,000 acres of private, state, and National Forest System (NFS) lands in Park, Jefferson, Douglas, and Teller Counties, Colorado. About 72% of the burn occurred on NFS lands managed by the South Platte, South Park, and Pikes Peak Ranger Districts of the Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands (PSICC) (see Figure 1 below).

Figure 1: Hayman Fire Vicinity Map and Hayman Roads Management Project Area.



The Hayman Fire ignited on June 8, 2002 and burned for approximately three weeks. Approximately 51% of the fire area burned at high to moderate intensity, 34% at low intensity, and 15% remained unburned. The majority of the fire burned in montane Ponderosa Pine/Douglas-Fir forest, with a small amount of mixed-conifer and subalpine forest involved (Romme et al., 2003a). It has been concluded that such a large patch of severe stand-replacing fire is unprecedented in the past 700 years within the Cheesman [Reservoir] landscape that is situated near the center of the Hayman Fire (Romme et al., 2003a).

Burned Area Emergency Rehabilitation (BAER) efforts were initiated by the Forest Service (FS) on 31,300 acres after the fire was contained on July 7, 2002. This work provided short-term mitigation of the fire's effects and involved projects such as seeding, hydromulching, scarification, dry mulching, and dead tree felling to trap eroding soil. These measures were implemented on high-risk areas (high burn intensity, steep slopes, and erodible soils) within the fire perimeter to reduce the likelihood of damage to life and property. Extensive road surveys were also completed within the burn area.

For this project, a ***road*** is defined as a vehicle travel-way greater than 50 inches wide, unless designated and managed as a Forest trail. Because many roads in the Hayman burn area have required and continue to require extensive maintenance and repair and are causing resource and public safety concerns, a ***roads analysis*** was carried out to assess the current condition of the road system in the burn area. In addition to the effects of the 2002 Hayman Fire, heavy monsoon rains during summer 2003 caused extensive flash flooding and subsequent road damage and public safety risk. In accordance with the NFS Final Road Management Policy and Rule published in the Federal Register on January 12, 2001, the science-based roads analysis process is designed to help forest officials better address needs, issues, and opportunities associated with road and access management.

Hayman Roads Analysis Report

The Hayman Roads Analysis Report (also referred to as “RAP”) was conducted by a Forest Service interdisciplinary team from April to September 2003 and published in October 2003 (USDA Forest Service, 2003a). The RAP evaluated approximately 620 miles of road within the major watersheds encompassing the burn area and provides recommendations for a road system that is safe to the public, responsive to public needs, environmentally sound, affordable, and efficient to manage. Because the roads analysis was conducted on a watershed-scale basis, the report addresses an area larger than the burn area. The Hayman RAP examined each road and the associated risks to soil and water, wildlife habitat, noxious weed infestation, cultural and heritage sites, as well as the value of the road for recreation, social, and economic purposes.

In the Hayman burn area, there are approximately 260 miles of classified roads and 35-70 miles of unclassified roads. A total of 130 miles from the 260 miles of classified roads in the burn area will be addressed in this environmental assessment. The remaining classified roads that are not being addressed are all necessary for the functioning of the basic transportation network in the area. Roads providing access to private inholdings, special use sites, and/or mining claims were identified through the RAP process and are not being considered in this EA. However, access will be addressed on a case-by-case basis if there are additional roads identified that are the primary access to private inholdings, special use sites, and/or mining claims.

The Forest Service has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the project’s foreseeable environmental effects for consideration in determining whether or not to prepare an Environmental Impact Statement. Many of the documents cited in this EA, and additional project documentation, can be obtained from the Hayman Travel Management website: http://www.fs.fed.us/r2/psicc/hayres/travel/index.htm or from the project planning record located at the Hayman Fire Restoration Team Office in Colorado Springs, CO.

Purpose and Need for Action

The ***purpose*** of the Hayman Fire Roads Management Project is to restore needed roads to a safe, environmentally sound condition, and decommission (obliterate) unneeded roads and those causing excessive erosion, water degradation and/or habitat degradation. There is a ***need*** to provide a safe transportation network in the burn area that is responsive to public needs, realistic to projected budgets, and sensitive to wetlands, riparian areas, and wildlife habitat.

The purpose and need of this project would help achieve the following PSICC Forest Plan goals:

- Provide a broad spectrum of developed and dispersed recreation opportunities in accordance with identified needs and demands.
- Increase diversity for wildlife and habitat improvement.
- Maintain or improve water quality to meet Federal and State standards and increase the average annual water yield.
- Protect riparian areas and wetlands from degradation.
- Manage the transportation system for increased cost-effectiveness, efficiency, and utility.

Proposed Action

The Proposed Action would implement recommendations from the Hayman Roads Analysis Report. Specific management recommendations include the following elements:

- Approximately 69.5 miles of classified roads would remain open year-round ("maintain as is");
- The road maintenance level would be increased on 2.5 miles of road;
- Approximately 3 miles of classified roads would have seasonal travel restrictions;
- Approximately 6 miles of the classified roads would be closed to motorized vehicles year-round;
- Approximately 49 miles of classified roads would be decommissioned (obliterated) or converted to another use such as a motorized or nonmotorized trail;
- All unclassified roads would be decommissioned;
- Some of the roads in Wildcat Canyon used to access the South Platte River before the Hayman Fire including Hackett, Longwater, and the upper portion of Corral Creek Road would be restored to their former road maintenance level;
- Overall, about 79% of the total 260 classified road miles in the Hayman burn area would be open to public use.

Classified roads are roads constructed or maintained for long-term motor vehicle access within or adjacent to NFS lands. *Unclassified roads* are not constructed, maintained, or intended for long-term vehicle use. *Road decommissioning* is the stabilization and restoration of unneeded roads to a more natural state. ***(See Appendix A for a glossary of road-related terms and other terms used throughout this document).***

Decision Framework

The South Park, South Platte and Pikes Peak District Rangers are the officials responsible for this decision. The District Rangers may decide to select the no action alternative, to defer action, or to select an action alternative. If an action alternative is selected, the District Ranger will decide on which roads to keep open or increase the maintenance level, and which roads to close, decommission or convert to another use such as a motorized or nonmotorized trail.

The *1984 Land and Resource Management Plan for the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands* (Forest Plan), provides long-term programmatic forest-wide goals and objectives (USDA Forest Service, 1984). This EA is a project-level analysis that considers all applicable Forest Plan management direction (goals, standards, guidelines and management area (MA) direction). Where appropriate, this EA tiers to the Forest Plan and is hereby incorporated by reference, as encouraged by 40 CFR 1520.20.

Public Involvement

Scoping for the current proposal was initiated on January 15, 2004 with a legal notice to four newspapers and a mailing to approximately 1600 persons either known to be interested in similar projects, had asked to be informed of such projects or were landowners in the vicinity of the proposed project. Furthermore, two public open houses were held in Denver and Colorado Springs on January 21 and 22, 2004 respectively, and were attended by over 700 people. Approximately 1500 persons or organizations responded with comments during the scoping process.

A majority of the comments received were focused on those roads in the Wildcat Canyon area that provide access to the Upper South Platte River such as Metberry, Longwater, Hackett and Corral Creek roads. The comments regarding water quality and recreation access in Wildcat Canyon were divisive and polarized enough that the Forest Service sent a letter to 42 Off-Highway Vehicle (OHV) and environmental groups on March 11, 2004 requesting that they work together to develop a compromise alternative sufficient to both groups. However, for various reasons, not all groups were in alignment to seek a compromise alternative and the idea was shelved. Subsequently, the four project alternatives presented in Chapter 2 were developed by the Forest Service to cover the broad range of issues raised by the public during scoping and to present a broad range of alternatives to the Proposed Action (Alternative C).

Issues

The Pike National Forest identified two key issues raised during scoping:

Issue 1. Effects on Recreation Access and Opportunities

The potential closure and decommission of roads in the Hayman burn area may decrease motorized recreation access to popular areas and may decrease recreational opportunities.

Issue 2. Increased Soil Erosion and a Decrease in Water Quality

The potential closure and decommission of roads in the Hayman burn area may improve water quality and reduce soil erosion in the South Platte River watershed.

Other relevant issues raised during scoping that will be addressed in this EA include wildlife, noxious weeds, fisheries and aquatics, transportation, social economics, heritage resources, fuels and fire, and the protection of eligibility and maintenance of the classifications identified in the South Platte Wild and Scenic River Study.

CHAPTER 2. ALTERNATIVES

Introduction

An Interdisciplinary Team (IDT) representing various resources and uses of the Forest developed a broad range of reasonable alternatives to the Proposed Action. The IDT identified relevant issues that were presented during public scoping and formulated alternatives to the Proposed Action in response to these issues. The Forest Plan goals and objectives for the project area were also considered.

The Environmental Consequences chapter of this report (Chapter 4) describes the likely environmental effects associated with implementation of each alternative. A sharp comparison of the key effects provides the decisionmaker and the public with the information needed to make an informed decision.

Alternatives Considered in Detail

The Forest Service developed four alternatives to cover the broad range of issues raised by the public, including the No Action (Alternative A), Alternative B, Alternative C, and Alternative D. (*Specific details of each alternative can be found below and in Appendix B.)*

Table 1: Comparison of Alternatives by Road Miles Open, Closed, and Decommissioned

	Alternative A	Alternative B	Alternative C	Alternative D
Classified road miles to be addressed in this project	130	130	130	130
Classified road miles that would be opened or "Maintained As Is"	53	118	72	47
Classified road miles that would have seasonal travel restrictions	0	0	3	4
Classified road miles that would be closed (gated and signed)	77	12	6	9
Classified road miles that would be decommissioned or converted to another use such as a trail	0	0	49	70
Unclassified road miles that would be closed (gated and signed)	36.5	0	0	0
Unclassified road miles that would be decommissioned (obliterated)	0	36.5	36.5	36.5
Total classified road miles that would be open within the Hayman Area (out of 260 road miles).	183 miles or 70% of road system	248 miles or 95% of road system	205 miles or 79% of road system	181 miles or 70% of road system

Alternative A – No Action

Under the No Action alternative, current post-fire management direction would continue to guide management of the project area. The current road closures would remain in place, with no decommissioning of classified or unclassified roads. The 36.5 miles of unclassified roads would continue to be signed as closed and/or fenced off under this alternative. Approximately 53 miles of the 130 classified road miles addressed by this project would remain open and 77 miles would remain closed.

Much of the 77 miles of roads currently closed to motorized vehicles occur in management areas identified by the Forest Plan as suitable for motorized recreation. Therefore, if Alternative A was selected, a Forest Plan Amendment would probably be necessary to emphasize the new recreation use in these areas.

Alternative B – Pre-Fire Condition

Under Alternative B, the road system would be managed according to the road maintenance level that existed before the Hayman Fire. Approximately 118 miles of the 130 classified road miles addressed by this project would be reopened. Approximately 12 miles of classified roads that were already gated and closed to motorized use before the Hayman Fire would remain closed. All unclassified roads would be decommissioned.

Many of the roads under this Alternative would require extensive repair and rehabilitation to get them back to an acceptable level of safety and resource sustainability. Depending on the extent of rehabilitation work required, current road closures would remain in place until resources are obtained and the road is fixed. Many of the roads which accessed Wildcat Canyon and the South Platte River prior to the burn would be restored to their former maintenance level.

Alternative C – Proposed Action

Alternative C is the proposed action based on recommendations from the Hayman Roads Analysis Report (RAP). Under this Alternative, the proposed management strategy is to "maintain as is" approximately 69.5 miles of the classified roads, increase the maintenance level on 2.5 miles of classified roads, implement seasonal travel restrictions on 3 miles of road, close 6 miles of road year-round, and decommission or convert to another use 49 miles of road. Conversion to another use could include the conversion of an existing road to a motorized or nonmotorized trail. Forest Roads 343.B and 340.B are proposed to be converted into a motorized trail and the last two miles of Forest Road 540 is proposed to be converted to a nonmotorized trail. All unclassified roads would be decommissioned under this alternative.

Some of the roads which accessed Wildcat Canyon and the South Platte River prior to the Hayman Fire including Hackett, Longwater, and the upper portion of Corral Creek Road would be open to motorized use and restored to their former maintenance level. Overall, about 79% of the total 260 classified road miles in the Hayman burn area would be open to motorized access.

Alternative D – Proposed Action plus additional road closures and decommissions

Alternative D is the proposed action based on recommendations from the Hayman Roads Analysis Report (RAP) plus additional road closures and decommissions primarily in the Wildcat Canyon area. Under this Alternative, approximately 44.5 miles of the classified roads would be opened or "maintain as is", the road maintenance level on 2.5 miles of road would be increased, seasonal travel restrictions would be implemented on 4 miles of road, 9 miles of road would be closed year-round, and approximately 70 miles of road would be decommissioned or converted to another use. Conversion to another use could include the conversion of an existing road to a nonmotorized trail. Forest Roads 540 and 294 are proposed to be converted to a nonmotorized trail. All unclassified roads would be decommissioned. *(See Appendix B)*

Much of the 79 miles of road proposed to be closed or decommissioned in this alternative occur in management areas identified by the Forest Plan as suitable for motorized recreation. Therefore, if Alternative D was selected, a Forest Plan Amendment would probably be necessary to emphasize the new recreation use in these areas.

Note: Maps and spreadsheets show the approximate location, length and figures associated with the proposed road management recommendations. The exact locations and lengths would be determined before the implementation phase of the project. Minor variations may occur due to: 1) changes in on-the-ground conditions, 2) use of more accurate measuring techniques, or 3) the occurrence of unforeseen obstacle and opportunities. Minor variations occurring at implementation would be documented. Any road repair or relocation work that is required outside of the existing road location, or "road prism", may require additional NEPA analysis.

Mitigation Measures Common to all Alternatives

Water Quality & Aquatic Resources

- Best Management Practices (BMP's) for water quality protection as indicated in the Forest Service Handbook (FSH 2509.25-2001-1) would be applied to all proposed activities ***(see Appendix C for a list of BMP's and road engineering guidelines)***.
- The effectiveness of BMP's and other measures would be monitored to ensure compliance with the Forest Plan and Clean Water Act. The monitoring program would measure the success of BMP's and help improve future mitigation methods. The monitoring program would also identify unforeseen problems that require remedial measures. This monitoring would involve field measurements and inspections.

Wildlife

- Prior to decommissioning a road in mapped Pawnee Montane Skipper (butterfly) habitat using ground-disturbing techniques (ripping, recontouring, etc.), a survey will be conducted to evaluate the road for potential habitat. If the skipper is present and/or if quality habitat occurs, the U.S. Fish and Wildlife Service (USFWS) will be contacted prior to implementing the activity. This contact will include informal discussions regarding the activity and the potential effects on the skipper and determine if additional Section 7 consultation with USFWS is needed.
- All maintenance and reconstruction activities will remain within the existing road prism to the extent possible. Minor disturbances along the transition zone between the road prism and mapped Pawnee Montane Skipper habitat will not exceed a total of four (4) acres or three (3) miles of road. Major reconstruction or road realignment activities that are expected to exceed this will require additional USFWS Section 7 consultation.
- Prior to replacing a culvert in mapped habitat for the Preble's Meadow Jumping Mouse additional Section 7 consultation will be initiated with the U.S. Fish and Wildlife Service.
- Prior to decommissioning a road in designated Critical or potential habitat for the

Preble's Meadow Jumping Mouse using ground-disturbing techniques (ripping, recontouring, etc.) the U.S. Fish and Wildlife Service will be contacted prior to implementing the activity. This contact will include informal discussions regarding the activity and the potential effects on the Preble's Meadow Jumping Mouse to determine if additional Section 7 consultation is needed.

Heritage

- Heritage resources may be present in the subsurface with no visual evidence or surface manifestation. Therefore, if additional heritage resources are discovered during project implementation, all operations must cease within a 100-foot radius of the site location and a forest archaeologist notified immediately. Any heritage resources located before or during project implementation would be protected based on the recommendations of the forest archaeologist and the Colorado State Historic Preservation Officer.
- Provide road project managers and contract inspectors with maps and GPS readings indicating locations and extent of all significant or potentially significant cultural properties. Provide direction to avoid these locations and their near vicinities. Provide barriers and/or wrapping for vulnerable cultural properties. Inspect these locations during the progress of the proposed activities to assure significant cultural sites are protected.
- Before road management activities, inspect significant and potentially significant cultural sites to identify erosion vulnerability. To prevent erosion at vulnerable sites, increase the protected area and place soil barriers if necessary. Install straw bales, wattling or other suitable material if water channeling is a possible threat. Monitor erosion during the road management activities.

Noxious Weeds

- Incorporate weed prevention into road maintenance and decommission projects. Consider treating weeds in roads to be decommissioned before roads are made undriveable. Monitor and retreat if needed.
- Inventory roads for noxious weeds and maintain records of weed species and their locations so planning for road maintenance can include mitigation measures.
- Minimize the transport of seed and vegetative propagules within a road corridor.
- Avoid working in weed infested areas if possible. Postpone work until weeds have been eliminated from the site.
- Perform road maintenance such as road grading and ditch cleaning from uninfested areas to infested areas to the extent possible. This will help prevent moving weed propagules from infested areas to adjacent uninfested areas.
- Clean all heavy equipment before entering and exiting Forest Service system lands to minimize transporting weed seed. Remove all mud, dirt, and plant parts.
- Clean all equipment prior to leaving project site. Remove all mud, dirt, and plant parts.
- Wash road graders and other equipment immediately after operating in infested areas. Clean all mud, dirt and plant parts from the undersides.
- Reseed after construction, heavy maintenance, and other soil disturbing activities. Where roads are graded once a year or less, seed the roadways' shoulders after grading. Only use weed free seed and desirable native species.
- Minimize sources of weed seed. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.
- Use only clean fill material from a weed-free source rather than borrowing fill from a weed-infested stockpile, road shoulder, or ditch line.

Alternatives Considered but Eliminated from Detailed Study

Some comment letters received during the scoping process made suggestions of alternatives to the proposed action. Some of these suggestions were incorporated into the action alternatives and are being analyzed later in this document. Following are the suggested alternatives not being considered further and the reasons for not considering them:

1) Convert the Wildcat Canyon area (e.g., Hackett, Metberry, Longwater, Corral Creek roads, etc.) into a motorized trail system for four-wheelers and motorcycles. This alternative is not being considered because it does not address the key issues raised during scoping concerning water quality and recreational access for all uses including full-size motorized vehicles. Furthermore, one of the options already incorporated under Alternative C (the Proposed Action) is to convert roads into Forest motorized or nonmotorized trails.

2) Temporarily close the Wildcat Canyon area for a period of 2 to 5 years or place roads on a rotation system in order to let the burn area recover, fix the problems, perform road relocations, mitigate impacts, and utilize OHV groups to help fix the roads. This alternative is not being considered because much of the Wildcat Canyon area has already been closed to motorized vehicles for about 2 years now and this project is taking place in order to assess and take action (unless deferred) on which roads should be restored to provide recreation access and which roads should be closed and/or decommissioned in order to address water quality or other issues. The opportunity to utilize and partner with OHV groups to help fix and perhaps maintain some roads will be considered during the project implementation phase.

3) Take this opportunity to expand roadless areas (IRA's), research natural areas (RNA's) and replace the "Scenic" classification of the Wildcat Canyon area with a "Wild" classification. This alternative is not being considered because it does not meet the purpose of this project which is to restore needed roads to a safe, environmentally sound condition, and decommission unneeded roads and those causing excessive erosion, water degradation and/or habitat degradation. This alternative also does not meet the need for this project which is to provide a safe transportation network in the burn area that is responsive to public needs, realistic to projected budgets, and sensitive to wetlands, riparian areas, and wildlife habitat.

Decommissioning roads may result in an increase in the amount of land that is unroaded. Decommissioning does not, however, change the underlying allocation or assigned use for that land. Currently approved activities in areas where roads are decommissioned would continue until, and unless, Forest Plan direction is amended to preclude these activities.

The South Platte River has been found to be eligible for consideration as a wild and scenic river. The Wildcat Canyon portion has been classified as Scenic, while the segments above and below it have been classified as Wild. As stated above, creating conditions in the Wildcat Canyon portion that are consistent with the Wild classification does not meet the purpose of this project.

4) *Keep roads, such as those in Wildcat Canyon, open to provide motorized access for the elderly and persons with disabilities.* This alternative is not being considered because it does not meet the purpose of this project which is to restore needed roads to a safe, environmentally

sound condition, and decommission unneeded roads and those causing excessive erosion, water degradation and/or habitat degradation. Changes in travel management, including closing or decommissioning roads for environmental or safety reasons, would have the same effect on all groups of people traveling to and through the Forest, including minorities and different cultures. All people are affected by changes in travel management and the access afforded by roads. The PSICC does not discriminate against any group or persons based on color, creed, abilities, nationality or background. All persons are treated equally in policy and management of the National Forest. The management of roads is no exception. The rules, standards, laws that govern how the road system is developed and used apply equally to all who use it.

Table 2: Comparison of Alternative Effects

Issue	Alternative A - No Action	Alternative B - Pre-fire Condition	Alternative C - Proposed Action	Alternative D – Proposed Action plus more road closures
Soil and Water	No reduction of hydrologically-connected roads. High level of water quality impacts.	No reduction of hydrologically-connected roads. High level of water quality impacts.	46% reduction of hydrologically-connected roads. Low level of water quality impacts due to road closure and rehabilitation.	58% reduction of hydrologically-connected roads. Low level of water quality impacts due to road closure and rehabilitation.
Noxious Weeds	6.4 acres of noxious weeds generated	25.64 acres of noxious weeds generated	30.96 acres of noxious weeds generated	33.82 acres of noxious weeds generated
Wildlife – **For other effects on MIS or Sensitive species please turn to the Chapter 4 Wildlife Section.**	May affect but is not likely to adversely affect Preble's Meadow Jumping Mouse and Pawnee Montane Skipper. No affect on Mexican Spotted Owl. Beneficial affect on Bald Eagle.	May affect but is not likely to adversely affect Preble's Meadow Jumping Mouse and Pawnee Montane Skipper. No affect on Mexican Spotted Owl. May affect but is not likely to adversely affect Bald Eagle.	May affect but is not likely to adversely affect Preble's Meadow Jumping Mouse and Pawnee Montane Skipper. No affect on Mexican Spotted Owl. May affect but is not likely to adversely affect Bald Eagle.	May affect but is not likely to adversely affect Preble's Meadow Jumping Mouse and Pawnee Montane Skipper. No affect on Mexican Spotted Owl. Beneficial affect on Bald Eagle.
Fisheries & Aquatics	6% of roads high risk to aquatics; 52% moderate risk; 42% low risk.	22% of roads high risk to aquatics; 54% moderate risk; 24% low risk.	18% of roads high risk to aquatics; 17% moderate risk; 65% low risk.	10% of roads high risk to aquatics; 15% moderate risk; 75% low risk.
Transportation	Implementation Cost: $15,000. Annual Maintenance Cost: $128,076. Deferred Maintenance Cost: $380,913	Implementation Cost: $669,010. Annual Maintenance Cost: $161,448. Deferred Maintenance Cost: $435,938	Implementation Cost: $1,729,000. Annual Maintenance Cost: $141,241. Deferred Maintenance Cost: $0	Implementation Cost: $1,429,730. Annual Maintenance Cost: $132,465. Deferred Maintenance Cost: $0
Recreation	77 miles closed; Higher level of displacement and visitor dissatisfaction; reduced opportunities for motorized recreation; Reduced opportunities for specialized 4x4 recreation; Increased opportunities for nonmotorized recreation.	Pre-fire condition: 12 miles closed; No displacement; higher level of visitor satisfaction and motorized recreation opportunities; Increased opportunities for specialized 4x4 recreation at pre-fire levels.	55 miles closed or decommissioned; Moderate level of displacement and moderate visitor dissatisfaction; higher level of mixed motorized and nonmotorized recreation opportunities. Reduced opportunities for specialized 4x4 recreation.	79 miles closed or decommissioned; Higher level of displacement and visitor dissatisfaction; Reduced opportunities for specialized 4x4 recreation; Increased opportunities for nonmotorized recreation.
Protection of eligibility and maintenance of classification identified in the South Platte Wild and Scenic River Study	Fisheries value least protected. Recreation value is least protected. Scenic classification is maintained.	Fisheries value least protected. Recreation value is well-protected. Scenic classification is maintained.	Fisheries value protected at intermediate level. Recreation value is well-protected. Scenic classification is maintained.	Fisheries value best protected. Recreation value is least protected. Scenic classification is maintained.
Social Economics*	Low overall impact to local tourism economy. Moderate social effects to specialized 4x4 recreation.	Low overall impact to local tourism economy. Low social effects to specialized 4x4 recreation.	Low overall impact to local tourism economy. Low to moderate social effects to specialized 4x4 recreation.	Low overall impact to local tourism economy. Moderate social effects to specialized 4x4 recreation.
Heritage Resources	No impact to heritage resources.	Potential impact to heritage resources.	Potential impacts to heritage resources due to ground disturbance.	Potential impacts to heritage resources due to ground disturbance.
Fuels and Fire	Potential slow-down in response time to fire incident due to gates.	Faster response time to fire incident due to road access.	Potential slow-down in response time to fire incident due to closures.	Potential slow-down in response time to fire incident due to closures.

* Social Economics – the table displays impacts in terms of road closure or decommissions within the Hayman area, not an analysis of overall economic trends or conditions in the region.

- “Low overall impact to local tourism economy” – Indicates that alternatives may change access, but will not likely change overall number of users and activities in the area. A decrease in motorized users will likely be compensated by increases in nonmotorized users.
- “Low social effects” - opportunities for access remain at a level similar to the pre-fire conditions.
- “Moderate social effects” - access to specific routes and opportunities will be eliminated for 4x4 use, substitute recreation sites may not be available within the same area or at the same level of challenge.

CHAPTER 3. AFFECTED ENVIRONMENT

This Chapter summarizes the physical, biological, social and economic environments of the project area. Specific information about each resource analysis and potential effects is detailed in Chapter 4 and in the individual Specialist Reports located in the Hayman Project Record.

SOIL AND WATER

Soil Resources

The shallow granitic soils in the Hayman area are among the most erosive in the United States (USDA Forest Service, 2002). Nearly all of the project area is comprised of shallow, weathered soils from the Pikes Peak batholith, primarily the Sphinx and Legault families. The Sphinx-Legault-Rock complex occurs on slopes of 15 to 80 percent and forms on mountainsides. This soil mapping unit consists of approximately 50 percent Sphinx component, 20 percent Legault, and 15 percent rock outcrop. The **Sphinx soils** are coarse-textured and shallow, are moderately to excessively drained, and form on mountainsides. The surface layer is gravelly coarse sandy loam. Permeability is high and the available water capacity is low. Runoff is moderate to rapid and the hazard of water erosion is moderate to severe depending on slope. The **Legault soil**s are dark grayish brown, very gravelly coarse sandy loam and are found on north-facing aspects and higher elevations of mountainsides. Permeability is moderate to high, and the available water capacity is very low. Runoff is rapid and erosion hazard is moderate to severe depending on slope. The dominant vegetation of these soil types is Douglas-fir and ponderosa pine.

The decomposed granite soil types of the project area, in combination with climate and topography, have resulted in a soil surface low in organic matter. These soils support sparse vegetative cover and lack soil development and structure making them highly susceptible to erosion from normal precipitation events, even in an unburned condition. The landforms are predominantly mountain slopes in steep, V-shaped valleys, and rock outcrops cover about 10% of the area. The upland landscape is highly dissected. Annual precipitation is comprised of snowfall during the winter and high intensity rainfall events during the summer. The majority of the precipitation comes during the summer monsoon season, and because most of this occurs in high-intensity, short–duration thunderstorms, the natural rate of erosion is high. For that part of the project area within the Hayman Fire perimeter 70% is rated *high* for potential erosion hazard.

After the Hayman Fire, soil conditions were most altered in the area of high and moderate burn severity. The fire totally consumed ground litter in this part of the fire. An estimated 80% of the high and moderate burn severity areas of the fire exhibited *hydrophobic soils*. This fire-induced water repellent soil condition increases runoff and erosion by reducing water infiltration into the soil surface. In the burn area, soil erosion is estimated to have increased from the pre-fire condition of 1 ton/acre to the post-fire condition of 86 tons/acre on average (Upper South Platte Watershed Protection, 2002). In 2003, one year after the Hayman Fire, field observations indicate that hydrophobic fire-induced water repellency has greatly diminished in extent and strength over widespread portions of the burned area.

Water Resources

Increases in sedimentation, turbidity, and mass erosion are regarded as the most serious threats to water resources following wildfire. These changes in water quality often alter stream functions so that original designated uses, including municipal water supply, wildlife habitat, and fish culture, are no longer supported. Adverse impacts to water quality after the Hayman Fire were largely attributed to ash and sediment. Streams impacted by the Hayman Fire experienced high levels of turbidity that was caused by suspended sediment. Short-term increases of nutrients, metals, dissolved solids, and pH may also occur while water yields remain elevated.

The project area includes eleven sixth-level watersheds that drain into the South Platte River (Table 3). Pre-Hayman fire, all of the watersheds were determined to be either *limited* or *degraded* according to the Inland West Watershed Initiative (IWWI) (Winters and Gallagher, 1997), in part due to roads and road conditions. According to the Inland West Watershed Initiative, Class II – **Limited** watersheds are areas where there are currently management activities occurring and are not in a pristine condition; Class III – **Degraded** watersheds are areas where major impacts to the land have resulted in severe damage to stream and riparian function.

TABLE 3: SIXTH LEVEL WATERSHEDS LIMITED OR DEGRADED WITHIN THE BURN

6th Level Watershed	Watershed Name	Limited or Degraded
101900020105	Fourmile/Deckers	Degraded
101900020101	Cheesman Composite	Degraded
101900020104	Goose Creek Composite	Limited
101900010403	Lower Lake George Composite	Degraded
101900020106	Wigwam Creek	Limited
101900010607	Tappan Mountain Composite	Limited
101900020805	West Creek	Degraded
101900020804	Lower Trout Creek	Degraded
101900020107	Waterton/Deckers Composite	Degraded
101900010406	Twin Creek Composite	Degraded
101900010401	Elevenmile Canyon Composite	Limited

The State of Colorado's Department of Public Health and Environment (CDPHE) has designated beneficial uses for streams in the project area which includes Coldwater Class 1 and Domestic Water supply. The federal Clean Water Act requires states to compile a list (303(d) list) of streams that are impaired (do not fully or partially support their beneficial uses). Two stream reaches within the area, the South Platte River above Cheesman Reservoir and Trout Creek, are on the Colorado's 303(d) list for high levels of sediment (CDPHE, 2002). Federal law also requires that a Total Maximum Daily Load (TMDL) plan to improve water quality be approved prior to removal from the 303(d) list. Another reach in the area, the Upper South Platte has a TMDL plan already established in response to the 1998 listing on the Federal 303(d) list. A TMDL plan for the Trout Creek stretch is currently in process. *Trout Creek and the South Platte were impaired prior to the Hayman Fire.*

In addition, several streams within the Hayman Fire perimeter are on the State of Colorado's 2002 Monitoring and Evaluation List (M&E) (CDPHE, 2002), mostly for high levels of sediment and/or water temperature. Streams on the M&E list are suspected of not meeting water quality standards for all beneficial uses. In the project area watersheds, the following streams are on the 2002 M&E list: Horse Creek, Trail Creek, Tarryall Creek, Goose Creek, Spring Gulch, and

Wren Gulch. *All of these streams were impaired and placed on the M&E list prior to the Hayman Fire.*

The Hayman Fire burned nearly 138,000 acres in 2002. All of these watersheds have large burned areas that are extremely sensitive, susceptible to disturbance, and prone to further degradation. Natural vegetation has started to take root, but it will probably be over five years before the vegetation approaches its pre-fire ability to mitigate erosion.

Potential Pre-Fire Road Effects

The 2002 M&E list and the 1998 303(d) list indicate that water quality was a problem prior to the Hayman Fire and due to the proximity of roads to the streams, they have had an effect on water quality. Many of the roads act as conduits, delivering sediment and runoff extremely quickly to the headwater streams that drain into the South Platte River. Effects of roads on streams include increased water runoff due to soil compaction, increased soil erosion and sediment production from road and ditch surfaces, increased possibility of water pollutants associated with motor vehicles entering water, and possible altering of surface water and subsurface water flows. Furthermore, roads directly located in stream channel bottoms remove bank stabilizing vegetation, making fine substrate (soils) available for mobilization downstream and increasing the amount of sediment in the stream and downstream waterbodies.

Potential Post-Fire Erosion and Sediment Delivery Rates

Adverse impacts to water quality after the Hayman Fire were largely attributed to ash and sediment. Streams impacted by the Hayman Fire experienced high levels of turbidity that was caused by suspended sediment. Short-term increases of nutrients, metals, dissolved solids, and pH may also occur while water yields remain elevated.

A large amount of sediment will likely become mobile during storm events due to the soil type and steep slopes within the burn. The hillslope erosion potential is predicted to be high, averaging approximately 43 tons/acre/year. However, due to storage and buffering, actual sediment delivery to streams is predicted to be less. The sediment delivery potential is based on post-fire monitoring of the Buffalo Creek Fire (Moody and Martin, 2001), which demonstrated that approximately 15 acre-feet (ft) of sediment was delivered to Strontia Springs Reservoir for each square-mile (mi^2) of burn over five years following the fire. This value of 15 acre-ft/mi^2 (approximately 35-50 tons/acre) over the five-year recovery period provides an upper bound for sediment export because Buffalo Creek runoff and sediment transport were influenced by an extreme precipitation event immediately after the fire. In other words, 15 acre-ft/mi^2 is a high-end estimate of the potential sediment delivery and includes storms of greater intensity than the design storm discussed below. Given the Hayman Fire area of approximately 215 mi^2, the potential volume of sediment delivered to streams may be as great as 70 tons/acre over the five-year recovery period (see Table 4 below).

Erosion data from Big Turkey and Buffalo Creek fires were used for the post-fire erosion rate in the moderate and high severity part of the Hayman Fire and the Water Erosion Prediction Project (WEPP) model was used to adjust the erosion rates for the low severity and unburned parts of the fire (Elliott, Hall, & Scheele, 2000). Field review of the burned area was used to verify conditions and assumptions used in the modeling.

TABLE 4: EROSION RATES BY BURN SEVERITY ON THE HAYMAN FIRE

Burn Severity	Acres of Burn	% of Burn	Erosion Rate (Tons/acre/year)
Unburned	21,000	(15)	1
Low	46,500	(34)	22
Moderate	21,700	(16)	70
Severe	47,865	(35)	70

The average erosion rate for the Hayman Fire is 43 tons per acre/year based on a weighted average of the erosion rate by severity class and acreage in each group. The potential sediment delivery rate is 15 ac-feet/mi^2/5 years (approximately 35-50 tons/acre/5 years) (Moody and Martin, 2002). Table 5 shows the expected sediment delivery rates after the Hayman Fire.

TABLE 5: SEDIMENT DELIVERY SUMMARY, HAYMAN FIRE

General Area Description	Area[1] (acres)	Area[1] (mi^2)	Potential Sediment Delivery to Streams[2] (ac-ft/mi^2/5 yrs)
Upstream of Cheesman Reservoir	82,974	130	1,950
Below Cheesman Reservoir (west)	21,699	34	510
Below Cheesman Reservoir (east)	43,655	68	1,020

[1] Approximate area, includes some unburned area outside of fire perimeter.
[2] Based on post-fire monitoring of the Buffalo Creek Fire (Moody & Martin, 2001) – The potential rate of 15 acre-ft/mi^2 during the 5- year recovery period includes storms of higher intensity than the design storm.

Downstream from the project area, Cheesman Reservoir and Strontia Springs Reservoir managed by Denver Water impound the Upper South Platte River. About 56% of the burned area drains into either Cheesman or the Upper South Platte River. Below Cheesman, the remaining 44% drains into the Upper South Platte River which eventually flows into Strontia Springs Reservoir.

The aftermath of the Hayman Fire (erosion, sediment, runoff) has had a devastating effect on Denver Water and metropolitan Denver's water supply that passes through the Upper South Platte Watershed (Upper South Platte Watershed Protection, 2002). Because of poor water quality, Denver Water had to bypass storage water during the rain events that occurred after the fire (Upper South Platte Watershed Protection, 2002). Additionally, over one million Denver Water customers were affected because of taste and odor problems resulting from the fire (Upper South Platte Watershed Protection, 2002).

Storage capacity losses to both Strontia Springs and Cheesman Reservoirs have occurred and will continue to occur from the tremendous amount of sediment generated from erosion in the Upper South Platte Watershed (Upper South Platte Watershed Protection, 2002). Due to the Hayman Fire, major ash and sediment flows have already impacted water quality at Cheesman Lake, the key reservoir in the watershed (Upper South Platte Watershed Protection, 2002). The Buffalo Creek Fire in 1996, dramatically increased sedimentation into Strontia Springs Reservoir causing millions of dollars of treament and maintenance costs for Denver Water Board.

To summarize, the hydrology and stream flow of the area has drastically changed since the Hayman Fire. As was experienced in the summer of 2003, the burn area is prone to frequent flash floods and these will continue to occur until the area has sufficiently recovered.

Burned Area Emergency Rehabilitation (BAER) Treatments

Although much of the burn occurred in forested upland areas, the riparian areas around Horse Creek, Trail Creek, Turkey Creek, Wigwam Creek and others also burned. Many intermittent and ephemeral stream drainages were completely burned. Many drainages experienced a loss of riparian vegetation, streamside habitat, and stream-drainage buffering ability. It is anticipated that ground vegetation will recover over a two to five-year period. Re-growth has already begun in many riparian corridors.

During the initial BAER assessment in 2002, five "emergency issues" were identified and addressed with BAER treatments in 2002 and 2003 and are summarized below:

***Increased flood flows* –** Fires can cause increased magnitude and frequency of floods due to a combination of the loss of ground cover, decreased infiltration, a reduction in evapotranspiration, reduced water storage within the soil, and snowmelt modification (Robichaud et al., 2000). Magnitude of increase varies with moderate to high severity burn areas producing the greatest increases in runoff. The BAER team used the WILDCAT flow prediction model (Hawkins and Greenberg, 1990) to predict changes in peak flow events from the Hayman area. The modeled design storm was a 25-year, 1-hour storm and represents the maximum storm that BAER treatments could withstand. Predicted increases were greatest for watersheds where a high percentage of the area was moderately to severely burned. According to the model, 13% of the affected watersheds would have flows exceeding 500 cubic-feet per second (cfs)/square mile (or csm) and 4% exceeding 600csm. The average pre-fire predicted runoff was 75csm and post-fire was 290 csm. After the BAER treatments were completed, the WILDCAT model was run again for each of the sub-watersheds (7^{th} order watershed) that had some portion treated. The average runoff rate was reduced from 290 to 175 csm.

***Ponds/dams* –** Several private ponds exist in the West Creek, Trail Creek, and Trout Creek drainages. Both in-channel and within floodplain ponds exist. Post-fire flows may be a combination of water and debris in which jams form and break, causing surges or slugs of material down the stream channels.

***Debris flow potential* –** Increased stream flows may be combined with debris of floatable and transportable material. Recent experiences from the Cerro Grande, East Fork Bitterroot, Clover-Mist, and Buffalo Creek Fires demonstrate that debris flows have greater potential of occurrence after high severity burns.

***Water quality* –** As mentioned earlier, Trout Creek and the South Platte River above Cheesman Reservoir are on the 2002 State 303(d) list for sediment. Horse Creek, Trail Creek, Tarryall Creek, Goose Creek, Spring Gulch, and Wren Gulch are on the 2002 State Monitoring and Evaluation list for high levels of sediment and/or temperature. The South Platte River is the conveyance system for the public water supply of Denver. Changes in water quality might include increases in organic carbon, ash, and inorganic sediment. These increases will likely be measurable within several smaller drainage basins as well as within the South Platte River above and below Cheesman Reservoir.

Threats to aquatic life **–** Ash, sediment, and other water quality impacts may impair aquatic resources through the deposition of fine material in the substrate and suspension within the water column. Alteration of the nutrient levels may also be detrimental to aquatic life.

BAER Treatments

In order to mitigate some of the potential issues and impacts, BAER treatments within the Hayman Fire area included: 1) Hydro-mulching and seeding from roads and the air; 2) Ground cover with straw mulch and seeding; and 3) Ground scarification (hand or mechanical) with seeding (see Table 6).

TABLE 6: BAER TREATMENTS AS OF MAY, 2004

BAER Treatment	Acres
Aerial hydro-mulch	1,500
Aerial seeding only	7,800
Aerial straw mulching	12,200
Ground hydro-mulch	1,500
Contour scarification/seeding	13,000
TOTAL	**36,000**

Straw mulching and hydro-mulching with seeding on slopes 30-60% was used to help provide ground cover to the burn area until native vegetation is established. Most of the slopes in excess of 60% were predominantly rock outcrop on which BAER treatments were considered to be ineffective and were therefore left untreated.

Contour scarification serves two purposes: 1) it creates a seedbed for the annual grass seeds to germinate and grow in and 2) it helps to break up the shallow hydrophobic layer to improve water infiltration. Groundcover established by seeding annual grasses is helpful in keeping soils in place when it rains, thereby decreasing erosion and sediment delivery from burned slopes.

Roads, Soils and Water

Also during the BAER treatments, extensive road surveys were completed within the burn area and many road/stream crossings located that need to be upgraded or at least maintained. Many roads with safety risks have been kept closed since 2002 and may need to be kept closed through 2004, especially following large storm events. .

Many of these roads were impacted by increased runoff on the roadways resulting from a decreased amount of vegetation on the watershed post-Hayman Fire. Many of these roads will need maintenance and reconstruction that could include ditch cleaning, rolling dips, water bar development, culvert replacement and culvert realignment. Many culverts in the project area are poorly located and undersized. Some culverts divert sediment-laden storm flows directly into stream channels. Proper water bars and culverts could divert water off of the road and disperse the water frequently across the watershed to have less erosion occurring. Generally speaking, some of these roads could be reopened once maintenance to the road surface and drainage structures occurs.

However, there are also many roads that would be extremely difficult to reopen even with regular maintenance due to their poor location. Some of the roads located directly in drainage and valley bottoms have been severely effected by the increased peak flows post-Hayman. These roads are serving as the drainage channel carrying water and sediment down the slopes. In the burn area, there are stretches of road that have eroded 6 feet down for over 100 feet in length. Many of these roads are located on slopes greater than 30% and may require reconstruction or relocation (see Transportation section). The reconstruction of these roads in the same location may continue to impact the stream stability and prevent riparian vegetation from re-establishing.

Fisheries and Aquatic Habitat

This section describes the baseline conditions of the fisheries and aquatic habitat that could be affected by the proposed and alternative actions. Changes caused by recent wildfires, drought and disease were also described. The analysis area encompasses mostly the Hayman and Schoonover fire perimeters. About 190 miles of perennial streams and 186 miles of intermittent creeks have been mapped within the analysis area.

Historically, white suckers (*Catostomus commersoni*), longnose suckers (*Catostomus catostomus*), longnose dace (*Rhinichthys cataractae*), creek chubs (*Semotllus atromaculatus*), and greenback cutthroat trout (*Oncorhynchus clarki stomias*) were known to inhabit the Upper South Platte River. The greenback cutthroat trout, a common species historically, is no longer found in the analysis area. Habitat loss and modification, and hybridization with or displacement by non-native trout species has eliminated greenbacks from most of its native range.

Brook trout (*Salvelinus fontinalus*), a nonnative species, is the only aquatic Management Indicator Species (MIS) present in the analysis area. Before the fires and recent drought, brook trout were found mostly in tributaries of the South Platte, particularly the smaller streams. Besides fire and drought, competition with brown trout and whirling disease may be contributing to their decline (USDA Forest Service, 2001). Optimal stream habitat for brook trout and other trout species is characterized by clear, cold water; silt-free rocky substrate in riffle-run areas; well vegetated stream banks; abundant instream cover; deep pools; relatively stable flow regime and stream banks; and productive aquatic insect populations.

The Colorado Division of Wildlife (CDOW) manages the South Platte River and its tributaries as a sport fishery for trout. Denver Water and the US Forest Service work with the CDOW as an advocate of the fishery.

<u>South Platte River and Tributaries - Lake George to Beaver Creek</u>
This segment begins below Lake George, about 8.7 miles below Elevenmile Dam. This reach meanders through a wide valley. Unfortunately, there is considerable bank erosion and poor pool development because there is little woody riparian vegetation to help stabilize the stream banks. As the river enters a steeper canyon, meandering decreases, and habitat improves. Pools, rapids, and glides are more abundant here, and the substrate is more variable, with large boulders becoming more prevalent, providing additional habitat. The upstream Elevenmile Reservoir influences water temperature and flows. Stream temperatures are warmer than normal during the summer and colder during the winter. The temperature fluctuations tend to favor the native sucker species, but do not appear to benefit the trout fishery. The regulated flows, generally follow a normal pattern of peak flows during the summer and low flows in the fall and winter. However, flows can change suddenly which is not typical of most unregulated streams. Instream

flow habitat assessment efforts during the 1980s indicated relatively high habitat quality for brown and rainbow trout because of the varied habitats in this reach, especially the deeper pools and runs associated with large rocks and boulders (USDA Forest Service, 2004a).

The CDOW has planted rainbow (*Oncorhynchus mykiss)*, brown, and cutthroat trout in this area to provide a put-and-take fishery and to establish self-sustaining populations of trout. Although rainbow trout reproduction is limited, the brown trout population is, by and large, self-sustaining. Native fish in these segments include white suckers, longnose suckers, and creek chubs. Angler use in public areas along this segment is relatively high (USDA Forest Service, 2004a).

The primary tributaries with fish habitat that may be affected by the proposed action include Beaver Creek with brook trout and Crystal Creek with rainbow trout (Chadwick and Associates, 1985).

South Platte River and Tributaries - Beaver Creek to Cheesman Reservoir

Most of this segment of the South Platte River is confined in a narrow, high-gradient canyon. Although there are areas of reduced gradient, much of this segment is typified by pool-riffle complexes associated with boulders and bedrock. The riparian area is relatively narrow, except where it widens near the tributary confluences. Input from tributaries help moderate Elevenmile Reservoir's influence on temperature and stream flows. Habitat conditions for brown and rainbow trout is similar to the upstream segment described above.

This segment of the South Platte River is designated as "wild trout waters" by the CDOW. This designation is only given to streams that are capable of producing a quality trout fishery. These waters receive little, if any, hatchery supplementation and rely primarily on natural reproduction for recruitment to the fishery. Existing data indicates a healthy self-sustaining brown and rainbow trout fishery. Native longnose and white suckers are also present. Sampling in the spring of 2003 showed that adult fish were present in this segment despite large inputs of sediment resulting from the Hayman Fire (USDA Forest Service, 2004a).

Because there are few roads and trails for public access, fishing pressure is probably lower than in any other South Platte River segments in the analysis area. Except in the Corral Creek area of Wildcat Canyon, anglers enjoy a relatively pristine setting.

The tributaries known to support fish before the fire and drought include Corral Creek, Metberry Gulch, and Northrup Gulch with brook and rainbow trout; Longwater Gulch with rainbow trout; Tarryall Creek with brown, rainbow, and longnose suckers; and Hackett Gulch with rainbow and brown trout (Chadwick and Associates, 1985).

Cheesman Lake and Tributaries

Chessman Lake is a 900-acre reservoir managed by Denver Water. The CDOW has managed the fishery for Denver Water. Smallmouth bass (*Micropterus dolomieu*), brown trout, rainbow trout, northern pike (*Esox lucius*), and kokanee (*Oncorhynchus nerka)* have been introduced in to the reservoir in the past. Longnose and western white suckers are the only native species.

The primary tributaries known to support fish before the fire and drought include Goose Creek with rainbow, brook and rainbow trout, and longnose sucker and Turkey Creek with brook trout, rainbow trout, brown trout, and white sucker (Chadwick and Associates, 1985).

South Platte River and Tributaries - Cheesman Canyon

The Cheesman Canyon segment is short, but contains probably the best habitat in the analysis area (USDA Forest Service, 2004a). The confined nature of the canyon and the abundance of exposed bedrock and boulders provide excellent pool development and other habitats for both rainbow and brown trout. This section is classified as "gold medal water" and is nationally known as an outstanding trout fishery. Gold Medal Waters provide quality fishing and produce many "quality size" (14 inch or longer) trout. The criteria for Gold Medal Water are a minimum trout standing stock of 60 pounds per acre and a minimum of 12 quality trout per acre. CDOW data suggests that this reach greatly exceeds these minimum criteria. In the upper reaches of the river, trout exceeding 20 inches in length are not uncommon. Typically, rainbow trout biomass exceeds 300 pounds per acre, with values documented at over 700 pounds per acre during the mid-1980s. Nationwide, there are few trout fisheries that approach the population dynamics of this segment (USDA Forest Service, 2004a).

This segment of the river is only accessible via the Gill Trail, making it highly desirable to anglers pursuing a more primitive fishing experience. CDOW creel census information indicates that this segment has heavy fishing use and high catch rates. Fishing is challenging and limited to artificial lures only. There are several successful guiding services permitted each year for angling excursions to this segment. There are no tributaries with notable fish habitat that flow into this segment.

South Platte River and Tributaries – Below Cheesman Canyon

This segment has a variety of habitat and angler experience. Highway access is good throughout this segment, and private land is scattered throughout its length. Many of the private segments are not open to the public, but some owners like the Wigwam Club, manage these areas as a trophy fishery for its members.

As the river exits Cheesman Canyon, the river valley begins to widen. The stream gradient is relatively less; and although pools created from bedrock and boulder outcrops are apparent, they are not as prevalent as in the steep canyon upstream. The riparian area is more extensive in this segment, and the river is wider. The CDOW does not consider this a Gold Medal section, however, the overall fisheries quality is considered high (USDA Forest Service, 2004a).

The primary tributaries known to support fish before the fire and drought include Wigwam Creek, Horse Creek, Trout Creek, and West Creek with one or more of the following species brown trout, rainbow trout, brook trout, longnose sucker, white sucker, and longnose dace.

Fire, Drought, and Disease

Wildfires had a major impact on South Platte aquatic habitat and fisheries in recent years. Burn severity in the Hayman Fire area varied from unburned (15% of burn area), low (34%), moderate (16%) to high severity (35%). The fire was more severe in riparian areas where 91% of the riparian habitat suffered moderate to high burn severity (Graham, 2003). However, most of the riparian corridor along the main stem of the South Platte River was not burned. Subsequent flooding, erosion and sedimentation drastically affected most analysis area streams and fish populations.

For example, brown trout population numbers on the South Platte River below the Decker's bridge have declined dramatically in the fall of 2002 compared to 2001 and are at an all time low. Brown trout biomass and number of fish larger than 14 inches were reduced by about 50% (Graham, 2003). The impacts on tributary streams were even greater. Wigwam Creek, for example, supported a productive brown trout fishery before the fire averaging an estimated 170 pounds per acre (Wagner, 2001). After the fire, most fish were likely lost due to high temperatures, severe erosion and sedimentation impacts. The US Forest Service sampled the Wigwam Creek fish population at five sites within the burn area during 2003. Three sample sites had no fish and only two trout were captured at a fourth site. The fifth sample site, which was the uppermost site closest to the burn boundary, had only about 1/3 the biomass compared to 2001 estimates (42 lbs/ac vs. 117 lbs/ac). Recovery of stream habitat may be slow in some areas of the burn, as decades or longer may be needed to remove the sediment that is being deposited in lower gradient streams (Graham, 2003). The recent drought also has caused some of the smaller tributaries that supported fish in the past to temporarily stop flowing or go dry.

Besides the Hayman fire and drought, whirling disease has also affected trout populations in the analysis area. The European disease was introduced to Colorado waters in 1987. This parasite affects most trout species but is particularly lethal to the rainbow trout. It is unlikely that the proposed actions would have any positive or negative effects on the existence of whirling disease in this system.

Wildlife

Approximately 51% of the fire area burned at high to moderate intensity, 34% at low intensity, and 15% remained unburned. The historic fire regime of the Hayman area can be characterized as mixed severity, which includes both understory and crown fires (Kotliar et al., 2003). Within the Hayman Fire, approximately half of the area burned as a severe fire and half burned as a mixed-severity fire. The severe fire area resulted in a high amount of tree mortality that may be uncharacteristic for the area (Romme et al., 2003a), however, a more heterogeneous mixture of live and dead trees occurs in the mixed-severity fire area.

The response of different wildlife species to these burn conditions is expected to vary both spatially and temporally and be influenced by factors such as dispersal capability, life history traits, available refugia within and outside the burn, and the post-fire successional pathways (Kotliar et al., 2003). Anthropogenic factors may also influence the recovery rates of some habitat types. Roads and associated human uses are a key anthropogenic factor expected to influence the recovery of habitats within the Hayman Fire, particularly where they may influence riparian areas (Kotliar et al., 2003, Kershner et al., 2003).

Potential Road Effects on Species and Habitats

Various types of roads affect terrestrial and aquatic ecosystems in several different ways. For example, roads can result in direct mortality and habitat loss, provide barriers to dispersal, alter behavior and habitat use, increase parasitism and predation, and present habitat modifications such as increased edge habitat and exotic species introductions (Thomas et al., 1988, Reed et al., 1996, Wisdom et al., 1999, Trombulak and Frissell, 2000, Geneletti, 2002, Chong et al., 2003, Wisdom et al., 2004). Effects that alter the physical condition of the habitat are often more pronounced in wet, unstable, and sensitive environments, particularly from off-highway vehicles (Meyer, 2002). The type, amount, location, and condition of roads within the Hayman Fire can be expected to influence how different wildlife species respond to and/or use the post-fire landscape.

Wildfire areas are sensitive environments, and soil property changes caused by the Hayman Fire have resulted in areas that are vulnerable to surface runoff and erosion, especially where high-severity burns occurred. Erosion rates in these areas are expected to return to near-background levels in four or five years when the percent cover has increased to at least 60 or 70 percent of normal (Cipra et al., 2003). However, the presence of roads in steep or sensitive areas is expected to influence the recovery rate of habitat types used by some wildlife species included in this analysis, particularly those associated with riparian areas (Kershner et al., 2003). More than half of the 260 road miles within the Hayman Fire are also within the influence zones of streams, and compromise the restoration and functioning of aquatic systems and riparian zones (Decker et al., 2003).

Invasive, non-native plant species pose one of greatest potential threats to long-term ecosystem integrity in the area burned by the Hayman Fire (Chong et al., 2003). A particular concern for some wildlife species is that riparian systems, roads and trails are particularly vulnerable to invasion by non-native plant species. For example, seventeen non-native plant species had been documented in plots established within the Hayman Burn prior to the fire, six of which are considered noxious in Colorado (Chong et al., 2003). Some of these species were already concentrated within riparian areas and along roads, many of which were located along streams. Existing non-native plants along riparian areas and disturbance corridors such as roads are therefore expected to persist or dominate within the post-fire environment over the long-term (50-100 years) without control measures (Chong et al., 2003), and are recognized as a primary threat to the recovery of some wildlife species within the Hayman Fire (Kotliar et al., 2003). The presence of roads and trails is also considered a potential avenue for the introduction of other non-native species (Chong et al., 2003).

A Biological Evaluation (BE) for Threatened, Endangered, Proposed and Sensitive Species (Ghormley, 2004a) and a Wildlife Report (Ghormley, 2004b) were completed for this proposed project. These reports determined the wildlife species that are known to occur or may occur in the project area, and provide a detailed analysis of the effects of the project on these species. These reports are incorporated by reference. Summaries are provided here. Suitable habitat may exist in the project area for the species identified in Table 7.

Table 7: Threatened, Endangered, Proposed, and Sensitive Wildlife and Plant Species with Suitable Habitat in Project Area

Common Name	Scientific Name	Status	Known/suspected to be present?	Suitable habitat present?	
THREATENED, ENDANGERED & PROPOSED SPECIES					
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Yes	Yes	
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened	Yes	Critical habitat and one PAC occur within the project area.	
Pawnee Montane Skipper	*Hesperia leonardus montana*	Threatened	Yes	Yes	
Preble's Meadow Jumping Mouse	*Zapus hudsonius preblei*	Threatened	Yes	Critical habitat and potential habitat occur within the project area.	
SENSITIVE SPECIES					
AMPHIBIANS					
Northern Leopard Frog	*Rana pipiens*	Sensitive	Possible	Yes	
BIRDS					
Flammulated Owl	*Otus flammeolus*	Sensitive	Yes	Yes	
Lewis' Woodpecker	*Melanerpes lewis*	Sensitive	Yes	Yes	
Northern Goshawk	*Accipiter gentilis*	Sensitive	Yes	Yes	
Olive-sided Flycatcher	*Contopus cooperi*	Sensitive	Yes	Yes	
Three-toed Woodpecker	*Picoides tridactylus*	Sensitive	Yes	Yes	
MAMMALS					
Fringed Myotis	*Myotis thysanodes*	Sensitive	No	Yes	
Gunnison's Prairie Dog	*Cynomys gunnisoni*	Sensitive	Yes	Yes	
Townsend's Big-eared Bat	*Plecotus townsendii*	Sensitive	No	Yes	
PLANTS					
Scientific & Common Name	Habitat Association	Status	Known/ Suspected to be Present?	Suitable Habitat Present?	
Aquilegia chrysantha var. rydbergii **Rydberg's golden columbine**	Montane, subalpine; rocky ravines near streams; 8000-9800 ft.	Sensitive	No	Yes	
Botrychium lineare **Narrowleaf grapefern**	Montane, subalpine; grass/forb meadows; 7900-11000 ft.	Federal candidate; Sensitive	No	Yes	
Cypripedium arviflorum **Lesser yellow-lady's-slipper**	Montane, subalpine; moist forest, aspen groves;7400-8500 ft.	Sensitive	No	Yes	
Malaxis brachypoda **White adder's-mouth**	Foothills, montane; in mosses along	Sensitive	No	Yes	

Common Name	Scientific Name	Status	Known/suspected to be present?	Suitable habitat present?	
orchid	streams; 7200-8000 ft.				
Mimulus gemmiparus **Rocky Mountain monkeyflower**	Subalpine, montane; seepages, wet banks; 8400-11120 ft.	Sensitive	Yes	Yes	
Potentilla rupincola **Rock cinquefoil**	Subalpine to montane granite outcrops, low tundra; 6900-10500 ft.	Sensitive	No	Yes	
Rubus arcticus ssp. acaulis **Dwarf raspberry**	Wetlands; willow, mossy streamsides; 8600-9700 ft.	Sensitive	No	Yes	
Viola selkirkii **Selkirk's violet**	Montane, subalpine; cold mountain forests; 6000-9100ft.	Sensitive	No	Yes	
MANAGEMENT INDICATOR SPECIES (MIS) SELECTED FOR PROJECT-LEVEL ANALYSIS					
Common Name	**Scientific Name**	**Status**	**Known/suspected to be present?**	**Suitable habitat present?**	
Mule Deer	*Odocoileus hemionus*	MIS	Yes	Yes	
Elk	*Cervus elaphus*	MIS	Yes	Yes	
Beaver	*Castor Canadensis*	MIS	Yes	Yes	
Wilson's Warbler	*Wilsonia pusilla*	MIS	Yes	Yes	

Noxious Weeds

The term "weed" includes all plants defined as "noxious weeds" by Forest Service policy, which is ". . plants designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being non-native or new to or not common to the United States or parts thereof." (Forest Service Manual (FSM) 2080.5)

Most noxious weeds are early successional species that prefer highly disturbed sites such as areas along rivers and streams, trails, trailheads, roadsides, building sites and campgrounds. Invasive, nonnative plant species pose one of the greatest potential threats to long-term ecosystem integrity in the area burned by the Hayman Fire (Graham, 2003). Noxious weeds have been shown to cause decline of native plant species and pollinators, as well as adverse changes in fire regimes, nutrient cycling, and hydrology. Thus, invasive non-native species may be responsible for some of the most serious ecological impacts and greatest long term costs associated with the Fire.

The fire converted several thousand acres of a variety of forest types in the area to potential habitat for non-native invasive plants, including identified noxious weeds. Fire-fighting and subsequent emergency rehabilitation efforts may have inadvertently introduced some of these plants. Noxious weed species observed in the area of the Hayman fire include orange hawkweed

(*Hieraceum aurantiacum*), leafy spurge (*Euphorbia esula*), yellow toadflax (*Linaria vulgaris*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), diffuse knapweed (*Centaurea diffusa*), and Dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*).

A cursory inventory of high priority roads, trails and drainages was completed in the summer of 2002 after the fire. Yellow toadflax and Canada thistle were the most prominent species found. Approximately 3,088 infested acres were recorded. Species found included yellow toadflax, Canada thistle, orange hawkweed, spotted knapweed, diffused knapweed, Oxeye daisy, houndstongue and leafy spurge. In 2002, 370 acres of yellow toadflax and Canada thistle were treated. In 2003, 1,579 acres were treated. Of these acres yellow toadflax, knapweeds, and leafy spurge made up the major species. Helispots, staging areas and along roads, trails and drainages were areas treated.

Approximately 31,000 acres were surveyed for noxious weeds along roads, trails and drainages in the Burnt Cedar salvage sale and Waterton-Deckers watershed. The number of acres infested is still being calculated at this time. Inventories of the affected watersheds will continue in 2004. With the use of BAER monies, approximately the same number of acres and same types of treatments (both herbicide and biological) will continue into 2004. Funding to treat after 2004 will depend on availability of rehabilitation funds and Forest dollars.

Transportation

Of the 130 miles of classified roads to be addressed in this environmental assessment, maintenance level 1 roads (closed to the public) account for 12 miles, maintenance level 2 roads (maintained for high clearance vehicles) total 96 miles, and maintenance level 3 roads (maintained for passenger vehicles) total 22 miles.

Primary access around and through the burn area is provided by Jefferson County Road 126 at the north end, Colorado State Highway 67 on the east side, Forest Road 211 on the west side, Park County Road 77 and US Highway 24 at the south end of the burn area.

Teller County Roads 3, 33, 51, 78 and 330 as well as Douglas County Roads 68 and 73 extend into the burn area on the east side. Park County Road 94 and Teller County Road 32 border the burn area on the south side. The remainder of the roads within the burn area are primarily native surfaced, low volume, Forest Service level 2 roads that provide access for recreation, mining, private inholdings and other traditional uses.

Prior to the fire and subsequent rain storms in 2003, the roads within the burn area were generally adequate for their intended use, although deferred maintenance needs were evident. Since the fire, increased runoff has damaged some of these roads by depositing ash, sediment, rocks and debris on the roads. The runoff has also cut and/or blocked some roads at intermittent stream crossings, damaged roadside ditches and plugged culverts with sediment and debris. Roads with steeper slopes (21% and greater) and areas of high burn intensity have experienced much greater damage than flatter slopes and areas of low burn severity. These roads are in need of major repair work for erosion control and drainage, above and beyond the usual maintenance work, to bring them up to a safe level for vehicular use. In many cases, realignment of portions of these roads will be necessary in order to adequately maintain them and to keep major erosion problems from continuing to occur while natural revegetation takes place on the adjacent slopes.

Since the fire, emergency BAER maintenance and mitigation work concentrated primarily on protecting the major level 3 roads (i.e., Forest Roads 211, 560, etc.), and also level 2 roads that are open for public use. Road surfaces were repaired, culverts were cleaned, roads were armored with jersey barriers and riprap, and drainage areas along and across roads were also repaired, cleaned and enhanced as needed. In many cases, roads had to be repaired and culverts cleaned multiple times due to the amount of sediment carried into culverts and across roads during each rain event. Many of the hazard trees along roads were removed for public safety reasons but many hazard trees still exist in the burn area and will start to fall in the next 5-10 years.

Road Maintenance

Safety work such as surface maintenance, roadside brush and vegetation clearance, and installation and maintenance of warning and regulatory signs is performed on an annual basis, but due to budget limitations many roads do not receive adequate yearly maintenance. According to data from the PSICC, annual maintenance costs for level 2 roads averages $409 per mile and for level 3 roads it is $5,329 per mile. See Table 8 below.

Table 8. Annual and Deferred Maintenance Costs	Cost per mile
Annual Maintenance Costs - Level 1 Roads	$463
Annual Maintenance Costs - Level 2 Roads	$409
Annual Maintenance Costs - Level 3 Roads	$5,329
Deferred Maintenance Costs - Level 1 Roads	$86
Deferred Maintenance Costs - Level 2 Roads	$771
Deferred Maintenance Costs - Level 3 Roads	$16,506

Deferred maintenance is maintenance that was not performed when it should have been and was put off until a future time due to budget constraints. Deferred maintenance costs for level 2 roads within the PSICC averages $771 per mile and for level 3 roads it is $16,506 per mile. The lack of maintenance can accelerate the deterioration of these roads, which means that over time, adverse environmental impacts and safety concerns become increasingly more important to address when deciding the future management of these roads. The fact that deferred maintenance costs are increasing each year indicates that maintenance needs exceed the amount of funds available.

Recreation

All three ranger districts (South Platte, South Park, and Pikes Peak) of the Pike National Forest were affected by the Hayman Fire. Because of the subsequent resource and public safety concerns, the 138,000 acre burned area was closed to the general public from June 2002 until April 2003. In April 2003 all National Forest System (NFS) lands in the Hayman area were reopened to the public but many road restrictions were enacted by Special Order to keep motorized vehicles off of fire-damaged and flood-prone roads. Additionally, the Special Order directed that all vehicle parking and car-camping be in designated sites marked with appropriate signs only. As of January 15, 2004, approximately 120 miles of classified roads out of 260 miles in the burn area were open to the public for general access and recreation use (see Appendix D). The remaining roads, while currently closed to motorized vehicle use, are still open to the general public for nonmotorized activities such as hiking, horseback riding, hunting, and mountain biking.

The South Platte District, based in Morrison, CO and the Pikes Peak District based in Colorado Springs, CO receive tremendous recreation visitor use due to their proximity to the Colorado Front Range. In 1998, there was an estimated 2.2 million recreation visits to the South Platte District alone. The South Park District based in Fairplay, CO also receives moderate to heavy use but primarily on weekends due to the longer driving distance from urban population centers.

South Platte Ranger District

The South Platte District makes up the majority of the Hayman burn area (60%) and is basically the entire central and northern portion of the burn. The southern boundary of the District starts at Longwater Gulch then goes west up the Corral Creek Road to the Lost Creek Wilderness and then north until it meets the eastern boundary of the burn area at Gunbarrel Creek. From Longwater Gulch the district boundary goes east up the Cedar Mt. Road, over to Turkey Rocks and through Westcreek, over to Hwy. 67 and then north up to the South Platte River to Gunbarrel Creek.

The recreation demands placed on the district are very diverse with approximately 70% of the use occurring as dispersed activities such as: motorcycle and ATV trail riding, 4WD riding, sightseeing, driving for pleasure, camping, picnicking, hunting and fishing, hiking and backpacking, horseback riding, mountain biking, rock climbing, tubing, Christmas tree cutting, and mineral collecting (Sporl et al., 1998). Dispersed recreation on the district represents the greatest use by the public, but also creates the greatest resource impacts and disturbances (Sporl et al., 1998). Furthermore, resource damage is occurring and increasing in areas of heavy user concentrations throughout the dispersed areas of the district (Sporl et al., 1998).

Because the recreation visitation is high especially during the summer and fall months, there is a noticeable management presence in the area. For example, numerous regulatory, informational and safety signs are present in the area in addition to many gates, fences and barricades. Weekend patrols by Forest Service law enforcement personnel and Forest Protection Officer's (FPOs) are common in the summer and fall in order to educate visitors on regulations and safety precautions and to protect the resource.

Recreational use occurs throughout the year with the summer and fall being the greatest time of use. Winter recreation, such as cross-country skiing and snowmobiling are dependent upon the weather. Most years, there is not enough snow for snowmobiling to occur. Because the Hayman portion of the South Platte District is further away from the Front Range population and a little more remote, recreation use is mostly pre-planned and occurs on the weekends and holidays.

Recreation Resources on the South Platte Ranger District

The South Platte District's portion of Hayman includes tremendous recreation resources such as the nonmotorized Gill Trail for fishing access; Matukat Road (211) for developed and dispersed recreation access and pleasure driving; the upper South Platte River and Wildcat Canyon for fishing, dispersed camping and extreme OHV riding; the Wigwam and Goose Creek area for dispersed camping and trailhead access to Lost Creek Wilderness; Cedar Mountain Road (360) for OHV access and dispersed camping; Turkey Rocks, Sheeprock and Sheep Nose for world-class rock climbing; and a portion of the well-known Rampart Range Motorized Recreation Area.

Within the burn area there are also three small campgrounds developed in the 1960s that were under concessionaire agreement for upkeep and maintenance: Molly Gulch Campground and Goose Creek Campground along the 211 Road and Big Turkey Campground along the 360 Road near Turkey Rocks. These three campgrounds were closed due to the fire and remain closed because of safety and resource concerns. A Decision Memo was issued in May 2004 to permanently close and decommission the Molly Gulch and Goose Creek Campgrounds. The decision on Big Turkey Campground has been delayed.

Motorized Recreation

In terms of recreation use, the Forest Roads located on the South Platte Ranger District primarily function as routes for recreationists to access certain portions of the forest, and in a few cases function as the objects of recreational pursuits in themselves. For example, Forest Roads 211 (Matukat), 360 (Cedar Mt.), and 560 (Stoney Pass) are each traveled by recreationists for the main purpose of arriving at developed recreation sites, dispersed recreation areas, and trailheads. However, some people utilize these roads for pleasure driving and/or sightseeing purposes including four-wheel drive motorized users, mountain bikers, and horseback riders.

The road segments mentioned are located primarily in the 2B Management Area where the management direction is for rural and roaded-natural recreation opportunities such as driving for pleasure, viewing scenery, picnicking, and fishing. The ROS setting for the portion of this MA is Roaded Natural (RN), an appropriate setting since the area is predominately natural appearing but readily accessible to vehicles.

Wildcat Canyon

One Hayman area of the South Platte District that is especially popular with four-wheel drive motorized users is the northern section of Wildcat Canyon which includes nationally-known four-wheel drive roads such as Metberry, Northrup, Longwater, and Corral Creek. Due to the Hayman fire and subsequent resource and safety concerns, these roads have been closed to public motorized access since June 2002. Nonmotorized access to this area was allowed in April 2003. The Wildcat Canyon area was extremely popular because of the 4x4 challenge of the roads, the South Platte River destination point, the opportunity for long and scenic loop rides, the close proximity to the Colorado Front Range and the many other dispersed recreational opportunities available in the area like fishing, hunting, camping, picnicking, and rock-climbing. Furthermore, many local OHV clubs were involved in the maintenance and upkeep of these roads through grant agreements with the Colorado State Parks OHV Fund and partnerships with the US Forest Service. Over the past 8-10 years, a considerable amount of volunteer hours and over $100,000 in grant monies has been dedicated to hardening and rehabilitating four-wheel drive roads in the area, especially Longwater, Corral Creek and Hackett.

The Wildcat Canyon area is chiefly located in the 2A Management Area where the primary management direction is for semi-primitive motorized recreation opportunities such as snowmobiling, four-wheel driving, and motorcycling. The ROS setting for the portion of this MA is Semi-Primitive Motorized (SPM) which is mostly appropriate since the area appears natural and the presence of other users is limited since only four-wheel drive vehicles can handle the roads. However the tremendous popularity of this area and prevalent management presence especially on weekends and holidays makes this area appear at times to be more in the ROS setting for Roaded-Natural (RN).

Non-motorized Recreation

Part of the 120,700 acre Lost Creek Wilderness is in the Project Area, but the vast majority is adjacent to it. The wilderness is known for its granite canyons, walls, and domes that range from 8,000 feet to over 12,400 feet in elevation. From the South Platte District the Wilderness is accessed by trails such as Wigwam and Goose Creek with their trailheads located along Forest Road 211 or Matukat Road. The ROS designation of Primitive and Semi-Primitive Non-Motorized are found primarily in the western portion of the project area in and near the Lost Creek Wilderness.

Outfitters/Guides

Before the Hayman fire in 2002 there were approximately 20 commercial outfitters/guides permitted by the Forest Service to operate on the South Platte District portion of the Hayman burn area. The permitted activities included hiking, backpacking, horseback riding, tubing, fishing, hunting/horsepacking, and rock-climbing. In 2001, the number of service days allocated to commercial outfitters in the area was approximately 11,500 days. A majority of these days were permitted to private land-based operations located in the project area such as Lost Valley Ranch, Flying G Girl Scout Camp, and YMCA Shady Brook Camp. At least seven of the outfitters provide rock-climbing opportunities almost exclusively at Turkey Rocks. Outfitters and guides are still able to operate in the Hayman Fire area but are still subject to the road closures for motorized vehicles. Many permitted outfitters have been accommodated to operate in other unburned areas of National Forest lands outside of the Hayman area.

Rock climbing

The South Platte region is known nationwide by rock climbers because of the approximately 1,500 routes located on the protruding granite crags, domes, spires and slabs dotting the landscape. The routes provide a diversity of challenge and complexness ranging from classic single-pitch and multi-pitch climbs to crack-climbing and splitters. On the South Platte District portion of the Hayman Fire popular climbing rocks include Helen’s Dome, Sheeprock, crags along the South Platte River, Turkey Rocks, Turkey Tail, and Sheep Nose to name just a few. Access to these climbing spots is by Forest Roads.

Hunting and Fishing

The project area occurs primarily in the Colorado Division of Wildlife Game Management Unit (GMU) 51, 501 and 511. Big game hunting (deer and elk), small game hunting (e.g., grouse and rabbit) and turkey hunting are popular dispersed recreational activities within the burn area. In 2001, the total number of deer and elk hunters in these GMUs totaled 3,366. In 2002, due to the

Hayman Fire and resulting burn area closure order, access to portions of GMU 51, 501 and 511 was restricted and numbers of hunters in that area were greatly reduced. However in 2003, the burn area was reopened allowing hunter access except by motorized vehicles on those roads that are closed by Special Order.

The Gill Trail provides non-motorized access to Cheesman Canyon and the South Platte River upstream from the Wigwam Club. This section of river is a catch and release Gold Medal Trout Stream. The proximity of this section of the river to large population centers coupled with excellent fishing prospects, beautiful scenery, and relatively easy access, makes this section of river very popular. Many pools and riffles will host multiple anglers on weekends and it can be difficult to walk along portions of the trail for more than a few minutes without seeing anglers and hikers.

South Park Ranger District

The South Park Ranger District makes up most of the southern and western portion of the Hayman burn area and includes the fire origin location. The portion of Hayman on the South Park District includes the area from Lake George north to the South Platte District boundary at Longwater Gulch, west over to Park County Road 77, and east over to the Pikes Peak District boundary located between Turkey Creek and Trail Creek.

Like the South Platte and Pikes Peak Ranger Districts the recreation demands placed on the district are very diverse with the majority of use occurring as dispersed recreation activities such as: motorcycle and ATV trail riding, 4WD riding, sightseeing, driving for pleasure, camping, picnicking, hunting and fishing, hiking and backpacking, horseback riding, rock climbing, tubing, and mineral collecting (especially crystals). Similar to the South Platte and Pikes Peak Ranger Districts, resource damage is occurring and increasing in areas of heavy user concentrations.

On this portion of the South Park District the recreation visitation is high especially during the summer and fall months. Consequently there is a noticeable management presence in the area which includes numerous regulatory, informational and safety signs in addition to many gates, fences and barricades. Weekend patrols by Forest Service law enforcement personnel and Forest Protection Officer’s (FPOs) are common in the summer and fall in order to educate visitors on regulations and safety precautions and to protect the resource.

Recreational use occurs throughout the year with the summer and fall being the greatest time of use. Winter recreation, such as cross-country skiing and snowmobiling are dependent upon the weather. Most years however, there is not enough snow for these activities to occur. Because the Hayman portion of the South Park District is further away from the Front Range population and a little more remote, recreation use is mostly pre-planned and occurs on the weekends and holidays.

Recreation Resources on the South Park Ranger District

The South Park District’s portion of Hayman includes well-known recreation resources such as Matukat Road (211) and the 211 spur roads for dispersed camping, rock climbing and pleasure driving; the upper South Platte River and Wildcat Canyon for fishing, dispersed camping and extreme OHV riding; the Platte Springs area for dispersed recreation and nonmotorized trail access to the South Platte River; Cedar Mountain Road (360) for OHV access and dispersed camping; and the Crystal Creek and Lake George area for mineral collecting. There are no developed recreation facilities (e.g., campgrounds and picnic areas) on the Hayman portion of the South Park Ranger District.

Motorized Recreation

In terms of recreation use, the Forest Roads located on the South Platte Ranger District primarily function as routes for recreationists to access certain portions of the forest, and in a few cases function as the objects of recreational pursuits in themselves. For example, Forest Roads 211 (Matukat), 360 (Cedar Mt.), and 210 (Platte Springs) are each traveled by recreationists for the main purpose of arriving at developed recreation sites, dispersed recreation areas, and trailheads. However, some people utilize these roads for pleasure driving and/or sightseeing purposes including four-wheel drive motorized users, mountain bikers, and horseback riders.

The road segments mentioned are located primarily in the 2B Management Area where the management direction is for rural and roaded-natural recreation opportunities such as driving for pleasure, viewing scenery, picnicking, and fishing. The ROS setting for the portion of this MA is Roaded Natural (RN), an appropriate setting since the area is predominately natural appearing but readily accessible to vehicles.

Wildcat Canyon

One Hayman area of the South Park District that is especially popular with four-wheel drive motorized users is the southern section of Wildcat Canyon which includes nationally-known four-wheel drive roads such as Forest Roads 220 (Hackett), 540 (Corral Creek), 220.A (Crossover) and about 20 miles of single-track motorized trails like Forest Trails 731, 732 and 733, the “730 trails”. Due to the Hayman fire and subsequent resource and safety concerns, these roads and trails have been closed to public motorized access since June 2002. Nonmotorized access to this area was allowed in April 2003. The Wildcat Canyon area was extremely popular because of the 4x4 challenge of the roads and trails, the South Platte River destination point, the opportunity for long and scenic loop rides, the close proximity to the Colorado Front Range and the many other dispersed recreational opportunities available in the area like fishing, hunting, camping, picnicking, mineral collecting and rock climbing. Furthermore, many local OHV clubs were involved in the maintenance and upkeep of these roads through grant agreements with the Colorado State Parks OHV Fund and partnerships with the US Forest Service. Over the past 8-10 years, a considerable amount of volunteer hours and over $100,000 in grant monies has been dedicated to hardening and rehabilitating four-wheel drive roads in the area, especially Hackett, Corral Creek and Longwater.

The Wildcat Canyon area is chiefly located in the 2A Management Area where the primary management direction is for semi-primitive motorized recreation opportunities such as snowmobiling, four-wheel driving, and motorcycling. The ROS setting for the portion of this MA is Semi-Primitive Motorized (SPM) which is mostly appropriate since the area appears natural and the presence of other users is limited since only four-wheel drive vehicles can handle the roads. However the tremendous popularity of this area and prevalent management presence especially on weekends and holidays makes this area to appear at times to be more in the ROS setting for Roaded-Natural.

Non-motorized Recreation

Part of the 120,700 acre Lost Creek Wilderness is in the Project Area, but the vast majority is adjacent to it. The wilderness is known for its granite canyons, walls, and domes that range from 8,000 feet to over 12,400 feet in elevation. There is no developed trailhead access to the Lost Creek Wilderness from the South Park District's portion of the Hayman Burn Area. In the South Park portion of the project area the ROS designation of Primitive and Semi-Primitive Non-Motorized are found primarily near Pilot Peak (Lost Creek Wilderness boundary) and in the Lower Lake George watershed where two non-motorized Forest Trails exist: Platte Springs Trail and Platte River Trail.

Outfitters/Guides

Before the Hayman fire in 2002 there were approximately 10 commercial outfitters/guides permitted by the Forest Service to operate on the South Park portion of the Hayman burn area. The permitted activities included backpacking, mountain biking, horseback riding, tubing, fishing, motorbike trials riding, and rock climbing. In 2001, the number of service days allocated to commercial outfitters in the area was approximately 2,500 days. A majority of these days were permitted to private land-based operations located in or near the project area such as Lutheran Valley Retreat and Golden Bell. Outfitters and guides are still able to operate in the Hayman Fire area but are still subject to the road closures for motorized vehicles. Many permitted outfitters have been accommodated to operate in other unburned areas of National Forest lands outside of the Hayman area.

Rock climbing

The South Platte region is known nationwide by rock climbers because of the approximately 1,500 routes located on the protruding granite crags, domes, spires and slabs dotting the landscape. The routes provide a diversity of challenge and complexness ranging from classic single-pitch and multi-pitch climbs to crack-climbing and splitters. On the South Park District portion of the Hayman Fire popular climbing rocks include Trumans Rock and several crags along the South Platte River and near Pilot Peak. Access to these climbing spots is primarily by Forest Roads.

Hunting

The project area occurs primarily in the Colorado Division of Wildlife Game Management Unit (GMU) 51, 501 and 511. Big game hunting (deer and elk), small game hunting (e.g., grouse and rabbit) and turkey hunting are popular dispersed recreational activities within the burn area. In 2001, the total number of deer and elk hunters in these GMUs totaled 3,366. In 2002, due to the Hayman Fire and resulting burn area closure order, access to portions of GMU 51, 501 and 511 was restricted and numbers of hunters in that area were greatly reduced. However in 2003, the burn area was reopened allowing hunter access except by motorized vehicles on those roads that are closed by Special Order.

Pikes Peak Ranger District

The Pikes Peak Ranger District makes up the southeast portion of the Hayman burn area. The portion of Hayman on the Pikes Peak District includes the Trail Creek Road corridor (Teller Co. Road 3) south to Phantom Creek, starting at the intersection with Cedar Mountain Road (known as Four Corners) and then northeast over to Westcreek, across State Highway 67 to Rainbow Falls.

Like the South Platte and South Park Ranger Districts the recreation demands placed on the district are very diverse with the majority of use occurring as dispersed recreation activities such as: motorcycle and ATV trail riding, 4WD riding, sightseeing, driving for pleasure, camping, picnicking, hunting and fishing, hiking, horseback riding, Christmas tree cutting, fuel wood gathering, and rock and mineral collecting. Similar to the South Platte and South Park Ranger Districts, resource damage is occurring and increasing in areas of heavy user concentrations.

On this portion of the Pikes Peak District the recreation visitation is high especially during the summer and fall months. Consequently there is a noticeable management presence in the area which includes numerous regulatory, informational and safety signs in addition to many gates, fences and barricades. Weekend patrols by Forest Service law enforcement personnel and Forest Protection Officer's (FPOs) are common in the summer and fall in order to educate visitors on regulations and safety precautions and to protect the resource.

Recreational use occurs throughout the year with the summer and fall being the greatest time of use. Winter recreation, such as cross-country skiing and snowmobiling are dependent upon the weather. Most years however, there is not enough snow for these activities to occur. Because the Hayman portion of the Pikes Peak Ranger District is further away from the Front Range population and a little more remote, recreation use is mostly pre-planned and occurs on the weekends and holidays.

Recreation Resources on the Pikes Peak Ranger District

The Pikes Peak Ranger District's portion of Hayman includes well-known recreation resources such as Trail Creek Road (Teller County Road 3), Signal Butte Road (Forest Road 362), and Manchester Creek Road (Forest Road 364) for dispersed camping, sightseeing, and pleasure driving; the Rainbow Falls area and the 717 motorized trail system for OHV riding; and the Turkey Track area for dispersed recreation and hunting.

Within the area there are also two small campgrounds developed in the 1960s that were under concessionaire agreement for upkeep and maintenance: Trail Creek Campground and Wildhorn Campground. These two campgrounds were initially closed due to the fire; however, Wildhorn Campground was reopened during the summer of 2003. An official decision was made in April 2004 to permanently close and decommission these two campgrounds as an outcome of a separate NEPA analysis performed during 2003 and 2004: Trail Creek and Wildhorn Campground Closure and Decommission.

Motorized Recreation

In terms of recreation use, the Forest Roads located on the Pikes Peak Ranger District primarily function as routes for recreationists to access certain portions of the forest, and in a few cases function as the objects of recreational pursuits in themselves. For example, Forest Roads 362 (Signal Butte), 364 (Manchester Creek), and 366 (No Name) are each traveled by recreationists for the main purpose of arriving at developed recreation sites, dispersed recreation areas, and trailheads. However, some people utilize these roads for pleasure driving and/or sightseeing purposes including four-wheel drive motorized users, mountain bikers, and horseback riders.

The road segments mentioned are located primarily in the 2B and 7A Management Area where the management direction is for: (2B) rural and roaded-natural recreation opportunities such as driving for pleasure, viewing scenery, picnicking, and fishing; and (7A) wood-fiber production and utilization of large roundwood of a size and quality suitable for sawtimber. The ROS setting for this portion of Hayman is Roaded Natural (RN), an appropriate setting since the area is predominately natural appearing but readily accessible to vehicles.

Rainbow Falls

One Hayman area of the Pikes Peak District that is especially popular with four-wheel drive motorized users is the Rainbow Falls area, located east of State Highway 67. This area is one of the most popular OHV designated road and trails systems in the region and links riders with other designated road and trail systems in the Rampart Range Motorized Recreation Area, Fern Creek, Sprucewood, 717 motorized trail system and beyond. This area has received increased recreation use over the past year since many popular OHV areas in the Hayman area are still closed to motorized vehicles. Because of the intense and heavy concentration of use in this area before and after the Hayman Fire, there is a considerable spider-web network of unclassified motorized routes. This area is a main focus point for visitor education and law enforcement patrol especially on busy summer weekends and holidays.

The Rainbow Falls area is chiefly located in the 2B Management Area where the primary management direction is for rural and roaded-natural recreation opportunities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling and cross-country skiing. The ROS setting for the portion of this MA is Roaded Natural (RN), an appropriate setting since the area is predominately natural appearing but readily accessible to vehicles. However the tremendous popularity of this area and prevalent management presence especially on weekends and holidays makes this area to appear at times to be more in the ROS setting for Rural

717 Motorized Trail System

Another popular motorized recreation destination on the Pikes Peak District is the approximately 50 miles of connecting multiple-use trails known as the Signal Butte Multiple-Use Trail System or “717” trail system. These trails are very popular with ATV quad and motorcycle riders, but they also see use from hikers, mountain bikers, and equestrians. These trails receive lots of maintenance from local OHV clubs who obtain grant funds for this purpose. The trail system has also hosted many equestrian events, National Trails Day work parties, and the Pikes Peak Enduro motorcycle event.

Non-motorized Recreation

Motorized recreation use dominates over hikers, bicyclists, and equestrian users in this portion of the Hayman burn area. Some nonmotorized use does occur on designated roads and trails but the majority of nonmotorized use in this region occurs in or near the Lost Creek Wilderness, Manitou Park, the Pikes Peak area, and Mueller State Park.

This portion of the Pikes Peak Ranger District is located primarily in the 2B and 7A Management Area where the management direction is for: (2B) rural and roaded-natural recreation opportunities such as driving for pleasure, viewing scenery, picnicking, and fishing; and (7A) wood-fiber production and utilization of large roundwood of a size and quality suitable for sawtimber. The corresponding ROS setting for this area is Roaded Natural (RN), an appropriate setting since the area is predominately natural appearing but readily accessible to vehicles.

Hunting and Fishing

The project area occurs primarily in the Colorado Division of Wildlife Game Management Unit (GMU) 51, 501 and 511. Big game hunting (deer and elk), small game hunting (e.g., grouse and rabbit) and turkey hunting are popular dispersed recreational activities within the area. The Turkey Track area in the vicinity of Forest Road 343 is a popular area for deer hunting. Phantom Creek and West Creek are popular fishing areas and provide a good brook trout fishery. In 2001, the total number of deer and elk hunters in these GMUs totaled 3,366. In 2002, due to the Hayman Fire and resulting burn area closure order, access to portions of GMU 51, 501 and 511 for game hunting was restricted and numbers of hunters in that area were greatly reduced. However in 2003, the burn area was reopened allowing hunter access in all areas except by motorized vehicles on those roads that are closed by Special Order.

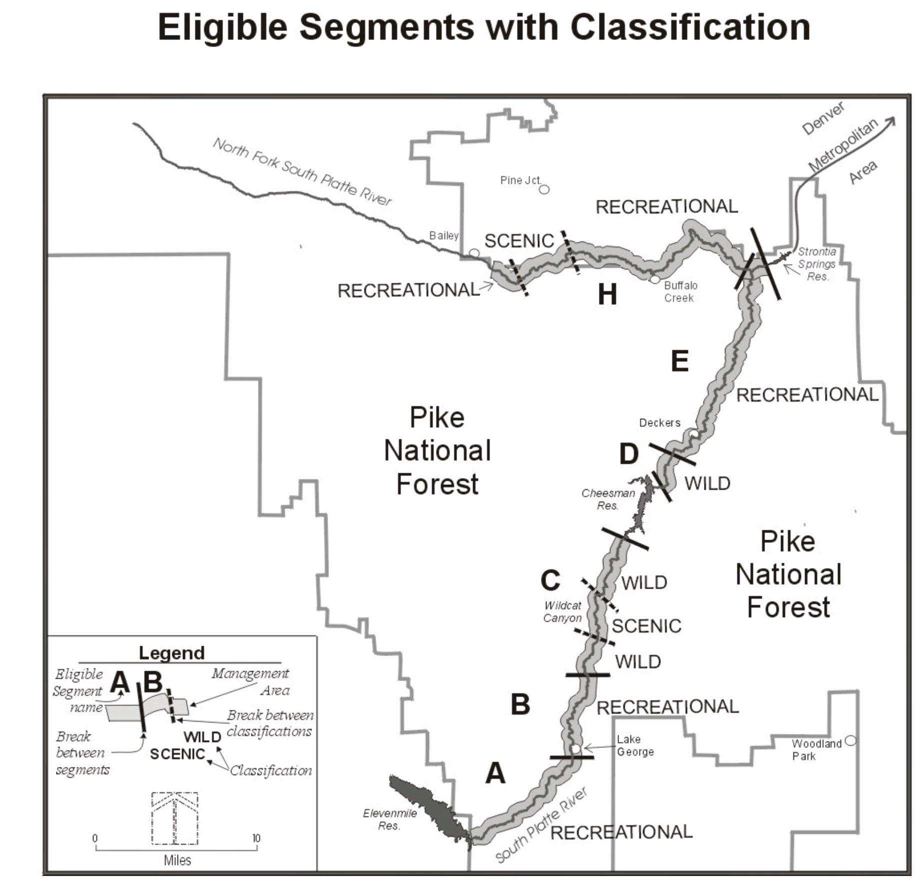
South Platte Wild and Scenic River Study

The South Platte River in the project area has been part of a Wild and Scenic River study that looked at the South Platte River from Elevenmile Reservoir to Strontia Springs Reservoir and the North Fork of the South Platte River (USDA Forest Service, 1997, 2000a, 2004a). All of the South Platte River was found eligible for consideration as a wild and scenic river, along with the lower portions of the North Fork of the South Platte River.

The eligibility study identified the following outstandingly-remarkable values along the river through the Hayman project area: fisheries, scenery, recreation, geology, and wildlife (USDA Forest Service, 2004a). The ensuing classification study determined that, above Cheesman Dam, the Wildcat Canyon area fell within the “Scenic” classification, while the river segments above and below it met the “Wild” classification. The basis for the “Scenic” classification in the Wildcat Canyon area was the long-established pattern of motorized use. Below Cheesman Dam, Cheesman Canyon is classified as “Wild”, while the remainder of the river downstream is entirely in the “Recreational” classification.

Forest Service policy governing eligible rivers is to protect eligibility and maintain classification until the river has been either (1) added to the National Wild and Scenic Rivers System, or (2) found not suitable for inclusion in the System (see Forest Service Manual, section 2354.21). Neither of these outcomes is likely to occur in the foreseeable future. As a result, the outstandingly-remarkable values identified above must be protected to the extent that eligibility and classification are retained. The Forest Plan has been amended to establish a management area embracing the eligible segments, with accompanying direction to protect identified values within the management area (USDA Forest Service, 2004b). The management area extends ¼ mile on either side of the river. See Figure 2 below.

Figure 2: South Platte Wild and Scenic River Study Classifications



The Hayman fire burned in or around the river corridor for several miles upstream from Cheesman Reservoir, and burned adjacent to it for a few miles downstream. The fire's primary effect on eligibility-related values pertains to the adverse effect on fisheries caused by significantly increased sediment yield from the burned areas. Even though burn severity was generally low to moderate within the river corridor, high burn severity in the uplands is causing high sediment yields to reach the river. Roads located directly in stream channel bottoms play a role in the delivery of these sediments.

Social Economics

The study area included in the social and economic analysis includes Douglas, Jefferson, Park and Teller Counties, the four counties within which the Hayman burn area is located. The communities surrounding the Hayman area include Bailey, Buffalo Creek, Chipita Park, Deckers, Divide, Florissant, Lake George, Pine, South Platte, West Creek, and Woodland Park. Economic and demographic data for these small communities is not regularly collected or reported by state or national agencies, so county-level information is used to highlight trends in the area.

Demographics

Table 9 highlights the population of the four counties and the 10-year average growth rate between 1990 and 2000. Jefferson County has seen growth slow down as it has been built out earlier than the other three counties. The State of Colorado Demographer estimates that Jefferson County will continue to grow at about 1.2 percent over the next 5 years. Douglas County is current one of the fastest growing counties in the state – and the State Demographer estimates an addition 4.1 growth each year over the next five years. Park County has seen some moderate growth associated with commuters from Colorado Springs; over the next 5 years, it is estimated to see an addition 7.8 percent increase a year. Teller County has increased significantly over the 10-year time frame, and is expected to see continued growth at about two percent a year over the next 5 years.

Table 9: Population Counts by County, 1990, 2000, 2001 and 2002.

	Population				Average annual percent change
	1990	**2000**	**2001**	**2002**	**1990-2000**
Douglas County	60,391	175,766	200,385	213,526	11%
Jefferson County	436,908	525,330	529,404	530,821	2%
Park County	7,174	14,703	15,325	15,738	7%
Teller County	12,468	21,145	21,827	21,988	5%

Source: Colorado Demography Section, 2004

As noted in the Recreation section of this document, continued growth of the area surrounding the Hayman area will likely increase the demand for recreational opportunities and access to the Forest. People will also continue to demand other Forest products and amenities in terms of wood products, water, wildlife, and the scenic backdrops that draw people to the area to live and work.

Environmental Justice

In 1994, Executive Order 12898 was signed to highlight the potential disproportionate negative impacts government activities may have on minority or low-income communities. The order requires each federal agency clearly identify any minority and or low-income communities within a project area that may be impacted and develop an outreach strategy to ensure those communities are included in the process, and their issues understood and addressed within the project. The four counties within the study area have been analyzed in Tables 9 and 10 to determine if there are any minority or low-income and populations that should be considered during the planning phase of the project. Table 10 summarizes the minority population for the State and each county; none of the counties meet the criteria of a minority population that is significant. The information does indicate that for the entire study area, the minority population is increasing, although still not reflective of the State averages.

Table 10: Percent of Population that is Minority by State & County, 1980, 1990, and 2000.

	Percent Minority		
	1980	1990	2000
Colorado	11.0	11.7	17.2
Douglas County	1.9	3.1	7.2
Jefferson County	4.0	5.2	9.4
Park County	2.0	2.1	4.9
Teller County	1.1	2.3	5.1

Source: USDA Forest Service, NRIS HD module, 2004c.

Similarly, Table 11 highlights the percent of the population at or below the poverty level. Again, the counties in the study area do not exceed the threshold of 20 percent (USDA Forest Service, 2004c). The information displays a decline in the percent of poverty over the three decades, with much less poverty in the study area than the State on average.

Table 11: Percent of Individuals at or below the poverty level by State and County, 1980, 1990, and 2000.

	Percent Poverty		
	1980	1990	2000
Colorado	10.1	11.7	9.3
Douglas County	4.1	3.2	2.1
Jefferson County	4.6	5.8	5.2
Park County	11.9	9.4	5.6
Teller County	11.3	10.1	5.4

Source: USDA Forest Service, NRIS HD module, 2004c.

No additional analysis or outreach for environmental justice was completed as there is no indication that this project would cause disproportionately negative impacts to minority and or low-income populations.

Many people were concerned that closure of motorized access would discriminate against elderly, handicapped, or physically impaired people who require motorized transportation for forest access. The Forest Service will not be denying access to any single group under any of the alternatives. If a road is closed to motorized access, it is closed to all motorized access equally. Similarly, if a road or trail is open to motorized use, it is open to everyone.

Employment and Income

The economy of the Hayman area is difficult to isolate as much of the activity occurs within the larger urban areas of the Denver-metro area and Colorado Springs. The tourism sector specifically is most directly related to potential changes to access on the Forest in the Hayman area. Tourism activity is also difficult to define because many residents purchase the same goods and services as visitors, but the impact of a visitor spending a dollar is of greater importance that the impact of a resident’s dollar. The Colorado State Demography section has completed several studies of tourism activity at the county level. Based on their most recent 2002 survey, tourism related activity accounts for 35 percent of all employment and 28 percent of all income in Teller County, 10 percent of all employment and 9 percent of income in Park County, and 5 percent of employment and 5.5 percent of income in the Denver Metro area (including Adams, Arapahoe, Bounder, Denver, Douglas, and Jefferson Counties). So tourism in the Hayman area is a significant part of the local economy, especially in Park and Teller counties.

The 2002 Employment and Income Base Industry Study completed by the Colorado Demography section further breaks down the tourism industry by county. Table 12 displays this additional analysis for Park and Teller counties. Jefferson and Douglas counties are included within the larger Denver-Boulder metro area, so results would be more reflective of urban activity, rather than tourism directly related to the Hayman area.

Table 12: 2002 CO Demography Base Industry Results for Park and Teller Counties.

	Park County		Teller County	
Basic Industry Group	**Percent Jobs**	**Percent Income**	**Percent Jobs**	**Percent Income**
Agribusiness	5.8	-0.7	1.5	-0.1
Mining	0	0.1	4	6.4
Manufacturing	0.4	0.5	2.6	4
Regional Center/national services	3.4	4.3	2.2	4.5
Tourism	9.9	8.7	35.1	27.8
Resorts	4.5	2.3	30.3	23.6
Second Homes	4.9	6.1	2.7	2.8
Tourist Services	0.2	0.1	1.6	1.2
Tourism Transport	0.3	0.2	0.6	0.1
Government	0.8	1.8	0.6	1.7
Indirect/unassigned	6.8	10.1	2.1	2.3
Households	72.6	75	51.5	52.9
Retirees	13.5	13.9	14.4	14.7
Commuters	52.1	53.8	29.7	30.4
Public assistance	2	2.1	2	2.1
Dividend, interest, rent	5	5.2	5.5	5.7
TOTAL Basic - Jobs and Income	4,761	$149,975	8,737	$254,973

Agribusiness: Activities related to agriculture including agricultural production, agricultural inputs, and agricultural processing.
Agricultural production: raising crops and livestock for sale.
Agricultural inputs: goods and services that enable production, such as farm equipment manufacture and sales, fertilizer production, or the sale of seeds and feed grains.
Agricultural processing: activities that add value to agricultural products and readies them for market, including milling, transportation to market, brewing, curing, packing, food manufacturing or otherwise creating a finished food product.
Mining: Includes all of mine operation and mining support activities. Mine operations includes establishments operating mines, quarries, or oil and gas wells. Mining support activities include establishments that perform exploration and/or other mining activities.
Manufacturing: Manufacturing includes all activities that can be classified under manufacturing except for food and kindred product manufacturing which is included in agribusiness.
Regional Center/National Services: Includes all establishments primarily engaged in providing services to a region (a group of counties) or the nation. Examples include health services in the Eastern Plains or Western Slope or Denver International Airport in the Front Range.
Tourism: Includes all establishments with activities related to tourism. Examples include activities at resorts, second homes, tourist services ,and tourist transportation.
Government: Includes all government owned establishments regardless of activity.
Indirect unassigned: An establishment is assigned as having indirect employment and earnings when a base industry purchases local supplies or services for the operation of their business from it. The distinction between direct and indirect basic is obvious in some cases, but imprecise in many others. Where a distinction could be made, we assigned the indirect to the basic industry, combining both direct and indirect employment. Where a distinction could not be made, but it was obvious that the establishment was serving a base industry, the employment and earnings were assigned here.
Households: Retirees – Earnings and employment associated with expenditures made by retirees on local resident services. Retiree income includes transfer payments from the federal government to individuals over age 60 and dividends, interest, and rental income also earned by individuals over age 60. These consist primarily of retirement and disability insurance benefit payments, income maintenance, and Veterans payments.
Households: Commuters – These data are the earnings and employment associated with expenditures made by households who earned their income outside of their county of residence, but who made local resident service purchases with those outside dollars in their county of residence.

This source of income is significant for counties within metropolitan areas and for counties which serve as bedroom communities for several of the ski resorts.
Households: With Public Assistance Income – These data are the earnings and employment within local resident service sectors associated with expenditures made by households who earned their income from public assistance payments made by the federal government. Such payments include food stamps, SSI, AFDC, etc. These data exclude Retirees earnings.
Households: With Dividends, Interest, and Rental Income – These data are the earnings and employment within local resident service industries, which are the result of local expenditures of dividends, interest, and rental income.
Source: Colorado State Demography Section, 2004.

In Park County, the resort and second home activities are about the same in terms of employment, with second homes producing over twice the income. In Teller County, resort activity accounts for the majority of both employment and income produced by tourism activity. Considering that 40.5 percent of the homes in Park County are seasonal, or second homes, it is reasonable to assume that a large part of the tourism industry would be directly related to the upkeep and management of these homes. Teller County's seasonal homes account for 15 percent of all homes, which is still significantly more than either Douglas or Jefferson counties at just 0.7 percent, or the state average of four percent seasonal homes (US Census Bureau, 2000).

Households are the largest economic generator within Park and Teller counties with both commuters and retirees contributing significantly to the local economy. Park County's base economy is just over half supported by commuters – people driving to the Front Range for employment, or tele-commuting to other areas from their rural locations. Teller County's commuters account for 30 percent of economic activity, with another 14 percent of economic activity tied to retirees living in the area and spending their pensions on goods and services locally. As the general population continues to move toward retirement age, and technology and transportation opportunities improve, these trends will likely increase for both Teller and Park counties.

<u>Hayman Fire Economic Trends</u>

For most people, worries about the economy, war, and drought play a more prominent role in their decision-making than a limited view of the single fire event (Kent, 2003). Assessments completed nine months after the Hayman fire concerning the degree of economic impact were varied. At a County level, the financial effect was considered to be minor. Instead small businesses and individuals appear to have borne the brunt of negative impacts caused by the effects of the Hayman fire …many businesses that rely on tourism have been hard hit (Kent, 2003).

The Hayman area was closed during and after the fire, drastically reducing the number of visitors through the area. As displayed by alternative A, many parts of the forest have reopened, but negative publicity and perceptions about the area kept people away for the first 9 months. The concessionaire for the developed campgrounds on the Forest estimated that revenues were significantly lower in 2002 than previous years. Flooding danger and resource damage will prevent some campgrounds from opening for the 2004 summer season. In the long term, the concessionaire thought that return visits would be low due to the loss of natural beauty. A business owner who sells OHV and snowmobile equipment estimated that he lost 80 percent of his business in the 9 months since the full containment of the Hayman fire (Kent, 2003).

Several studies have indicated that visitor use of a large fire area will increase for several years following the fire as people curious about the impacts will focus their visits in the area. A study conducted in Colorado highlights that over a 50-year period, visits to a fire event increase from 10.28 trips a year to 10.30 trips a year in 25 years, to 10.33 trips a year in 50 years, indicating a small increase in visitation related to the fire event (Hesseln, 2003). According to Hesseln (2003), older crown fires receive fewer visits than newer crown fires and this may be explained by the initial interest in seeing effects of severe fires.

Changes in recreational use and access within the study area since the containment of the fire are presented in the Recreation section of this document.

Lifestyle

Most of the communities surrounding the area are rural and those choosing to live in the area commit to long commutes to surrounding urban areas for employment, health care, goods and services. Much of local industry is related to tourism activity associated with visitors from the Front Range accessing National Forest System lands for day trips or weekend outings. Residents of the study area take advantage of close access to the Forest as well as amenities such as scenic landscapes, wildlife habitat, and open space.

Based on the results of surveys conducted after the Hayman Fire, the area has a high level of community capacity, the extent to which a community possesses the resources and ability to cope with large disturbance events such as a fire (Kent, 2003). Respondents to the case study stated that the most positive impact resulting from the fire was the way the community ‘pulled together’ and helped each other out (Kent, 2003).

Values, Attitudes, and Beliefs

People currently living in the area tend to have a strong sense of place, many who lost their homes in the Hayman Fire are planning to rebuild again in the same location. In general, those who experienced the fire are not planning to alter their behavior in terms of defensible space or fire prevention because such activities conflict with their desire to be surrounded by trees, one of the main reasons for living in the area (Kent, 2003).

Within the study area, there is a strong sense of ownership with people willing to volunteer time and donate materials for projects to improve or maintain Forest resources. This willingness to volunteer is present in all types user groups, and from all around the region; many people view the Hayman area as important to their enjoyment and access, and are willing to support projects in terms of labor and materials that benefit their continued use of the area.

Heritage Resources

The heritage and cultural resources present within the Hayman Fire area offer unique information about the history and prehistory of this region as it relates to Colorado Mountain Archaeology. Prehistoric uses included hunting, ceremonies, temporary and permanent occupation sites. Historic uses include mining, homesteading, logging and the activities associated with them.

A review of previous cultural/heritage reports: Hayman Burn Area Emergency Recovery (CRR

1920), Hayman Roadside Salvage (CRR 1926) and several other reports yielded information on several heritage sites. These sites were recorded in the vicinity of several roads addressed by this project but outside the area of potential affect. To date one potentially eligible site has been recorded in the project area and two sites recorded which have been recommended as not eligible during the field assessment. There have been two prehistoric Isolates recorded in the roadbed of two unclassified roads.

Tribal governments and other officials of tribes with possible traditional ties to the area, or those tribes that have previously indicated interests, were contacted regarding the Proposed Action. The Northern Ute Tribe and the Jacarilla Apache Nation were the only respondents. The Northern Ute Tribe expressed that there are no known impacts to Native American Cultural Sites sensitive to their tribe. The Jacarilla Apache requested that any objects found that are associated with indigenous historic habitation, such as shards and obsidian points, remain on site and that measures be taken to ensure that no objects are removed from site.

Surveys will be completed, recorded sites evaluated, and any necessary avoidance or mitigation measures developed before the proposed road management activities are implemented. Concurrence on the eligibility determinations and determinations of “no effect” on heritage resources would be obtained from the Colorado State Historic Preservation Officer (SHPO) prior to the Decision Maker’s final decision for this project.

Fuels and Fire

Pre-Fire

Before the Hayman fire occurred, the forest cover type within the area was predominantly Ponderosa Pine with an understory of Douglas-fir. Aspen stands were also present, although generally small because of conifer encroachment. Additionally, Englemann and Blue spruce occurred, but were largely limited to riparian areas.

Although no forest-wide dead fuel loading data is available, ten sample plots in the area yielded an average of 18 tons per acre with a range from 11 tons per acre up to 34 tons per acre (Pike-San Isabel National Forests, 2002).

The pre-fire live vegetation and dead fuel loading were influenced by long-term fire exclusion, which allowed for increased encroachment of conifers into Aspen stands, proliferation of Douglas-fir and accumulation of dead fuels on the forest floor (USDA Forest Service, 1984, Kaufmann et al., 1999). Historically, a mixed severity fire regime would have maintained a more heterogeneous forest with numerous openings (Kaufmann et al., 1999).

Post-Fire

The analysis area currently has very little surface dead fuel loading as most of it was consumed when the fire passed. However, a large amount of standing fire-killed timber exists. Approximately 75% of fire-killed ponderosa pine snags can be expected to fall within the next 10 years (Harrington, 1996). These fallen snags would then become large woody surface fuels. Although not a significant factor in fire spread, large woody fuels (3 inches or larger diameter) have been shown to contribute to fire severity. Standing fire-killed timber also presents a hazard to firefighters and to forest visitors as these snags can fall with little or no warning.

In general, as vegetation returns to the Hayman area and standing dead timber begins to fall, fuel loads will increase sharply in about three to five years. Once this begins to happen, dead fuel loading would generally range from 10 to 30 tons per acre. Grasses and other live vegetation are expected to respond well, with fuel loadings up to three tons per acre.

Roaded access would again become very important as these fuel loads increase and roads are needed to meet fire protection objectives and fire suppression needs.

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

This Chapter summarizes the physical, biological, social and economic effects of implementing each alternative on the environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in Chapter 2: Alternatives.

Specific analysis area, cumulative effects area, and analysis methods were developed for each resource. Specific information about each resource analysis is detailed in the individual Specialist Reports located in the Hayman Project Record.

Soil and Water

Introduction

Slope, soil, surrounding vegetation, distance to wetlands, and channel type are prominent variables that determine direct, indirect, and cumulative impacts to soil and water resources.

Roads affecting Soil and Water Resources

The team that prepared the Road Analysis Report for the Hayman Fire Burn Area (USDA Forest Service, 2003a) rated the existing conditions of each road segment according to the risk those segments present to a particular resource including aquatic resources. Three aquatic risk ratings (High, Moderate, and Low) were defined in detail in Appendix C of the Hayman Road Analysis Report. A high-risk road segment has the potential for causing major or severe adverse effects on fisheries and aquatic habitat due to its location within or in close proximity to a stream channel. A moderate risk road segment has the potential for causing moderate effects that are readily apparent with the possibility of becoming a major impact due to its location. A low risk road segment has the potential for causing minor effects that are slight or negligible.

The following roads have a risk rating of **HIGH** for aquatics in the Hayman Roads Analysis Report: 200.B, 205, 205.A, 206, 210.2A, 211.A, 211.A1, 211.D, 211.D1, 211.G, 211.J, 211.M, 220, 220.A, 220.B, 221, 332, 349, 360.C, 361.A, 362.D, 366.AA, 367.1A, 522, 522.A, 525, 529, 540, 541, 544, and 560. *The total number of miles of roads that were given a HIGH rating is 59.5 miles.*

The following roads have a risk rating of **MODERATE** for aquatics in the Hayman Roads Analysis Project: 211.B, 211.C, 211.E, 211.F, 332.CA, 332.D, 340.B, 343.A, 343.A1, 343.A2, 343.B, 350.C, 352.A, 360.2C, 360.2D, 360.2E, 360.A, 360.B, 362.B, 362.C, 366.A, 366.AB, 366.B, 366.C, 366.D, 523, 523.B, 523.C, 524, 526, 558, and 560.A. *The total number of miles of roads given a MODERATE rating is 29.5 miles.*

The following roads have a risk rating of **LOW** for aquatics in the Hayman Roads Analysis Project: 207, 210, 210.2B, 211.I, 211.K, 211.L, 215, 215.A, 294, 340.C, 341.A, 341.B, 350.C, 352, 357.I, 357.J, 357.K, 357.L, 364.B, 366, 367, 367.A, 388, 391.A, 534, 535, and 536. *The total number of miles of roads given a LOW rating is 40.1 miles.*

Direct Effects Common to All Alternatives

Direct effects of roads include increased water runoff due to soil compaction, increased soil erosion and sediment production from road and ditch surfaces, increased possibility of water pollutants associated with motor vehicles entering water, and possible alteration of surface water and subsurface water flows. Furthermore, roads directly located in stream channel bottoms (*hydrologically-connected roads*) remove bank stabilizing vegetation, making fine substrate (soils) available for mobilization downstream and increasing the amount of sediment in the stream and downstream waterbodies (see also the Fisheries and Aquatics section).

Direct effects of roads also include adverse impacts to riparian areas, wetlands, and floodplains by increasing soil compaction and sediment production, altering stream morphology, mobilizing substrate materials, and altering or removing stabilizing riparian vegetation. These effects can cause higher peak water flows, which can increase the risk of flooding downstream. Many of these effects can be analyzed by determining the hydrologic connectivity of roads.

Methods used to measure hydrologic connectivity include stream channel proximity indicators. A ***hydrologically-connected road*** can be defined as any road segment that has a continuous surface flowpath to a stream channel. In other words, a hydrologically-connected road is one that has become part of the stream network. Wherever a hydrologic connection exists, accelerated water runoff, sediments and road-associated chemicals, such as oil or gasoline spills, generated on the road surface and cutslope, have a direct route to the natural channel network and surface waters (Furniss, 2000). There are about 35 miles of roads within the project area that are hydrologically-connected causing degradation of stream function, degraded water quality and increased peak flows that may alter physical channel processes. Roads that are on the Moderate and High Risk Ratings list on the previous page have some degree of hydrologic connectivity.

A field survey completed in the burn area during November 2003 of selected roads damaged by erosion yielded the following erosion data (Table 13). These roads, as well as others, that are hydrologically-connected, will continue to erode if they are not rehabilitated.

Table 13: Field survey on November 6, 7 and 10, 2003

Road Number	Total Length Surveyed in Miles	Length Eroded Material in Miles	% of Surveyed Road Eroded	Volume of Surveyed Road Material (soil) Eroded (ft^3)[1]	# of Dump Truck Loads[2]
220	7.2	4.3	60	67,970	251
220A	1.3	0.7	54	6,864	25
221	4.6	2.7	59	45,070	167
540	2.9	1.2	41	1,584	6

[1]One cubic foot (ft^3) is equal to 1 foot x 1 foot x 1 foot.
[2]One dump truck load is equal to approximately 270 cubic feet (ft^3).

The Water Influence Zone (WIZ) represents 300 feet on either side of a stream channel. The WIZ has effectively been used as a model to approximate hydrologic connectivity of roads. The union of WIZ and the roads addressed in this project, by alternative, yields the number of hydrologically-connected road miles that would be reduced in the water influence zone (see Table 14). It is assumed that, although Alternative A and Alternative B propose to close roads, there will be no reduction in hydrologic connectivity unless road decommission, road reconstruction or realignment occurs. The effects of closing roads in Alternatives C and D will be optimized with thorough decommission.

Table 14: Reduction of Classified Roads in the Water Influence Zone (WIZ)		
Alternative	**% decrease**	**Miles**
A	0.0%	0.0
B	0.0%	0.0
C	46.0%	15.4
D	58.0%	19.5

The effects of reducing the number of miles of roads in the WIZ would result in a decrease in the number of channel crossings and miles of road in or near drainages. Once closed, roads near the drainages would revegetate and reduce the bare, compacted soil that accelerates runoff and erosion. The reduction of classified roads would improve water quality in the area.

Many of the streams and tributaries are ephemeral, flowing in response to precipitation events or snowmelt. Most have flat channel bottoms, with sand or finer particles as substrate. Undisturbed ephemeral channels tend to have vegetation in the bottoms, stabilizing the substrate. Disturbed areas however, do not have vegetation, and particles are available for transport downstream. In many disturbed areas, vehicles have driven on, around and throught the stream banks removing stabilizing vegetation and causing bank erosion that contributes to higher sediment loads downstream.

Off highway vehicle (OHV) use in the project area has been increasing (see Recreation section also). The increase has contributed to the creation of many unclassified roads that are causing degradation to the soil, vegetation, and water resources because many are poorly located and are not maintained. As mentioned above, some of the hydrologically-connected classified roads are also causing degradation. The classified roads that remain open should be maintained at the prescribed maintenance level and have more frequent drainage structure maintenance to prevent degradation to the water resources especially in the aftermath of the Hayman Fire.

Indirect Effects Common to All Alternatives

Indirect effects of roads include increased sediment and bank instability which can cause sediment deposition further downstream, thus changing the channel morphology and watershed response to flood waters. When too much sediment is added to a stream system, channels that have moderate width/depth ratios and moderate sinuosity (the curvature of a stream channel) become wider and shallower. As a result, they tend to have very little habitat for aquatic life, and often exceed temperature standards for sustainable aquatic productivity (See Fisheries and Aquatics Section).

Downstream from the project area, Cheesman Reservoir and Strontia Springs Reservoir managed by Denver Water impound the Upper South Platte River. Storage capacity losses to both Strontia Springs and Cheesman Reservoirs have occurred and will continue to occur from the tremendous amount of sediment generated from erosion in the Upper South Platte Watershed (Upper South Platte Watershed Protection, 2002).

Cumulative Effects Common to All Alternatives

Changes in stream channels, sediment loads, bank stability, and loss of floodplain functionality, all have cumulative effects on overall watershed health and on water quality. In this case, the downstream water is the Upper South Platte River. Increased sediment in the Upper South Platte River can affect recreational fishing, aquatic habitat (see Fisheries and Aquatics Section), the storage capacity of Cheesman Reservoir, and the ability of downstream water users such as municipal water providers and agriculture/ranching irrigators.

Due to the effects from roads, streams have increased width, decreased depth, developed a bimodal particle size distribution unhealthy for fish productivity and increased in temperature. Streams are dynamic systems that change in response to watershed conditions. On a watershed scale, the anthropogenic or human-caused disturbances are greatly accelerated in comparison to the historical disturbance regime. Urbanization, roads, concentrated recreation use, and larger than normal fire disturbance have all caused increased peak flows. These peak flows, combined with stream banks that have been disturbed by livestock grazing, recreation, erodible soils and decreased vegetation, result in an overwidening of the channel. These shallow stream channels create an environment for elevated stream temperatures and sedimentation that often exceed required standards for water quality.

Alternatives C and D would reduce the cumulative sediment load coming out of the project area. Alternative A and Alternative B would contribute the same sediment load to the South Platte River Watershed.

Mitigations and Monitoring Common to All Alternatives

See Mitigations listed in Chapter 2 of this EA, Appendix C BMPs, and those that follow. Roads that are closed should include adequate, self-sustaining drainage, revegetation (with native plant species), and effective closures to discourage future use. Culverts and berms should be removed, if present. Channel bottoms around culverts should be checked to ensure that no headcutting occurs and to maintain the natural grade. Banks around stream crossings should be recontoured and revegetated. In perennial streams, erosion matting, or other stabilizing material, should be used to reduce sedimentation until vegetation is reestablished.

Willow and other roadside vegetation function as a buffer to trap sediment before being introduced to the stream, and serves to stabilize banks, when roads are adjacent to the streams. During road maintenance activities, willows are sometimes cut too low and eventually die, losing their function as bank stabilizers. During project implementation, roads that remain open should be maintained in such a manner that the willows are kept intact. Road management activities need to be frequently monitored to ensure that appropriate BMPs and mitigation measures are carried out.

ALTERNATIVE A – NO ACTION

Effects

Under this alternative, roads currently open would remain open and receive maintenance and rehabilitation if required (see Transportation section). All of the project roads that are currently closed to motorized vehicles would continue to be closed but not decommssioned thus potentially causing continued erosion and resource damage in the short term. In the long term however, some roads would eventually revegetate and the effects would diminish, particularly as the burn area recovers.

Since none of the hydrologically-connected roads would be decommissioned under this alternative, these roads would continue to have negative direct, indirect and cumulative effects on water quality as described in the direct, indirect and cumulative effects common to all alternatives section above. The hydrologically-connected roads would continue to cause decreased water quality, changes in stream channel and floodplain function, decreased stream bank stability, increased downstream flood potential, and increased opportunity for pollutants to enter the stream channel. Unclassified roads would not be decommissioned under this alternative and would continue causing degradation to the soil, vegetation, and water resources since many are poorly located and not maintained. Additional unclassified roads may increase under this alternative as recreationists try to gain access into areas currently closed to motorized vehicles.

Under Alternative A, there would continue to be road-derived sediment loading that impairs the Upper South Platte River Watershed. State and Federal Water Quality standards for sediment and temperature levels would not be met under this alternative.

ALTERNATIVE B – PRE-FIRE CONDITION

Effects

Alternative B would rehabilitate and reopen the majority of the roads in the burn area once the intended road maintenance level is reached. All unclassified roads would be decommissioned under this alternative. The unclassified road decommissions would decrease the amount of hydrologically-connected disturbed areas from the existing condition. The number of hydrologically-connected classified roads would not change unless roads or portions of road are relocated or realigned due to their location.

Direct/Indirect effects are those mentioned in the Direct and Indirect Effects Common to All Alternatives section above, but because of the rehabilitation and decommission of roads, the effects would be less than Alternative A.

Cumulative Effects

There would continue to be negative cumulative effects on the watershed with this alternative. The foreseeable action in the project area is the rehabilitation of currently open classified roads to achieve the pre-fire designated maintenance level and the decommission of unclassified roads. Even with a reduction in unclassified roads and the eventual rehabilitation of classified roads, many of the classified roads in the project area would continue to be hydrologically-connected to the Upper South Platte River and its tributaries and therefore the roads would continue to have a negative effect on water quality.

ALTERNATIVE C – PROPOSED ACTION

Effects

Effects are those mentioned in the Direct and Indirect Effects Common to All Alternatives section above, but because of the closure, decommission and rehabilitation of roads, the effects would be lessened considerably. Implementing the recommended mitigation measures mentioned in Chapter 2 of this EA would further reduce the undesirable effects.
Alternative C would close year-round 6 miles of classified roads and decommission or obliterate

49 miles of classified roads including 15.4 miles of hydrologically-connected roads in the burn area (see Table 14 above and Chapter 2, Table 1 for comparison of the alternatives). All unclassified roads would be decommissioned under this alternative. The unclassified road decommissions would also decrease the amount of hydrologically-connected disturbed areas in the burn area. Due to road decommission and rehabilitation that would lead to improved water quality, the effects of Alternative C would be considerably less than Alternatives A and B.

Cumulative Effects

Cumulative Effects would be the same as those identified in the "Cumulative Effects Common to All Alternatives" but would be less than Alternatives A and Alternative B (see also Fisheries and Aquatics Section). The proposed action will have a positive effect on water quality. The possible conversion of classified roads to motorized trails (Forest roads 343.B and 340.B) under this alternative would still contribute to the effects mentioned in the Direct, Indirect and Cumulative Effects Common to all Alternatives sections discussed above. The conversion of classified roads to nonmotorized trails under this alternative (last two miles of Forest road 540) should not cause any negative effects to the soil and water resources.

ALTERNATIVE D – PROPOSED ACTION PLUS ADDITIONAL ROAD CLOSURES AND DECOMMISSIONS

Effects

Effects are those mentioned in the Direct and Indirect Effects Common to All Alternatives section, but because of the closure, decommission and rehabilitation of roads, the effects would be lessened considerably. Implementing the recommended mitigation measures mentioned in Chapter 2 of this EA and Appendix C would further reduce the undesirable effects.

Alternative D would close year-round 9 miles of classified roads and decommission or obliterate 70 miles of classified roads including 19.5 miles of hydrologically-connected roads in the burn area (see Table 14 above and Chapter 2, Table 1 for comparison of the alternatives). All unclassified roads would be decommissioned under this alternative. The unclassified road decommissions would also decrease the amount of hydrologically-connected disturbed areas in the burn area. Due to road decommission and rehabilitation that would lead to improved water quality, the effects of Alternative D would be considerably less than Alternatives A and Alternative B. There would be four additional miles of hydrologically-connected roads decommissioned under this alternative compared to Alternative C, thus resulting in slightly less direct and indirect effects to soil and water resources.

Cumulative Effects

Cumulative Effects would be the same as those identified in the "Cumulative Effects Common to All Alternatives" but would be dramatically less than Alternatives A and B, and slightly less than Alternative C due to the additional road decommissions. This alternative would have the most positive effect on water quality. The proposed conversion of classified roads to nonmotorized trails under this alternative (Forest road 540 and 294) should not cause any negative effects to the soil and water resources.

Fisheries and Aquatic Habitat

Introduction/Methodology
The fisheries and aquatic habitat impact analysis focused on the sensitivities of trout to habitat changes resulting from proposed road closures, decommissioning, and improvements that may affect sediment erosion rates, riparian vegetation, and stream morphology.

Evaluation Criteria
The team that prepared the Road Analysis Report for the Hayman Fire Burn Area (USDA Forest Service, 2003a) rated the existing conditions of each road segment according to the risk those segments present to a particular resource including aquatic resources. Three aquatic risk ratings (High, Moderate, and Low) were defined in detail in Appendix C of the road analysis report. Basically, a high-risk road segment has the potential for causing major or severe adverse effects on fisheries and aquatic habitat. A moderate risk road segment has the potential for moderate effects that are readily apparent with the possibility of becoming a major impact. A low risk road segment has the potential for minor effects that are slight or negligible. The total road miles for each risk category for each alternative were compared.

For this analysis, if a moderate or high-risk road would be closed, then its risk rating was lowered by one category (e.g. high became moderate; moderate became low). Roads that are closed, but not actively rehabilitated, are expected to gradually revegetate, reducing the effects on aquatic resources. However, closed road prisms, particularly those in riparian areas, would continue to contribute sediment and encroach on stream channels over the long-term. If a moderate or high-risk road is decommissioned, then its risk rating was changed to low. Roads that are actively rehabilitated would be expected to recover to more natural conditions reducing adverse effects to a low level. If roads are maintained as is or closed roads are reopened, then the risk rating was not changed from the existing condition rating.

Overview of Road Impacts on Fisheries and Aquatic Habitat. Roads near or in natural stream channels can reduce the stream's productivity. Important impacts are associated with the 1) modification of stream morphology, 2) loss of riparian vegetation, and 3) accelerated erosion and sediment transport. Instream modifications, such as stream crossings, road fill, and embankments, can influence important habitat characteristics such as riffle/pool complexes, substrate type and composition, and cover. These physical aspects typically determine composition of the aquatic biological community, distribution of organisms, and trout spawning, nursery, feeding, and resting sites. Loss of riparian vegetation and sediment pollution from roads has been shown to reduce stream production potential for aquatic organisms. Road-stream crossings and improperly placed culverts can reduce or eliminate fish passage.

Research evidence of increased erosion and sediment delivery to streams resulting from roads is strong (USDA Forest Service, 2000b; MacDonald and Stednick, 2003). The relative effect of sediment sources on aquatic habitat depends on the amount that reaches the channel network and the size-class distribution of the sediment. Unlike erosion from burned areas, much of the sediment from roads may not be delivered to the channels. Therefore, the effect of roads on streams depends upon the extent to which the road network is connected to the stream network. Interception of subsurface flow increases runoff rate and potentially the amount of sediment that is delivered to streams. Ground cover and traffic also affect erosion rates from unpaved roads. Increased traffic can increase erosion rates by increasing the availability of fine particles, as vehicles will break down larger particles and “pump” finer particles to the surface (Luce and Black, 2001).

Road position on hillslopes affects both proximity to streams and amount of subsurface flow that is transformed to overland flow. An ongoing hillslope erosion study in and near the analysis area supports this fact. Libohova (2004) found that 90% of the roads in the Spring Creek and Saloon Gulch subwatersheds were on ridgetops, but less that 20% of these roads were directly connected to the channel network. In comparison, 80% of the roads in a nearby drainage were considered midslope, but 70% were connected to the channel network. Therefore, the effect of roads on streams depends upon the extent to which the road network is connected to the stream network.

This study also showed that the average erosion rate from road segments was 1.3 $kg/m^2/yr$. In comparison, the erosion rate from severely-burned areas in the Hayman burn area was less than 40% the erosion rate of unpaved roads. But, because the fire affected a much larger area than unpaved roads, the amount of fire-related sediment produced in the study area the first year after burning is several orders of magnitude larger than the amount of sediment from roads. Sediment production rates from severely-burned areas decrease with time as the vegetation recovers. Post-fires erosion rates in the Colorado Front Range recover to approximately background levels after 3-4 years. On the other hand, roads continue to produce sediment, although the amount will vary with road use, climatic conditions, and other factors. (Libohova, 2004).

ALTERNATIVE A: NO ACTION

Direct and Indirect Effects. Under No Action, the Forest Service would continue to manage affected roads according to existing forest road management guidelines. Roads, particularly high risk roads, would continue to adversely affect fisheries and aquatic habitat directly through physical alteration and indirectly through discharges of sediment-laden water. Road use, storm events, and spring runoff would continue to erode forest roads and cause temporary increases in suspended sediment concentrations and turbidity. Direct modification of the stream channel or increased sediment loading causes channel instability and shifting, increased bank and channel erosion, increased bed deposition, and altered streamflows.

Roads closed due to fire related issues would gradually revegetate over time, resulting in decreased sediment production and improved aquatic habitat conditions in the long-term. Stream processes may eventually reshape some closed road prisms in floodplain areas resulting in more natural stream habitat conditions.

Under the No Action alternative, 5.9% of the 166 miles of the affected roads (130 classified road miles + 36 unclassified road miles) would continue to be a high risk to aquatic resources; 51.9% would be a moderate risk; and 42.2% a low risk. Alternative A, the No Action alternative, would potentially have the second greatest impact on aquatic resources compared to the other alternatives. The following table compares the aquatic resource risks among the four alternatives.

TABLE 24: COMPARISON OF LONG-TERM AQUATIC RISK RATINGS UNDER EACH ALTERNATIVE

Alternative	High Risk Open Road Miles	Moderate Risk Open Road Miles	Low Risk Open Road Miles
A – No Action	9.8 (5.9%)	86.5 (51.9%)	70.2 (42.2%)
B – Prefire Condition	36.0 (21.6%)	90.8 (54.5%)	39.7 (23.8%)
C – Proposed Action	29.6 (17.8%)	29.0 (17.1%)	107.9 (64.8%)
D – Proposed Action plus more Road Decommissions	17.4 (10.4%)	24.1 (14.5%)	125.1 (75.1%)

ALTERNATIVE B: PRE-FIRE CONDITION

Direct and Indirect Effects. Under Alternative B, the Forest Service would repair and maintain the majority of roads that were closed due to fire and erosion damage. Road conditions would be returned to the standards they were maintained at before the fire. These roads would be reopened and use would be expected to return to pre-fire levels. Construction activities associated with repairing damaged roads, particularly in and near riparian areas and stream channels, would cause temporary short-term increases in stream sediment loading. Implementing Best Management Practices (BMPs) (FSH 2509.25, "Watershed Conservation Practices Handbook") (see Appendix C: BMP's) would help minimize the amount of sediment entering streams and impacts on aquatic habitat.

The long-term impacts of Alternative B would be greater than the No Action alternative because more than twice the miles of road (118 vs. 53 miles) would be opened to vehicle traffic. These opened roads, particularly high-risk roads, would continue to adversely affect aquatic resources directly through physical alteration and indirectly through discharges of sediment-laden water. Road use, storm events, and spring runoff would continue to erode forest roads and cause temporary increases in suspended sediment concentrations and turbidity. Direct modification of the stream channel or increased sediment loading could cause channel instability and shifting, increased bank and channel erosion, increased bed deposition, and altered streamflows.

This alternative would have the greatest risk of adverse effects on fisheries and aquatic habitat compared to the other alternatives (see Table 24 above).

ALTERNATIVE C: PROPOSED ACTION

Direct and Indirect Effects. Under the Proposed Action, the Forest Service would close, decommisison, maintain as is, or improve the maintenance level on the roads analyzed. This would reduce the overall risk of adverse effects on fisheries and aquatic habitat (see Table 24). However, some road segments would continue to adversely affect fisheries and aquatic habitat. Rehabilitation activities associated with decommissioning up to 85 miles of classified and unclassified roads, particularly in and near riparian areas and stream channels, would cause temporary short-term increases in stream sediment loading. Carrying out BMPs (see Appendix C) and the specific mitigations listed in Chapter 2 would help minimize the amount of sediment entering streams. The small increase in sediment would diminish downstream. Various studies have found that most river-dwelling fish can tolerate minor increases in sediment and turbidity for short periods (Lloyd, 1985, 1987; Newcombe and MacDonald, 1991). Thus, the proposed road decommissioning activities would have very minimal or no short-term effect on downstream aquatic habitat. If the roads are not decommissioned, but converted to other uses, such as foot trails (last two miles of Forest road 540), then there would be similar short-term impacts from activities associated with converting to other uses.

Over the long-term, decommissioning up to 85 miles of classified and unclassified road, particularly in riparian areas, to more natural conditions and removing culverts and stream crossings would have a long-term beneficial impact on downstream fish habitat. In riparian areas, streamside vegetation would recover resulting in more cover, lower water temperatures, protection against stream channel erosion, and more nutrients for aquatic and terrestrial fish food organisms. Tributary habitat would become more stable and more resilient to flood events. The proposed decommissioning of roads would have a greater beneficial impact on aquatic resources than Alternative A without decommissioned roads.

However, if some roads are converted to other uses such as hiking and/or equestrian trails, rather than decommissioned as is proposed for the last two miles of Forest road 540, then the long-term beneficial impacts would be less because some erosion and loss of riparian vegetation would still remain. Converting high or moderate risk roads to motorized trails such as Forest roads 343.B and 340.B would do little to reduce adverse effects caused by the roads and vehicle traffic. Changing to motorized trails would likely increase the use of off-highway vehicles that can cause additional soil and vegetation disturbance if users leave designated trails, particularly in riparian areas. Therefore, converting to motorized trails could potentially increase the risk of adverse impacts on aquatic resources.

The short and long-term effects of closing roads seasonally or year-round on 9.0 miles of roads and increasing maintenance on another 2.5 miles of road would help reduce erosion and stream sediment loading. Roads maintained to Forest Service standards have surfaces and drainage systems that reduce erosion and sediment runoff. This would have a beneficial impact on downstream aquatic habitat.

Continuing to maintain 72 miles of road as is would not reduce the risk of adverse impacts on aquatic resources. These roads, particularly high-risk roads, would continue to adversely affect aquatic resources directly through physical alteration and indirectly through discharges of sediment-laden water. Road use, storm events, and spring runoff would continue to erode forest roads and cause temporary increases in suspended sediment concentrations and turbidity. Direct modification of the stream channel or increased sediment loading could cause channel instability and shifting, increased bank and channel erosion, increased bed deposition, and altered streamflows.

The overall long-term consequences are improved aquatic habitat and reduced total stream sediment under the Proposed Action and therefore increased aquatic organism production and improved fisheries quality.

ALTERNATIVE D: PROPOSED ACTION PLUS MORE ROAD CLOSURES AND DECOMMISSIONS

Direct and Indirect Effects. The impacts of Alternative D on fisheries and aquatic habitat would be similar to the proposed action, except that an additional 21 miles of classified and unclassified roads would be decommissioned or converted to other uses, 13 miles would be closed seasonally or year round, and 47 miles maintained as is. If roads were converted to other uses, then they would primarily become hiking and/or equestrian trails and not motorized trails as is being proposed for Forest roads 540 and 294. Thus converting roads to other uses under Alternative D would have a greater beneficial effect on aquatic resources than the proposed action. Alternative D would have the greatest beneficial effects on fisheries and aquatic habitat compared to the other alternatives (see Table 24).

CUMULATIVE EFFECTS COMMON TO ALL ALTERNATIVES

The cumulative long and short-term effects to aquatic life are composed of influences caused by past, present, and future actions plus the effects predicted for the action alternatives. Land uses in the project area have caused long-term major modifications of the forest landscape, original stream channels, and riparian vegetation, thus altering the characteristics of water draining the analysis area. These modifications are a result of dams, water diversions, bridges, roads, trails, logging, grazing, mining, fire suppression, and homesteading. Dams, like the Cheesman Reservoir Dam, alter stream flows and temperatures, trap and reduce sediment transport, and block fish passage. Existing effects from roads not addressed by the proposed action, trails, and other development include loss of riparian vegetation, accelerated erosion, and increased sediment transport. Riparian land use and associated sediment runoff have been shown to reduce stream production potential for aquatic organisms. Although many of these past actions resulted in more sediment in the South Platte River and its tributaries, constructed reservoirs on the river trap sediment reducing downstream concentrations.

Wildfires and extreme storms drive the episodic erosion events that dominate long-term sediment yield in montane aquatic ecosystems (Kirchner et al., 2001). Therefore, human activities that alter the risk or the size of catastrophic erosion events have the greatest effect on sediment yield. The cumulative effects of past logging, grazing, and fire suppression have indirectly affected the burn severity and extent of the 2002 wildfires that have resulted in severe erosion in the analysis area. Storm events washed large quantities of sand and gravel from fire-exposed soils into the South Platte River and tributaries. This extreme sediment loading caused channel instability and shifting, increased bank erosion, and increased streambed deposition. The extreme flows and sediment also caused fish kills far downstream and damaged large areas of riparian vegetation. Sediment delivered from the burn areas is expected to adversely affect aquatic resources for several years gradually decreasing as the exposed soils and deposits revegetate and stabilize.

The cumulative long-term effects on aquatic organisms of reducing sediment from roads and improving riparian conditions by closing, decommissioning, or improving maintenance under any of the action alternatives and other concurrent burn area restoration projects would be beneficial. These actions combined with restoration efforts near the burn area to reduce the risk of catastrophic fire and thus reduce the potential for catastrophic sediment delivery over the long-term will likely have a major cumulative benefit to the aquatic ecosystem in the South Platte River watershed. Among alternatives, C and D permanently close and decommission the most roads and thus have the greatest beneficial cumulative effects. Under alternative B, most classified roads would be reopened and none decommissioned, resulting in adverse effects that would reduce the overall cumulative benefits when combined with the current burn area restoration (BAER) efforts.

MITIGATION AND MONITORING

The Forest Service would apply BMPs (Appendix C) to proposed road management activities to reduce potential sediment yield and impacts to aquatic habitat and fisheries. Activities would be monitored to ensure that appropriate BMPs are carried out.

Wildlife

The anticipated effects of the no action and action alternatives for the Hayman Roads Management Project on wildlife species and their habitats are described below. All references used for the analysis below are documented in Appendix H: Bibliography and at the end of the Wildlife Specialist Report found in the Hayman Project Record.

MANAGEMENT INDICATOR SPECIES (MIS)

Management Indicator Species (MIS) are representative species selected to assess the effects of management activities on the habitats and populations of the MIS and similar species that they may represent (FSM 2620.5). MIS are evaluated and monitored to help demonstrate that a Forest Plan is providing for viable populations since their populations are believed to indicate the effects of management activities for other similar species. The general Forest-wide objectives for MIS on the Pike and San Isabel National Forests are as follows:

- Maintain habitat for viable populations of all existing vertebrate wildlife species.
- Provide for the habitat needs of management indicator species on the National Forests.
- Use both commercial and noncommercial silvicultural practices to accomplish habitat objectives.

Project-level MIS may be selected from all or a subset of the Forest-wide MIS if they have habitat present in the project area and their abundance is expected to be influenced by the management activity (USDA Forest Service, 2004d). Species should not be selected for project-level MIS analysis if abundance is assumed to be influenced by other factors. The following is the list of terrestrial MIS for the Pike and San Isabel National Forests, their general habitat relationships, and the rationale for selection or non-selection regarding effects that may be associated with the Hayman Burn Area Roads Management Project.

Table 16: Management Indicator Species for the Pike/San Isabel National Forests

Species Name	Suitable habitat	Selected For Project-Level Analysis?	Rationale For Selection or Non-Selection
Abert's Squirrel *(Sciurus aberti)*	Live, mature ponderosa pine forest	No	Habitat and populations present in the analysis area but will no significant influences expected by changes in road density. Abundance primarily related to other habitat features.
Mule Deer *(Odocoileus hemionus)*	Inhabits montane to subapline forests, shrublands, and openings	Yes	Habitat and populations present in the analysis area and can be influenced by changes in road density.
Elk *(Cervus elaphus)*	Inhabits montane to subapline forests, alpine, riparian areas and openings	Yes	Habitat and populations present in the analysis area and can be influenced by changes in road density.
Beaver *(Castor Canadensis)*	Inhabits riparian areas with deciduous forests and/or willows	Yes	Habitat and populations present in the analysis area and can be indirectly influenced by changes in road density.
Peregrine Falcon *(Falco peregrinus)*	Nests on predominant rock, hunts wetland habitats	No	Peregrine flacons are not present in the project area. Rocky outcrops/cliffs and wetlands will not be affected by the project activities
Wilson's Warbler *(Wilsonia pusilla)*	Nests and forages in dense willow thickets and riparian areas	Yes	Habitat and populations present in the analysis area and can be indirectly influenced by changes in road density.
Mallard *(Anas platyrhynchos)*	Inhabits streams, ponds, lakes, and riparian areas	No	Habitat and populations present in the analysis area but will not be significantly influenced by changes in road density. Abundance primarily related to other habitat features.
Three-toed Woodpecker *(Picoides tridactylus)*	Inhabits recently burned forests, coniferous forests	No	Habitat and populations present in analysis area but will not be significantly influenced by changes in road density. *Analyzed as a Sensitive Species*
Red-naped Sapsucker *(Sphyrapicus nuchalis)*	Strongly associated with mature aspen woodlands	No	Habitat present in analysis area but will not be significantly influenced by changes in road density. Abundance primarily related to other habitat features.
Lewis's Woodpecker *(Melanerpes lewis)*	Inhabits mature cottonwood stands and riparian, open forests and burned over areas.	No	Habitat and populations present in analysis area but will not be significantly influenced by changes in road density. *Analyzed as a Sensitive Species*

Wild Turkey *(Melegris gallopavo)*	Inhabits open forests, foraging on seeds, nuts, and insects. Roost in live, large trees at night	No	Habitat and populations present in analysis area but will not be significantly influenced by changes in road density. Abundance primarily related to other habitat features.
Mountain Bluebird *(Sialia currucoides)*	Inhabits open forests near meadows, forest edges; cavity nester	No	Habitat and populations present in analysis area but will not be significantly influenced by changes in road density. Abundance primarily related to other habitat features.
Green-tailed Towhee *(Pipilo chlorurus)*	Inhabits dry, shrubby hillsides and sagebrush flats	No	Habitat and populations present in analysis area but will not be significantly influenced by changes in road density. Abundance primarily related to other habitat features.

Analysis of the selected MIS for the Hayman Roads Management project is described as follows:

MULE DEER

Purpose as a MIS: The Forest Plan Final Environmental Impact Statement (FEIS) indicates that mule deer were selected as a management indicator species on the Pike and San Isabel National Forest because: 1) the public has a high concern for this species and its habitat, and 2) the public has a high interest for hunting and viewing.

Current Habitat Status and Trends: The Colorado Division of Wildlife (CDOW) manages for herds of big game animals within distinctive boundaries referred to as Data Analysis Units (DAUs). These DAUs are geographically discrete and contain distinct herd aggregations which are managed to support and accomplish big game population objectives. The Hayman Fire area is split between the northeast and southeast regions of the CDOW and includes several DAUs and numerous Game Management Units (GMUs) from which populations are tracked. Deer DAU D-17 and D-38 occur in the northeast region, while DAU D-50 occurs in the southeast region. The Hayman Fire represents only a small portion of these DAUs. For example, DAU D-17 encompass GMU 51, 39, 391, 46, and 461, DAU D-38 encompasses GMU 50 and 501, and DAU D-50 encompasses GMU 59, 511, 581, and 591. The Hayman fire affected four GMUs within the three deer DAUs. GMU 51, 501 and 511 were heavily influenced by the fire while GMU 50 was lightly influenced (150 acres).

The habitat condition within the deer DAUs varies due the large amounts of area they encompass. However, increases in deer use is suspected in past fire areas within the DAUs and a similar response is expected in the Hayman Fire area (George, pers. comm., 2004). Cover may be a limiting factor in some areas since it was eliminated or reduced on approximately 50 percent of the Hayman Fire area. Areas influenced by severe-intensity fire may be unable to meet the Forest Plan cover conditions for many decades to come. The influence of open roads may therefore be greatest where cover and topography is most limiting.

Current Population Status and Trends: Mule deer populations vary in relationship to their management objectives (MOs) within the DAUs that were influenced by the Hayman Fire. This is because the Hayman Fire represents a very small portion of the DAUs and may therefore not be a primary influence on the overall structure of local deer populations (J. George, pers. comm., 2004). For example, the 2003 post-harvest population for mule deer in D-17 is approximately 8,400 animals, which is about 20% below the MO of 10,500. However, the 2003 post-harvest population for mule deer in D-38 is approximately 3,000 animals, which is about 22% above the M.O. In the southeast region, deer populations are at or perhaps slightly above the M.O. of 3000 animals. This variation suggests that several factors may influence deer populations in the Hayman area, and that habitat and population management on National Forest Systems land may be complicated by management boundaries between the CDOW regions and the various DAUs and GMUs within the fire area.

Discussions with the CDOW indicate that roads are not a particular habitat concern within the Hayman Fire area from a deer perspective; however, off-road vehicle use is expressed as a concern (George, pers. comm., 2004, Davies, pers. comm., 2004). Although open roads may influence habitat use and behavior, deer populations are expected to increase due to favorable habitat conditions created by the fire.

Effects of Alternatives

The Pike/San Isabel National Forest uses Diversity Units (DU) as the primary scale at which attain habitat objectives for big game species such as deer and elk. Diversity Units are small geographic areas of one to several thousands of acres that may overlap different Management Areas. There are 26 Diversity Units that occur within the project area.

The focus of this analysis will be concentrated on the designated big game winter range within the project area (Management Area 5B). Opportunities for state-mapped winter and summer range will also be discussed where applicable between the alternatives.

Alternative A (No Action) Direct/Indirect Effects

Winter Range (MA 5B)

Designated winter range for big game occurs on roughly 2% of the project area and is primarily encompassed by Diversity Unit 508, with portions of DU 507 and 509 included. Both deer and elk are particularly susceptible to human disturbances on winter range areas, and may negatively respond to minimal open road densities. In the Hayman Fire Area, however, there are few roads which access the designated winter range area, and few opportunities to improve habitat conditions through road closures. There are few roads which access this area under all alternatives.

The winter Habitat Capability Index for deer in Diversity Unit 508 is currently at 0.39, and there is no capability of meeting the minimum recommended habitat capability potential in the post-fire condition even if all roads were closed. However, improvements can still be made by considering Forest Service Road (FSR) 367 (Chestnut), 522 (Bell Rock SH), 522A (Bell Rock Spur), 523 (Nine-J), and 524 (Upper Turkey Creek) for additional closures that address the period of winter use (generally October 1- March 31). Improvements on state-designated winter range can be made by considering FSR 350C (Anita) for closure during the same timeframes.

Summer Range
Deer summer range as mapped by the CDOW occurs throughout the Hayman Fire area. Based on the model runs conducted by the Hayman Fire Team, approximately 98% of this area currently meets the minimum Forest Plan habitat capability recommendations. However, there are opportunities to improve summer habitat to meet the minimum recommended habitat capability potential for deer in five Diversity Units (DUs) through additional road closures. Two of these five DUs (DU 918 and 925) have no roads included in the project alternatives, and will therefore remain below the Forest Plan minimums until cover regeneration occurs. However, improvements can be made in the remaining three DUs by considering FSR 332 (Laura Lane), 357.I (Dycks Drive), and 357.J (Lost) for year-round closure. Of these, the latter two may be considered the most effective due to the mileage involved. There is also potential for considerable improvement in and around Manitou Experimental Forest, just to the east of the project area.

Approximately 53 miles (41%) of the 130 miles of classified roads addressed by this project would remain open, with no roads closed on a seasonal basis. This would result in about 183 miles of open road maintained within the Hayman Fire area, and an average open road density of about 0.85 miles per square mile. Overall, this amount of average open road density is expected to have minimal influences on deer summer range based on the assumption that deer response to motor vehicles is similar to elk (Thomas et al., 1988).

<u>Alternative B: Direct/Indirect Effects</u>

Winter Range (MA 5B)
Approximately 2.5 miles of unclassified road that accesses designated big game winter range would be decommissioned in Alternative B. This has the potential to increase the amount of area that can effectively used by mule deer during the period of use. However, Alternative B has the greatest potential for negative influences on non-designated winter range since it maintains the highest open road density.

There is no change in the Habitat Capability Index for Diversity Units 507 and 508 from the existing condition (Alternative A). In DU 507, however, Alternative B does maintain an open road condition on FSR 522.A (Bell Rock Spur) and 524 (Upper Turkey Creek), which are closed in the other action alternatives. In DU 508, FSR 526 (Turkey Creek) is also reopened. Alternative B reopens or maintains an open condition on several roads in Diversity Unit 509, and results in a decrease in habitat capability of 1% from 0.47 to 0.46 due to the additional influences on mule deer.

Summer Range
Approximately 118 miles (91%) of the 130 miles of classified roads addressed by this project would remain open in Alternative B, with no roads closed on a seasonal basis. This would result in about 248 miles of open road maintained within the Hayman Fire area, and an average open road density of about 1.15 miles per square mile. All unclassified roads would be

decommissioned. Alternative B has the potential to reduce the amount of summer habitat that is modified by open roads by about 6 %. Alternative B does not offer any additional habitat benefits within the five Diversity Units that do not meet the minimum habitat capability recommendations for deer summer range.

Alternative C: Direct/Indirect Effects

Winter Range (MA 5B)
Approximately 2.5 miles of unclassified road that accesses designated big game winter range would be decommissioned in Alternative C. This effect is expected to be similar to Alternative B and has the potential to increase the amount of area that can effectively used by wintering mule deer. Alternative C decreases the potential for negative influences on non-designated winter range since it reduces open road densities.

There is no change in the Habitat Capability Index for Diversity Units 507 and 508 from the existing condition (Alternative A). In DU 507, however, approximately 0.3 miles of road (FSR 522.A and 524) would be closed that are scheduled to remain open in Alternatives A and B. In DU 508, Alternative C also decommissions about 3.3 miles of road (FSR 526) that would remain open in Alternatives A and B. In DU 509, Alternative C closes approximately 7.6 miles of road that is scheduled to remain open in Alternative B. However, the difference in road closure mileage does not change the Habitat Capability Index from Alternative B, and it decreases by 1% over the existing condition due to additional open roads.

Summer Range
Approximately 72 miles (57%) of the 130 miles of classified roads addressed by this project would remain open in Alternative C, with an additional three miles of road opened on a seasonal basis. This would result in about 205 miles of open road maintained within the Hayman Fire area, and an average open road density of about 0.95 miles per square mile (excluding the roads opened seasonally). All unclassified roads would be decommissioned. Alternative C has the potential to reduce the amount of habitat that may be negatively influenced by open roads by about 4 % over Alternative A and 2% over Alternative B.

Alternative C does not offer any additional measurable habitat benefits within the five Diversity Units that do not meet the minimum habitat capability recommendations for deer summer range. However, Alternative C does close FSR 357.I (Dycks Drive), and therefore provides additional habitat protection above Alternative B by reducing summer range road mileage by about 0.55 miles.

Alternative D: Direct/Indirect Effects

Winter Range (MA 5B)
Approximately 2.5 miles of unclassified road that accesses designated big game winter range would be decommissioned in Alternative D. This effect is expected to be similar to Alternative B and C and has the potential to increase the amount of area that can effectively be used by wintering mule deer. Alternative D offers the greatest potential for a decrease in negative influences on non-designated winter range since it maintains the lowest open road densities.

There is no change in the Habitat Capability Index for Diversity Units 507 and 508 from the existing condition (Alternative A). As in Alternative C, however, Alternative D reduces the amount of open roads in DU 507 by approximately 0.3 miles (FSR 522.A and 524) above Alternative B. In DU 508, Alternative D would decommission about 3.3 road miles (FSR 526) that would remain open in Alternatives A and B. In DU 509, the Habitat Capability Index increases by 1% over Alternatives B and C due to several additional road closures and equals the habitat protections offered by the existing condition (Alternative A).

Summer Range
Approximately 47 miles (38%) of the 130 miles of classified roads addressed by this project would remain open in Alternative D, with an additional four miles of road opened on a seasonal basis. This would result in about 181 miles of open road maintained within the Hayman Fire area, and an average open road density of about 0.84 miles per square mile (excluding the roads opened seasonally). All unclassified roads would be decommissioned. There would be no measurable change in the amount of habitat that is modified by open roads from Alternative A.

Alternative D does not offer any additional habitat benefits within the five Diversity Units that do not meet the minimum habitat capability recommendations for deer summer range. As in Alternative C, however, Alternative D closes FSR 357.I and therefore provides additional habitat protection above Alternative B by reducing summer range road mileage by about 0.55 miles.

Effects on Populations and Cumulative Effects
Correlations between population changes and changes in habitat effectiveness values cannot be made since habitat models do not include all of the factors that may affect populations (USDA Forest Service, 1994, Thomas et al., 1988). Although deer do respond to various open road densities, their response may differ from that described for elk (Gay, 1998). It should also be noted that these responses apply to the non-hunting seasons, and does not apply to habitat use during the hunting seasons. This is because habitat effectiveness is related to the ability of a given area to provide the resources needed for growth and survival and the animal’s ability to fully utilize them. These relationships are vastly altered during the hunting season since most animals seek more escape cover due to vulnerability issues.

Deer populations in and the around the Hayman Fire area fluctuate within the DAUs but are not experiencing the consistent declines noted elsewhere in much of Colorado. Mule deer populations that use and migrate between the DAUs within the vicinity of the project area are expected to respond favorably to post-fire conditions and increase over time (Davies, pers. comm., 2004). These conditions will most likely continue for one or two decades after the fire. Use of available habitat by mule deer may be negatively influenced by Alternative B and neutral with alternatives A, C, and D. However, all alternatives are anticipated to have neutral effects on mule deer populations and/or habitat conditions on a Forest-wide scale due to the small amount of area involved. Alternatives A, C, and D best contribute to the Forest Plan objectives for mule deer by maintaining lower open road densities than those that were present in the pre-fire condition. Alternative B offers the highest potential for negative influences on Forest Plan objectives for mule deer due to the loss of cover resulting from the Hayman Fire.

ELK

Purpose as a MIS: The Forest Plan FEIS indicates that elk were selected as a management indicator species on Pike/San Isabel National Forests because: 1) the public has a high concern for this species and its habitat, and 2) the public has a high interest for hunting and viewing. The Forest Plan also established general direction to establish elk on sites that can supply the habitat needs of the species and the population levels and distribution agreed to with the states.

Current Habitat Status and Trends: As in deer, populations of elk are managed by the CDOW primarily through hunting regulations. The Data Analysis Units (DAUs) for elk within the Hayman Fire area are also split between the northeast and southeast regions of the CDOW and may or may not overlap with deer DAUs. Numerous Game Management Units (GMUs) are also included within the elk DAUs. Elk DAU E-51 and E-18 occur in the northeast region, while DAU E-23 occurs in the southeast region. As with deer, the Hayman Fire represents only a small portion of these DAUs. In the northeast region, DAU E-51 encompasses GMU 51, 104, 105, 106, 110, and 111 while E-18 includes GMU 50, 500 and 501. In the southeast region, DAU E-23 follows the same boundary as defined for deer and encompasses GMU 59, 511, 581, and 591. GMU 51, 501 and 511 were heavily influenced by the fire while GMU 50 was lightly influenced (150 acres).

Habitat conditions within the elk DAUs varies due the large amount of area they encompass. Increases in tree density and cover has been a common trend throughout the Hayman area during post-settlement times (Romme et al., 2003b). Decreases in forage condition and availability are inversely related to the increases in tree canopy cover (Thomas, 1979). However, the potential decrease in foraging habitat has apparently not influenced elk populations since they are increasing throughout Colorado as well as within the area surrounding the Hayman Fire (Davies, pers. comm., 2004).

The designated winter range area discussed previously for deer is also intended to provide for the winter needs of elk. Forest Plan winter range (MA 5B) covers about 2.3% of the project area (2,993 ac.).

Current Population Status and Trends: Global and Colorado elk populations are known to be increasing (COVERS, 2001) and they remain widespread throughout northern United States and southern Canada. All elk populations in the Hayman area are above the state Management Objective (M.O.). In the northeast region, the 2003 post-hunting population for E-51 was estimated at 1,750 animals, which is approximately 46% above the M.O. of 1,200. The 2003 population for E-18 was 1,680 animals, which is about 10% above the M.O. of 1,530. Elk in the southern portion of the Hayman area number about 1,550 animals, which is about 32% above the M.O. of 1,180.

<u>Effects of Alternatives</u>
The focus of this analysis for elk will also be concentrated on the designated big game winter range within the project area (Management Area 5B). Opportunities for state-mapped winter and summer range will also be discussed where applicable between the alternatives.

Alternative A (No Action)   Direct/Indirect Effects

Winter Range (MA 5B)

The designated winter range discussed for mule deer also applies to elk. There are few roads which access this area, and few opportunities to improve habitat conditions through road closures.

The winter Habitat Capability Index for elk in Diversity Units 508 and 509 is currently at 0.35, and there is no capability of meeting the minimum recommended habitat capability potential in the post-fire condition of either DU even if all roads were closed. The Habitat Capability Index for Diversity Unit 507 is 0.41, and there are opportunities to meet the minimums through additional road closures. Roads addressed in this analysis that would benefit elk winter range include FSR 367 (Chestnut), FSR 522 (Bell Rock SH), 522A (Bell Rock Spur), 523 (Nine-J), and 524 (Upper Turkey Creek). Improvements on state-designated winter range can be made by considering FSR 350C (Anita) for closure during the same timeframes.

Summer Range

Elk summer range as mapped by the CDOW occurs primarily in the southwest portion of the Hayman Fire area. Based on the model runs conducted by the Hayman Fire Team, approximately 38% of the project area is not capable of meeting the minimum Forest Plan habitat capability recommendations due to the post-fire conditions. Potential habitat improvement from road closures is possible on 12 Diversity Units that occur within the project area. These roads include FSR 200.B (Emily Camp), 205 (Metberry), 205.A (Deer Meadow), 210 (Platte Springs), 210.2A (Shortcut), 210.2B (Lioness), 211.A (Stage Stop), 211.A1 (Stage Stop Spur), 211.B (Lentinus), 211.C (Deceptive), 211.D (Magilla Gorilla), 211.D1 (Alley Oop), 211.F (Iris), 211.G (Old Matukat Rd), 211.I (Lost Valley Cutoff), 211.J (Goose Crk CG), 211.K (Helen's Rock), 211.L (Helen's Rock Spur), 211.M (Molly Gulch CG), 215 (Preserve), 215.A (Preserve Spur), 220 (Hackett), 220.A (Crossover), 220.B (Widow Maker), 221 (Longwater), 294 (Approach), 340.B (What), 340.C (Whitney Way), 343.A (Turkey Track Spur N), 343.A2 (Hunting), 343.B (Turkey Track Spur S), 357.K (Elvis), 357.L (Camp), 360.A (Cedar Mtn. Spur), 360.C (Big Turkey CG), 360.2C (Pilgrim), 360.2D (Lutheran), 360.2E (Quartz), 366 (No Name), 366.A (No Name Spur), 366.AA (Bull Elk), 366.AB (Cow Elk), 366.B (Nice Bull), 366.C (Spike Bull), 366.D (Little Crk), 367 (Chestnut), 367.1A (Taylor Spur), 367.A (Chestnut Spur), 535 (Brush Crk), 540 (Corral Crk), 544 (Cabin Crk), and 558 (Goose Crk Trailhead).

Alternative A maintains an existing open road density of about 0.85 miles per square mile. As in deer, this amount of average open road density does not have much influence on elk summer range. Effects on elk summer range primarily become a concern when road densities approach about 1.5 miles per square mile (Thomas et al., 1988).

Action Alternatives: Alternative B, C, and D: Direct/Indirect Effects

The anticipated effects of each action alternative are anticipated to be similar to mule deer and are not repeated here for each alternative. The existing habitat conditions for elk are modified by open roads by about 30% in Alternative A, 36% in Alternative B, 34% in Alternative C, and 30% in Alternative D. Alternative A, C, and D reduce road influences in 9 of the 12 Diversity Units where habitat improvements are possible. Alternative B does not provide any benefit toward meeting the minimum habitat capability recommendations in any of the 12 Diversity Units.

Alternative A and D provide the highest potential for reducing the negative influences of roads in all Diversity Units where improvement is possible, while Alternative C offers a moderate amount of improvement on potential habitat.

There are no mapped elk calving areas in the Hayman Fire Area, and therefore no affect on these areas from any of the alternatives.

Effects on Populations and Cumulative Effects

As with deer, correlations between changes in habitat effectiveness values and populations cannot be made since the models do not include all of the factors that may affect populations (USDA Forest Service, 1994, Thomas et al., 1988). However, there is a considerable amount of information concerning road effects on elk (Thomas, 1979, Thomas et al., 1988, Wisdom et al., 2004). These effects are most profound on winter range areas when energy expenditures may be high. Elk also display a strong response to motor vehicles during the hunting season when the amount of open roads may contribute directly to their vulnerability (Hayes et al., 2002). Thus, the relationships between cover needs and open road density are vastly altered during the hunting season.

Elk populations within the Hayman Fire area and Colorado as a whole are increasing and exceed the management objectives established by the CDOW. Thus, all alternatives in the Hayman Burn Travel Management project are expected to have little influence on overall elk populations on the Forest or influence their population and habitat trends. However, those alternatives that maintain the most amount of open road (Alternative B) may assist the state in reducing populations within the local elk DAUs since vulnerability may be increased.

Table 17: Summary of Effects on Diversity Units that Contain Designated Big Game Winter Range

Species	Diversity Unit	Season	**Habitat Capability Index**			
			Alt A	**Alt B**	**Alt C**	**Alt D**
Deer	508*	Winter	0.39	0.39	0.39	0.39
Deer	507	Winter	0.54	0.54	0.54	0.54
Deer	509	Winter	0.47	0.46	0.46	0.47
Elk	508*	Winter	0.35	0.35	0.35	0.35
Elk	507	Winter	0.41	0.41	0.41	0.41
Elk	509	Winter	0.43	0.35	0.42	0.43

Diversity Unit 507 maintains an average open road density of 1.69 miles per square mile for all alternatives. Diversity Unit 508 maintains an average open road density of 1.68 miles per square mile for all alternatives. Diversity Unit 509 maintains an average open road density of 1.41 miles per square mile in Alternative A, 1.56 in Alternatives B and C, and 1.49 in Alternative D.

BEAVER

Purpose as a MIS: The Forest Plan FEIS indicates that beaver was selected as a Management Indicator Species because: 1) the public has a high concern for this species and its habitat, and 2) the public has a high interest for hunting and viewing.

Current Habitat Status and Trends: Human-induced impacts on beaver populations and the habitat conditions that support them had most likely occurred along the Front Range of Colorado and within the stream systems in the Hayman Fire prior to the burn (Decker et al., 2003). The effects of the Hayman Fire on beaver habitat most likely varied depending upon the burn severity in each particular watershed and riparian area. In some cases, the vegetation along streams was completely burned while other streams were minimally affected.

It is possible that some beaver colonies may have been locally extirpated by the Hayman Fire since fish kills did occur in some of the more severely burned areas. In some cases, post-fire storm events also deposited large amounts of ash and sediment into existing beaver ponds (Kershner et al., 2003). However, fire occurring in riparian areas often benefits beaver populations since they are adapted to the early stages of forest succession (Kellyhouse, 1979). Quaking aspen, willows, and other prime beaver food all sprout vigorously after fire and are expected to recover quickly in the Hayman Fire (Romme et al., 2003c). Approximately 84% of the stream miles within the Hayman Fire area have gradients that are conducive to beaver establishment. Of this, 26% was aspen dominated an additional 19% was riparian shrub dominated (Decker et al., 2003). In general, the five-year period following a major wildfire is one of transition for aquatic systems (Kershner et al., 2003). Habitat conditions for beaver are expected to recover and improve quickly but will also be dependent upon burn severity, anthropogenic (human) influences, and other factors.

Current Population Status and Trends: Global beaver populations are suspected to be stable or increasing. Beaver populations in North America are increasing rapidly but still represent a small fraction of their historical numbers (Naiman et al., 1988). Colorado beaver populations have experienced declines, but are thought to be stable (COVERS, 2001).

Population estimates for beaver in Colorado are available through trapping records (Fitzgerald, 1994). However, the harvest in Colorado varies with 8,448 beavers harvested in 1985, 3,020 in 1991, and 2,396 in 1996. This decline is attributed to reduced market value of beaver and the fact that most beaver trapping ended in Colorado after Amendment 14 was passed in November 1996 (Tapia, 2003). It is therefore difficult to discern a population trend for beaver in Colorado based on harvest data. Beaver harvests between 1987 and 1996 for the 13 counties that encompass Pike and San Isabel National Forests also do not display any population trends.

The current beaver population in the Hayman Fire area is unknown and impossible to attain at the present time. However, an assessment of potential influences on local beaver populations can still be achieved given the current habitat conditions, known stream gradients and potential habitat areas, and the scientific literature concerning their responses to post-fire conditions and roads/human influences.

<u>Alternative A (No Action): Direct/Indirect Effects</u>

Direct Effects*:* Approximately 53 miles (41%) of the 130 miles of classified roads addressed by this project would remain open under Alternative A, with no roads closed on a seasonal basis. This would result in about 183 miles of open road maintained within the Hayman Fire area, and an average open road density of about 0.85 miles per square mile.

Approximately 17.3 miles (13%) of the 130 miles of classified roads addressed in this analysis occur within or border potential riparian habitat for beaver. Approximately 12.2 miles (71%) of this is currently closed in the post-fire condition, and would remain closed under Alternative A. Potential direct effects on habitat are therefore expected to be substantially decreased in Alternative A.

Indirect Effects*:* The primary indirect threat to beaver in relationship to roads is most likely related to the influences on hydrology and stream function and to disturbances from humans. Although the risk is not totally eliminated, Alternative A offers the third-highest potential for reducing indirect effects on stream systems and providing security habitat to beaver.

Effects on Populations*:* Beaver populations are expected to recover following the Hayman Fire. Alternative A provides an opportunity for populations to expand and make use of new food supplies with minimal human disturbance since much of the Upper South Platte drainage will remain inaccessible.

<u>Alternative B: Direct/Indirect Effects</u>

Direct Effects*:* Approximately 118 miles (91%) of the 130 miles of classified roads addressed by this project would remain open in Alternative B, with no roads closed on a seasonal basis. This would result in about 248 miles of open road maintained within the Hayman Fire area, and an average open road density of about 1.15 miles per square mile. All unclassified roads would be closed and decommissioned.

The majority of the classified roads addressed in this analysis that occur within or border potential riparian habitat that could be recolonized by beaver would remain open in Alternative B, with approximately 1.5 miles (9%) of road remaining closed. Therefore, direct effects on beaver from access into riparian areas may be associated with Alternative B.

Indirect Effects*:* It is anticipated that Alternative B may offer the highest risk of further altering the hydrologic function of the project area due to the high amount of road that will need to be rehabilitated, reconstructed and maintained over the long-term. Indirect effects from disturbances may also be highest with Alternative B.

Effects on Populations*:* Beaver populations are expected to recover in the Hayman Fire Area under all alternatives due a flush in food supplies. However, Alternative B may provide the greatest risk of influencing current populations and/or their expansion into unoccupied habitats due to problems that may be encountered with increased human access and roads.

<u>Alternative C: Direct/Indirect Effects</u>

***Direct Effects**:* Approximately 72 miles (57%) of the 130 miles of classified roads addressed by this project would remain open in Alternative C, with an additional three miles of road opened on a seasonal basis. This would result in about 205 miles of open road maintained within the Hayman Fire area, and an average open road density of about 0.95 miles per square mile (excluding the roads opened seasonally). All unclassified roads would be decommissioned.

Approximately 9.8 miles (56%) of the roads that occur within or border potential riparian habitat for beaver would remain closed under Alternative C, with an additional 0.4 miles of seasonal closures. The majority of these roads (8.2 miles or 84%) would be decommissioned or converted to other uses. Alternative C is therefore anticipated to have moderate overall habitat benefits for beaver.

***Indirect Effects**:* Alternative C is the outcome of an in-depth evaluation of roads developed through the Hayman Roads Analysis Report (RAP). The objective of the RAP is to identify and manage a road system that is safe, environmentally sound, responsive to public and agency needs, and affordable and efficient to manage (USDA Forest Service, 2003a). Therefore, although Alternative C closes and/or maintains a road amount that is moderate between the other action alternatives, it also identifies and takes action on many of the roads considered to be problematic to water quality, riparian habitats, and other environmental values. It is therefore anticipated that Alternative C will offer considerable benefits to the hydrologic function of riparian areas and also lessen the potential for the human influences on beaver habitat and populations.

***Effects on Populations**:* Alternative C provides an opportunity for beaver populations to make use of existing habitats with minimal human influence and/or to expand into unoccupied habitats and exploit new food supplies without incurring additional human disturbance since portions of the Upper South Platte drainage will remain inaccessible. Disturbance factors and/or conflicts with humans are expected to be less than Alternative B, and similar to Alternatives A and D.

Alternative D: Direct/Indirect Effects

***Direct Effects**:* Approximately 47 miles (38%) of the 130 miles of classified roads addressed by this project would remain open in Alternative D, with an additional four miles of road opened on a seasonal basis. This would result in about 181 miles of open road maintained within the Hayman Fire area, and an average open road density of about 0.84 miles per square mile (excluding the roads opened seasonally). All unclassified roads would be decommissioned.

Approximately 11.1 miles (64%) of the roads that occur within or border potential riparian habitat for the beaver would remain closed under Alternative D, with an additional 0.4 miles of seasonal closures. A large majority of these roads (9.5 miles or 86%) would be decommissioned or converted to other uses. This is similar to Alternative C, although some additional benefits may be represented over time since an additional 1.3 miles of roads would remain closed.

***Indirect Effects**:* Alternative D maintains the least amount of open road and therefore is expected to provide the greatest potential indirect benefits to beaver. Additional roads that access potential habitat in the upper South Platte River corridor would remain closed and may facilitate greater expansion of existing colonies.

Effects on Populations and Cumulative Effects: Beaver populations have been substantially reduced across North America and Colorado. However, existing beaver colonies in the project area are expected to flourish and expand due to a flush of new food supplies associated with the Hayman Fire. Beaver populations will continue to be controlled and managed as needed in areas where their activities conflict with humans. Roads adjacent to riparian systems sometimes represent a key conflict area. Alternatives A, C, and D are therefore expected to have neutral or perhaps positive effects on beaver since they reduce the amount of road adjacent to riparian areas above the pre-fire condition and maintain them at or near the existing condition. Alternative B may offer negative influences on beaver since it reestablishes open road densities to the pre-fire condition and permits a considerably greater access to key riparian systems such as the Upper South Platte River. However, all alternatives in the Hayman Burn Roads Management project are expected to have little influence on overall beaver populations on the Forest or influence their current population and habitat trends.

WILSON'S WARBLER

Purpose as a MIS: The Forest Plan selected Wilson's warbler as an ecological indicator in high elevation riparian habitat. It is considered common (observations of 5 individuals per day in suitable habitat). The Forest Plan does not provide specific population objectives, however General Direction is to "provide for the habitat needs of MIS on the Forest and maintain that habitat at 40% or more of potential"

Current Habitat Status and Trends: The willow communities preferred by the Wilson's warbler occupy a very small portion of the landbase that is primarily restricted to floodplain areas associated with mountain streams, rivers, and other wetlands. The extent of these communities are highly influenced by landform and stream channel types, with valley bottoms often promoting larger and more complex willow systems (Hudak and Ketcheson, 1992). Disturbance factors such as floods and stream dynamics are important to the health and maintenance of many willow communities (Winward, 2000). Where they occur, however, beaver play a dominant role in the development of riparian shrub communities and can therefore also be benecifical to Wilson's warbler (Olson and Hubert, 1994, Johnson and Anderson, 2003).

Riparian zones represent one of the most heavily altered habitats throughout the western United States, and the numerous human pressures placed upon them are well documented (Clary and McArthur, 1992, Krueper, 1992, Bock et al., 1992). Human pressures may be similar on the Pike/San Isabel National Forest since riparian zones represent one of the most heavily used and visited area on the Forest (USDA Forest Service, 1984).

Current Population Status and Trends: Breeding Bird Surveys (BBS) provide a continent-wide perspective on bird population changes by producing indices of relative abundance. BBS Routes are conducted throughout North America during the peak of the breeding season along established road routes and data analyses assume that fluctuations in abundance indices are representative of the entire population (Sauer et al., 2003). However, these data should be interpreted with caution since local trends are difficult to interpret and may differ from trends at larger BBS scales. The most current BBS data (1966-2002) for the Wilson's warbler is displayed below in Table 18 in progressively smaller scales of analysis.

Table 18: BBS trend data for the Wilson's Warbler from 1966-2002. The Pike/San Isabel National Forest is included in the Southern Rockies analysis area.

Wilson's Warbler Area	Trend Estimate (%) (1966-2002)	P Value	N (# of Routes)	Variance	Relative Abundance
Continental	-1.2	0.01	511	0.23	1.56
Western BBS Region	-1.4	0.00	407	0.22	2.41
AZ, NM, UT, CO	-4.33	0.13	49	7.73	1.37
Colorado	-4.4	0.13	43	7.80	1.30
Southern Rockies	-4.9	0.10	41	9.0	2.66

The BBS trend data for the Wilson's warbler from 1966 to 2002 suggests a slow population decline continent-wide, and steeper declines in Colorado and surrounding states. The continental (survey-wide) estimated decline is about 1% annually, and the four states comprising the Colorado Plateau/Southern Rocky Mountains Bird Conservation Region (BCR 16) range from 4 to 5% annually. Additional information from the Southern Rocky Mountains Physiographic Area (Area 62) and the Partners In Flight prioritization process indicates that the Wilson's warbler has a moderate relative abundance throughout its global range. In the Southern Rocky Mountains, Wilson's warbler also occurs in moderate abundance relative to other parts of its range. Future habitat conditions are expected to remain stable, with no known threats to both breeding and non-breeding populations. However, the local population trend for the Wilson's warbler suggests that the species may be experiencing a large decrease of at least 50%.
which assigns scores to species in categories pertaining to their biology and conservation needs (Panjabi et al., 2001).

The Monitoring Colorado's Birds (MCB) Partnership Program (Leukering et al., 2000, Leukering and Levad, 2000) also provides information concerning the local population of Wilson's warbelrs and includes existing transects on the Pike/San Isabel National Forest. Species that are considered well sampled by the MCB program are those with coefficients of variation of the density estimate (CV of D) of less than 50%, and with two or fewer parameters (M) included in the detection curve function (Leukering et al., 2003). Evaluation of existing data indicates that the Wilson's warbler is adequately sampled by the MCB program in the two habitats for which there is consistent statewide information. The statewide data for the Wilson's warbler is displayed in Table 19 below.

As of 2002 there were 29 RMBO point-count transects located on the Pike-San Isabel National Forest, with three additional transects located on the National Grasslands. Four and one-half of these transects occur in High-Elevation (HR) habitat types, which is the target habitat type for Wilson's warbler. An additional four and one-half transects occur in Alpine Tundra (AT) habitats, which is also tracked for population trend analysis by the RMBO. A population trend analysis for the Wilson's warbler on the Pike-San Isabel National Forest or within the Hayman

Fire Area is unavailable at this time. However, Wilson's warbler is known to occur and be fairly common in suitable habitats within the Hayman Fire Area and an assessment of effects on populations can be adequately conducted given the current status of their preferred habitat and their known reponses to human disturbances and roads. Monitoring protocols for MIS on the Pike-San Isabel National Forest are currently being developed to provide a trend analysis at the appropriate scale.

Table 19: Average statewide Wilson's warbler density from the Monitoring Colorado's Birds Partnership Project, 2000–2002 (Leukering et al., 2001-2003). Information for aspen and spruce-fir is not included since the data is not available for most years. Information represents truncated data where available for a given year.

Habitat	N	D/hectare	D/acre	CV (D)	% Var*	K	M
Alpine Tundra	28	0.23	0.09	23.5	57.1	7.5	1.7
High-Elevation Riparian	103	1.08	0.44	18.8	62.3	16	2.0
Pooled Averages	*65.5*	*0.66*	*0.22*	*21.2*	*59.0*	*11.8*	*1.9*

N = Number of individuals detected in that habitat.
D = Density estimate from program DISTANCE, displayed as individuals per hectare.
CV (D) = Coefficient of variation expressed as a percentage of density.
* % Var = The percentage of the variance due to sample size; the other source of variance is detection probability. The average provided is from 1999-2000 since the information was not displayed in the MCB data tables thereafter.
K = Number of transects on which species was detected. The average provided is from 1999, 2000, and 2002 since the information was not displayed in the data tables for 2001.
M = Number of parameters required to fit a detection-function curve to the best model.

Effects of Alternatives

Potential influences on Wilson's warbler are associated with activities that could affect willow-riparian habitats and the processes and functions that maintain them. Roads can have direct and indirect impacts on riparian habitats and indirect effects on populations by providing recreational access into riparian areas, the latter of which has been noted as having negative influences on Wilson's warblers and other songbirds (Johnson and Anderson, 2003). However, it is difficult to quantify the effects of recreational influences without a focus on particular roads that provide such access. Therefore, although Wilson's warblers may occur in several of the smaller riparian areas within the project area, the focus of this analysis will revolve around the Upper South Platte River and the roads which provide access into this area. The Upper South Platte River, especially the Wildcat Canyon area, has been referred to as an area of concern in the Hayman RAP and is highly regarded for its riparian habitat values. The Upper South Platte River also consists of lower stream gradients and wider floodplain areas which are more likely to support larger riparian willow systems that are important to Wilson's warbler.

Alternative A: (No Action) Direct/Indirect Effects

***Direct Effects**:* The primary direct effects on Wilson's warbler are associated with roads and activities that potentially influence willow-riparian habitats. Approximately 17.3 miles (13%) of the 130 miles of classified roads addressed in this analysis occur within or border potential riparian habitat. Approximately 12.2 miles (71%) of this is currently closed in the post-fire condition, and would remain closed under Alternative A. Potential direct effects on habitat for the Wilson's warbler in Alternative A should therefore be substantially decreased over the pre-fire condition.

Alternative A provides a high degree of protection for the upper South Platte River since it maintains closures on access roads such as Metberry, Northrup, Hackett, Crossover, and Corral Creek. Potential recreational impacts on the upper river corridor are therefore expected to be substantially reduced over the pre-fire existing condition and only exceeded by Alternative D.

Indirect Effects*:* Roads and associated human uses can have indirect influences on Wilson's warblers and the habitat that they depend on (Johnson and Anderson, 2003). The primary indirect threat to Wilson's warbler in relationship to roads is most likely related to the influences on hydrologic function and disturbances from humans. Although the risk is not totally eliminated, Alternative A offers the third-highest potential for reducing indirect effects on stream systems and nesting habitat for Wilson's warbler.

Effects on Populations*:* Human intrusion can have negative influences on Wilson's warbler, particularly during the incubation period (Johnson and Anderson, 2003). Alternative A is expected to provide for a natural population density of breeding individuals due to the amount of security habitat along the river corridor.

<u>Action Alternatives: (Alternative B, C, and D) Direct/Indirect Effects</u>

Direct Effects*:* Alternative B provides the least amount of protection for the upper South Platte River since it reopens all access roads into the river corridor. Abundance of breeding individuals is expected to decrease under Alternative B.

Alternative C provides a high degree of road closures into the upper South Platte River corridor due to concerns with erosion and recovery of the fire area. Potential effects on breeding individuals is expected to decrease under Alternative C in relationship to Alternative B.

Alternative D provides a the greatest amount of protection to potential breeding habitat for the Wilson's warbler since it maintains additional road closures into the upper South Platte River above the existing condition. Alternative D is therefore expeted to provide the greatest potential benefits on breeding individuals that may nest within the river corridor.

Effects on Populations and Cumulative Effects*:* Human intrusion can have negative influences on Wilson's warbler, particularly during the incubation (egg-nesting) period (Johnson and Anderson, 2003). Alternatives A, C, and D are expected to provide neutral or perhaps positive effects on Wilson's wablers and allow for a natural density of breeding individuals to develop as post-fire succession occurs along the river corridor. Alternative B may have the potential to negatively influence populations below the potential density of nesting pairs due to increased open road densities that allow greater recreational influences along the river corridor. However, all alternatives in the Hayman Roads Management project are expected to have little influence on the overall population of Wilson's warblers on the Forest or influence their current population and habitat trends.

RESIDENT AND NEOTROPICAL MIGRATORY LANDBIRDS

Neotropical migratory landbirds (NTMB) are those that breed in the U.S. and winter south of the border in Mexico, Central and South America. Resident landbirds include those that remain during the winter period, or move to winter habitats that occur primarily within the U.S. border. Several landbird species may be experiencing population declines and have become an issue of international concern (Terborgh, 1992, Finch and Stangel, 1992).

Direction concerning landbird conservation in Forest Service Region 2 is to reference the 2002 Birds of Conservation Concern list produced by the U.S. Fish and Wildlife Service (FWS) for Bird Conservation Regions (BCRs) when completing NEPA evaluations for project activities. The Pike/San Isabel National Forest occurs within the Southern Rockies Colorado Plateau Bird Conservation Region (BCR 16), which encompasses portions of Colorado, New Mexico, Arizona, Utah and Wyoming. Information from BCR 16 was synthesized for use in Colorado through the development of the Birds of Conservation Concern list (USDI Fish and Wildlife Service, 2002) and the Colorado Landbird Conservation Plan (BCP). These Plans have been or are being developed by every state in the nation based on the individual physiographic areas encompassed by the BCR's. The following is the Birds of Conservation Concern for BCR 16, their status within the project area, and projected influence from the Hayman Fire Roads Management Project.

Table 20: FWS Birds of Conservation Concern for BCR 16 and the anticipated influence of the action and no action alternatives upon their conservation needs.

Bird Species	General Habitat of Bird Species	Occurrence in Project Area	Effect of Alternatives on Bird Species
Northern Harrier	Grasslands	No	Evaluated as an R2 sensitive species; No Effect
Swainson's Hawk	Grasslands	No	No Effect
Ferruginous Hawk	Prairie	No	Evaluated as an R2 sensitive species; No Effect
Golden Eagle	Cliffs/grasslands	Possible	No Effect; no nests known near roads.
Peregrine Falcon	Cliffs	No	Evaluated as an R2 sensitive species; No Effect
Prairie Falcon	Cliffs	Possible	No Effect; no nests known near roads.
Gunnison sage-grouse	Sagebrush	No	No Effect
Snowy Plover	Shorelines	No	No Effect
Mountain Plover	Prairie	No	Evaluated as an R2 sensitive species; No Effect
Solitary Sandpiper	Shorelines	No	No Effect
Marbled Godwit	Wetlands	No	No Effect
Wilson's Phalarope	Waterbodies/Shorelines	No	No Effect
Yellow-billed Cuckoo	Plains Riparian	No	Evaluated as an R2 sensitive species; No Effect
Flammulated Owl	Ponderosa pine/snags	Yes	Evaluated as an R2 sensitive species; No Effect
Burrowing Owl	Plains/grasslands	No	No Effect
Short-eared Owl	Parks/grasslands	No	No Effect
Black Swift	Waterfalls/wet cliffs	No	No Effect
Lewis's Woodpecker	Riparian Cottonwood	Yes	Evaluated as an R2 sensitive species; No Effect
Williamson's Sapsucker	Montane forests/snags	Yes	No Effect from roads. Effects similar to Lewis's woodpecker.
Gray Vireo	Oak woodlands/scrub	No	No Effect
Pinyon Jay	Pinyon/Juniper	No	No Effect
Bendire's Thrasher	Rare spp of arid areas	No	No Effect
Crissal Thrasher	No records in CO.	No	No Effect

Sprague's pipit	No records in CO.	No	No Effect
Virginia's warbler	Riparian scrub	Possible	Minimal influence from roads. Potential disturbance least in Alt. D and greatest in Alt.B
Black-throated gray warbler	Oak scrub/riparian	No	No Effect
Grace's warbler	Ponderosa pine	No	No Effect
Sage sparrow	Sagebrush	No	No Effect
Chestnut-collared longspur	Plains	No	Evaluated as an R2 sensitive species; No Effect

The Colorado Landbird Conservation Plan (BCP – Version 1) (Beidleman, 2000) identified priority species and habitats for each physiographic area in the state based on the Partners-In-Flight Species Prioritization Process. Priority habitats identified for the Southern Rocky Mountains Physiographic Area include alpine tundra, aspen, cliff/rock, high elevation riparian, lowland riparian, mixed-conifer, mountain shrubland, ponderosa pine, sagebrush shrubland, spruce-fir, and wetlands. Six of these habitat types also occur on within the Hayman Fire area, with ponderosa pine the most extensive and common. The priority habitats and species that occur within the project area are identified below in Table 21.

Table 21: Priority habitats and species of the Southern Rocky Mountains province and their relationship to assessment for the Hayman Roads Management Project

Priority Habitat Type	Colorado Landbird Conservation Plan (BCP) Priority Species	BCP Potential Issues(s)	Potential Influence from Roads	Effect of Alternatives on BCP Priority Species
Aspen	Red-naped sapsucker Purple martin Violet-green swallow	Grazing, snag habitat, Altered disturbance regimes	No major issues identified.	No effects anticiapted.
Cliff/Rock	Peregrine falcon Black swift	Rock climbing; mining	No major issues identified.	No effects anticiapted.
High Elevation Riparian	Cordilleran flycatcher American dipper MacGillivray's warbler Wilson's warbler	Grazing, Recreation impacts	Recreation impacts, travel mgmt.	Potential disturbances and influences on breeding habitat least in Alt. D, greatest in Alt. B
Lowland Riparian	Lewis' woodpecker Lazuli bunting	Development, roads, grazing, recreation	Recreation impacts, travel mgmt.	Minimal influences anticipated.
Mixed Conifer	Blue grouse Williamson's sapsucker	Altered disturbance regimes, snags, timber mgmt.	No major issues identified.	No effects anticiapted.
Ponderosa Pine	Band-tailed pigeon Flammulated owl Mexican spotted owl Lewis's woodpecker Grace's warbler	Timber mgmt, snags, altered disturbance regimes, prescribed fire	No major issues identified.	No effects anticiapted.
Spruce/Fir	Boreal owl Olive-sided flycatcher Hammond's flycatcher	Timber mgmt., snags, altered disturbance regimes	No major issues identified.	Minimal habitat in project area; no effects anticiapted.

Conclusion: Minimal influences are anticipated from the alternatives in forest and upland habitat types used by Birds of Conservation Concern in BRC 16 and for the priority species and habitats identified in the Colorado Landbird Conservation Plan. However, the roads alternatives are anticipated to influence species associated with riparian zones. This potentially involves one species of conservation concern (Virginia's warbler) and several priority species associated with high-elevation riparian habitats (Cordilleran flycatcher, American dipper, MacGillvary's warbler, and Wilson's warbler). These effects are not anticipated to be adverse and are expected to be greatest with Alternative B and least with Alternative D. The Proposed Action (Alternative C) is expected to be very similar to Alternative D and have neutral or perhaps positive influences on resident and migratory landbirds due to reductions in open road densities above the pre-fire condition.

PROPOSED, ENDANGERED, THREATENED AND SENSITIVE SPECIES

The following Threatened and Endangered Species and habitats occur within the Hayman Fire area:

- Pawnee Montane Skipper Habitat (based on extensive surveys)
- Preble's Meadow Jumping Mouse Potential Habitat (all riparian vegetation below 7600 ft. elevation buffered by 300 ft of upland habitat) and Designated Critical Habitat
- Mexican Spotted Owl protected activity centers (PAC)
- Known Bald Eagle Roosting locations

PAWNEE MONTANE SKIPPER

Determination: It is determined that Alternative A **May Affect, But Is Not Likely To Adversely Affect** the Pawnee Montane Skipper or its primary habitat. The rationale for this conclusion is as follows:

- Alternative A maintains the existing condition but does not totally eliminate the potential for effects on the skipper and its habitat due to road-associated influences such as routine maintenance, introduction and spread of non-native plants, and vehicle travel and associated human uses.
- Alternative A does not offer a potential for additional short-term impacts due to decommissioning of unclassified roads.

Determination: It is determined that Alternative B **May Affect, But Is Not Likely To Adversely Affect** the Pawnee Montane Skipper or its primary habitat. The rationale for this conclusion is as follows:

- Alternative B presents the highest risk of impact to the skipper and its habitat due to road-associated influences such as reconstruction, introduction and spread of non-native plants, and vehicle travel and associated human uses.
- Alternative B includes two mitigations that are applicable to decommissioning roads and the maintenance and/or reconstruction of classified roads. These mitigations are as follows:
    1. Prior to decommissioning a road in mapped skipper habitat using ground-disturbing techniques (ripping, recontouring, etc.) a survey will be conducted to

evaluate the road for potential habitat. If the skipper is present and/or if quality habitat occurs the U.S. Fish and Wildlife Service will be contacted prior to implementing the activity. This contact will include informal discussions regarding the activity and the potential effects on the skipper and determine if additional Section 7 consultation is needed.

2. All maintenance and reconstruction activities will remain within the existing road prism to the extent possible. Minor disturbances along the transition zone between the road prism and mapped habitat will not exceed a total of four (4) acres or three (3) miles of road. Major reconstruction or road realignment activities that are expected to exceed this will require additional Section 7 consultation.

Determination: It is determined that Alternative C **May Affect, But Is Not Likely To Adversely Affect** the Pawnee Montane Skipper or its primary habitat. The rationale for this conclusion is as follows:

- Alternative C presents a moderate risk of impact to the skipper and its habitat due to road-associated influences such as routine maintenance, introduction and spread of non-native plants, and vehicle travel and associated human uses.
    1. Alternative C includes two mitigations that are applicable to decommissioning roads and the maintenance and/or reconstruction of classified roads. These mitigations are the same as those above in Alternative B.

Determination: It is determined that Alternative D **May Affect, But Is Not Likely To Adversely Affect** the Pawnee Montane Skipper or its primary habitat. The rationale for this conclusion is as follows:

- Alternative D presents the lowest risk of impact to the skipper and its habitat due to road-associated influences such as routine maintenance, introduction and spread of non-native plants, and vehicle travel and associated human uses. However, roads and the risks associated with their maintenance and use are still present.
- Alternative D includes two mitigations that are applicable to decommissioning roads and the maintenance and/or reconstruction of classified roads. These mitigations are the same as those above in Alterative B.

<u>PREBLES MEADOW JUMPING MOUSE</u>

Determination: It is determined that Alternative A **May Affect, But Is Not Likely To Adversely Affect the Preble's Meadow Jumping Mouse or its Critical Habitat**. The rationale for this conclusion is as follows:

- Alternative A maintains the existing condition and reduces road influences on about 70% of the habitat addressed in this analysis; however, Alternative A does not totally eliminate the potential effects of roads on Preble's or its habitat.
- Alternative A has discountable influences on designated critical habitat.
- Alternative A does not offer a potential for additional short-term impacts (or long-term benefits) due to road decommissioning.
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Preble's Meadow Jumping Mouse (Kotliar et al.,

2003).

Determination: It is determined that Alternative B **May Affect, But Is Not Likely To Adversely Affect the Preble's Meadow Jumping Mouse or its Critical Habitat**. The rationale for this conclusion is as follows:

- Alternative B reduces road influences on about 9% of the habitat addressed in this analysis, and therefore does not eliminate the potential effects of roads on the Preble's or the majority of its habitat.
- Although potentially greater than the other alternatives, Alternative B has discountable influences on designated critical habitat.
- Alternative B offers a potential for additional short-term impacts (and long-term benefits) due to road decommissioning.
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Preble's Meadow Jumping Mouse (Kotliar et al., 2003).
- Alternative B includes a mitigation factor that is applicable to culvert replacement in critical or potential habitat. Alternative B also includes a mitigation factor applicable to decommissioning roads in critical or potential habitat. These mitigations are as follows:
    1. Prior to replacing a culvert in mapped habitat for the Preble's Meadow Jumping Mouse additional Section 7 consultation will be initiated with the U.S. Fish and Wildlife Service.
    2. Prior to decommissioning a road in designated Critical or potential habitat for the Preble's Meadow Jumping Mouse using ground-disturbing techniques (ripping, recontouring, etc.) the U.S. Fish and Wildlife Service will be contacted prior to implementing the activity. This contact will include informal discussions regarding the activity and the potential effects on the Preble's Meadow Jumping Mouse to determine if additional Section 7 consultation is needed.

Determination: It is determined that Alternative C **May Affect, But Is Not Likely To Adversely Affect the Preble's Meadow Jumping Mouse or its Critical Habitat**. The rationale for this conclusion is as follows:

- Alternative C reduces road influences on about 56% of the habitat addressed in this analysis, but does not totally eliminate the potential effects of roads on the Preble's or its habitat.
- Alternative C has discountable influences on designated critical habitat.
- Alternative C offers a potential for additional short-term impacts (and long-term benefits) due to road decommissioning.
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Preble's Meadow Jumping Mouse (Kotliar et al., 2003).
- Alternative C includes two mitigation factors applicable to culvert replacement and road decommissioning in critical or potential habitat. These mitigations are the same as in Alternative B.

Determination: It is determined that Alternative D **May Affect, But Is Not Likely To**

Adversely Affect the Preble's Meadow Jumping Mouse or its Critical Habitat. The rationale for this conclusion is as follows:

- Alternative D provides the highest potential benefit to the Preble's by reducing the greatest amount of road within potential habitat. However, it does not totally eliminate the potential effects of roads on the Preble's or its habitat.
- Alternative D has discountable influences on designated critical habitat.
- Alternative D offers a potential for additional short-term impacts (and long-term benefits) due to road decommissioning. This is slightly greater than Alternative C.
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Preble's Meadow Jumping Mouse (Kotliar et al., 2003).
- Alternative D includes two mitigation factors applicable to culvert replacement and road decommissioning in critical or potential habitat. These mitigations are the same as in Alternative B.

MEXICAN SPOTTED OWL

Determination: It is determined that Alternative A will have **No Affect on the Mexican Spotted Owl or its Critical Habitat**. The rationale for this conclusion is as follows:

- Alternative A does not provide additional access into the Thunder Butte PAC and reduces access into designated critical habitat.
- Alternative A has discountable influences on designated critical habitat.
- Mexican spotted owls appear to tolerate a considerable amount of disturbance and loud noises before responses are solicited (Delaney et al., 1999, Johnson and Reynolds, 2002, Swarthout and Steidl, 2003).
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Mexican Spotted Owl (Kotliar et al., 2003).

Determination: It is determined that Alternative B will have **No Affect on the Mexican Spotted Owl or its Critical Habitat**. The rationale for this conclusion is as follows:

- Alternative B does not provide additional access into the Thunder Butte PAC.
- Alternative B has discountable influences on designated critical habitat.
- Mexican spotted owls appear to tolerate a considerable amount of disturbance and loud noises before responses are solicited (Delaney et al., 1999, Johnson and Reynolds, 2002, Swarthout and Steidl, 2003). Therefore, additional access into or near designated critical habitat is not expected to have influences on the owl.
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Mexican Spotted Owl (Kotliar et al., 2003).

Determination: It is determined that Alternative C will have **No Affect on the Mexican Spotted Owl or its Critical Habitat**. The rationale for this conclusion is as follows:

- Alternative C does not provide additional access into the Thunder Butte PAC.
- Alternative C has discountable influences on designated critical habitat.
- Access into or near designated critical habitat is not expected to influence Mexican spotted owls.
- The effects of the Hayman Fire are expected to be short-lived and not have significant

influences on the overall viability of the Mexican Spotted Owl (Kotliar et al., 2003).

Determination: It is determined that Alternative D will have **No Affect on the Mexican Spotted Owl or its Critical Habitat**. The rationale for this conclusion is as follows:
- Alternative D does not provide additional access into the Thunder Butte PAC.
- Alternative D has discountable influences on designated critical habitat.
- Access into or near designated critical habitat is not expected to influence Mexican spotted owls.
- The effects of the Hayman Fire are expected to be short-lived and not have significant influences on the overall viability of the Mexican Spotted Owl (Kotliar et al., 2003).

BALD EAGLE

Determination: It is determined that Alternative A will have a **Beneficial Affect** on bald eagles that use or may continue to use the upper South Platte River and the greater Hayman Fire area. The rationale for this conclusion is as follows:
- Alternative A provides for a high degree of road closures that access potential alternate roosts and foraging sites along the upper South Platte River.
- Bald eagles can be disturbed by human presence and motor vehicles, and some overlap between their departure period and use of the river corridor for recreational purposes may occur. Recent documents for other projects completed in the Hayman Fire area indicate that human disturbance is a potential threat to eagles along the river corridor (Ryke and Madsen, 2002).
- The potential loss of a roost site due to the Hayman Fire affects a relatively small proportion of the overall bald eagle population; however, it remains unclear as to how their roosting patterns may change within the fire perimeter (Kotliar et al., 2003).

Determination: It is determined that Alternative B **May Affect But Is Not Likely To Adversely Affect** bald eagles that use or may continue to use the upper South Platte River and the greater Hayman Fire area. The rationale for this conclusion is as follows:
- Alternative B provides for a high amount of open roads that access potential alternate roosts and foraging sites along the upper South Platte River.
- Bald eagles can be disturbed by human presence and motor vehicles, and some overlap between their departure period and use of the river corridor for recreational purposes may occur. Recent documents for other projects completed in the Hayman Fire area indicate that human disturbance is a potential threat to eagles along the river corridor (Ryke and Madsen, 2002).
- The potential loss of a roost site due to the Hayman Fire affects a relatively small proportion of the overall bald eagle population; however, it remains unclear as to how their roosting patterns may change within the fire perimeter (Kotliar et al., 2003).

Determination: It is determined that Alternative C **May Affect But Is Not Likely To Adversely Affect** bald eagles that use or may continue to use the upper South Platte River and the greater Hayman Fire area. The rationale for this conclusion is as follows:
- Alternative C provides for an amount of open roads that access potential alternate roosts and foraging sites along the upper South Platte River above the existing condition.

- Bald eagles can be disturbed by human presence and motor vehicles, and some overlap between their departure period and use of the river corridor for recreational purposes may occur. Recent documents for other projects completed in the Hayman Fire area indicate that human disturbance is a potential threat to eagles along the river corridor (Ryke and Madsen, 2002).
- The potential loss of a roost site due to the Hayman Fire affects a relatively small proportion of the overall bald eagle population; however, it remains unclear as to how their roosting patterns may change within the fire perimeter (Kotliar et al., 2003).

Determination: It is determined that Alternative D will have a **Beneficial Affect** on bald eagles that use or may continue to use the upper South Platte River and the greater Hayman Fire area. The rationale for this conclusion is as follows:

- Alternative D provides for the highest amount of road closures that access potential alternate roosts and foraging sites along the upper South Platte River.
- Bald eagles can be disturbed by human presence and motor vehicles, and some overlap between their departure period and use of the river corridor for recreational purposes may occur. Recent documents for other projects completed in the Hayman Fire area indicate that human disturbance is a potential threat to eagles along the river corridor (Ryke and Madsen, 2002).
- The potential loss of a roost site due to the Hayman Fire affects a relatively small proportion of the overall bald eagle population; however, it remains unclear as to how their roosting patterns may change within the fire perimeter (Kotliar et al., 2003).

SENSITIVE WILDLIFE AND PLANT SPECIES

Past documents indicate that there are no sensitive fish, reptiles or invertebrate species that occur in the Hayman Fire area. A review of the new Regional Forester's List (USDA Forest Service, 2003c) indicates that this has not changed. Region 2 Sensitive Species that could potentially be affected by the Hayman Fire Roads Management Project alternatives consist of terrestrial wildlife and plant species.

TERRESTRIAL WILDLIFE SENSITIVE SPECIES

1. Northern Goshawk (*Accipiter gentilis*):

Effects Analysis: A specific analysis of each breeding pair of goshawks that occurs or potentially occurs within the Hayman Fire cannot be accomplished at this time since nest site information is unavailable. Goshawks do not normally nest in areas adjacent to roads or chronic human disturbance. However, the existing road condition (Alternative A) may disrupt foraging activities and nest relocations may have occurred adjacent to roads that have remained closed since the 2002 fire. It is therefore anticipated that potential impacts may be associated with all alternatives, and be greatest with those alternatives that reopen and maintain the greatest amount of roads. However, these types of individual impacts are not expected to be adverse to the population that occurs on the Pike/San Isabel National Forest nor to the species at the state or global scales.

Summary of Alternatives:

Alternative A, B, C, & D: May impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.

2. Flammulated Owl (*Otus flammeolus*)

Effects Analysis: Flammulated owls are very tolerant of humans and activities around their nesting and roosting sites (McCallum, 1994). Since they are insectivores, it is not anticipated that vehicular traffic causes as much mortality as other owl species that may be attracted to small mammal prey along roadsides. It is therefore determined that there will be no effect on flammulated owls or their primary habitats from any of the alternatives associated with the Hayman Fire Roads Management Project either directly, indirectly, or cumulatively.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

3. Three-toed Woodpecker (*Picoides tridactylus*):

Effects Analysis: There are no effects on three-toed woodpeckers except where they facilitate snag removal. Firewood cutting and other activities that remove snags will continue to be managed in the future to meet desired conditions for woodpeckers (USDA Forest Service, 1984). It is therefore determined that there will be no measureable effect on northern three-toed woodpeckers or their primary habitats from any of the alternatives associated with the Hayman Fire Roads Management Project either directly, indirectly, or cumulatively.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

4. Lewis's Woodpecker (*Melanerpes lewis*):

Effects Analysis: There are no direct effects on Lewis's woodpeckers anticipated with any of the road alternatives. Snag removal may be a concern in ponderosa pine stands; however, Lewis's woodpeckers prefer less dense stand conditions and cottonwood is not a preferred firewood tree. Cottonwood should also be protected by standards and guidelines that address riparian areas (USDA Forest Service, 1984). It is therefore determined that the alternatives associated with the Hayman Fire Roads Management Project will have minimal, if any, influences on Lewis's woodpecker.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

5. Olive-sided Flycatcher (*Contopus borealis*):

Effects Analysis: There are no direct effects on olive-sided flycatchers anticipated with any of the travel management alternatives. Snag removal as facilitated by roads may be a concern in some circumstances due to the the flycatchers' need for snags or spike-topped trees for flycatching. However, this habitat attribute is not expected to be highly influenced by the travel management alternatives since snag numbers are managed by Forest Plan standards and guidelines (USDA Forest Service, 1984). It is therefore determined that the alternatives associated with the Hayman Fire Roads Management Project will have minimal, if any, influences on the Olive-sided flycatcher.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

6. Townsend's Big-eared Bat (*Corynorhinus townsendii*):

Effects Analysis: There are no direct effects on Townsend's or other bat species anticipated with any of the travel management alternatives. Snag removal or access to hibernacula and roost sites as facilitated by roads may be a concern where habitats occur. However, no primary habitats are known within the fire area and it is expected that the alternatives associated with the Hayman Fire Roads Management Project will have no influences on the Townsend's big-eared bat.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

7. Fringed-tailed Myotis (*Myothis thysanodes*):

Effects Analysis: There are no direct effects on fringed myotis anticipated with any of the travel management alternatives. Snag removal or access to hibernacula and roost sites as facilitated by roads may be a concern where habitats occur. However, no primary habitats are known within the fire area and it is expected that the alternatives associated with the Hayman Fire Roads Management Project will have no influences on the fringed myotis bat.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

8. Gunnison's Prairie Dog (*Cynomys gunnisoni*):

Effects Analysis: There are no direct effects on Gunnison's prairie dogs anticipated with any of the road alternatives. The one existing colony occurs to the west of State Highway 67 across a fence into an open grassland area. State Highway 67 may be a cause of direct mortality; however, this road is a primary travelway and is not included in the transportation alternatives. There is no other road access into the colony area. It is therefore determined that the alternatives associated with the Hayman Fire Roads Management Project will have no influences on Gunnison's prairie dogs.

Summary of Alternatives:
Alternative A, B, C, & D: No Impact.

9. Northern Leopard Frog (*Rana pipiens*):

Effects Analysis: A specific analysis of road effects on leopard frogs is difficult to accomplish at this time since information on remaining breeding sites and migration routes is unavailable. It is therefore assumed that the frogs may be present and that the existing road condition may cause direct mortality and further influence the condition of riparian habitats. It is therefore anticipated that potential impacts may be associated with all alternatives, and be greatest with those alternatives that reopen and maintain the greatest amount of road. Additional analysis of individual roads is warranted if leopard frog population are discovered and thought to be influenced by them.

Summary of Alternatives:
Alternative A, B, C, & D: May impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.

SENSITIVE PLANT SPECIES

Table 22: Determination Summary and Mitigation

PLANT SPECIES	DETERMINATION	MITIGATION Y/N
Rydberg's golden columbine	May Impact	No
Narrowleaf grapefern	May Impact	No
Lesser yellow-lady's-slipper	May Impact	No
White adder's-mouth orchid	May Impact	No
Rocky Mountain monkeyflower	May Impact	No
Rock cinquefoil	May Impact	No
Dwarf raspberry	May Impact	No
Selkirk's violet	May Impact	No

May Impact – May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.

Analysis of Effects for R2 Sensitive Plant Species
Impacts of this proposed project were assessed as they pertain to their presence in the project area. It was determined that the proposed project may adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide. Although potential impacts are associated with all alternatives, benefits can be expected from those alternatives that maintain road closures above the pre-fire condition.

Summary of Alternatives:
Alternative A, C & D: May impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend to federal listing or a loss of plant species viability rangewide. Benefits expected above the pre-fire condition.

Alternative B: May impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.

Cumulative Effects For Sensitive Plant Species
The majority of plant species of concern that are present or potentially occurring within the Hayman Fire occurs in conjunction with wet or riparian areas. These areas are generally avoided by roads or effects are mitigated to reduce potential impacts. Nonnative plant species may have

a negative impact on habitats for native plant species since they are expected to respond favorably to the post-fire environment (Kotliar et al., 2003). This is a particular concern within riparian areas since many are bordered by and influenced by roads (Chong et al., 2003).

Cumulative Effects For Sensitive Wildlife Species

Conservation for sensitive species requires looking at entire ecosystems to ensure habitat protection over the long-term as well as the short-term. In addition to the Hayman Fire, several wildfires have occurred on the Pike National Forest in the past few years that have influenced an additional 30,300 acres. Fire can have both positive and negative effects on sensitive wildlife species, but is not expected to have significant influences on these species within the Hayman Fire area or the Pike/San Isabel Forest as a whole (Kotliar et al., 2003).

Road systems can have a significant ecological affect on wildlife and their habitats. For example, it is estimated that there are 6.2 million kilometers (3,852,501 miles) of public roads in the United States, used by over 200 million vehicles (Forman, 2000). Secondary roads, such as most of the roads in and around the Hayman Fire area, total about 2,383,817 miles in the United States, and may influence an area about 200 meters (656 ft.) wide (Forman, 2000). Forest Service Region 2 contains approximately 27,000 miles of public road and 30,000 miles of National Forest Systems road (USDA Forest Service, 1998). The current roads management policy is to reduce National Forest Systems roads where possible due to their negative ecological effects and the tremendous maintenance backlog.

The Hayman Roads Analysis Report identified 620 miles of road within those watersheds that encompass the Hayman Fire area (USDA Forest Service, 2003a). This equates to an average of about 1.4 miles of road per square mile of habitat. The ecological effects of roads can be exacerbated by the post-fire environment created by the Hayman Burn. The Hayman Fire Roads Management Project includes alternatives that reduce these ecological effects while providing access into and through National Forest Systems land. It is expected that some roads may need to be reconstructed and/or realigned due to the Hayman Fire. This could cause minor impacts or disturbances if sensitive species or habitats are involved. However, the potential cumulative effects of roads on sensitive species are expected to be reduced with all alternatives and in particular by Alternatives C and D.

A summary of anticipated direct, indirect, and cumulative effects on R2 Sensitive Wildlife Species is presented below in Table 23.

Table 23: Determination Summary and Mitigation

Species	Determination	Mitigation? Yes/No
American Bittern	No Impact - (No Habitat Present)	No
Boreal Toad	No Impact - (No Habitat Present)	No
Black Swift	No Impact - (No Habitat Present)	No
Black-tailed Prairie Dog	No Impact - (No Habitat Present)	No
Black Tern	No Impact - (No Habitat Present)	No
Boreal Owl	No Impact - (No Habitat Present)	No
Burrowing Owl	No Impact - (No Habitat Present)	No
Brewer’s Sparrow	No Impact - (No Habitat Present)	No
Cassin’s Sparrow	No Impact - (No Habitat Present)	No
Chestnut-collared Longspur	No Impact - (No Habitat Present)	No

CO. Hog-nosed Skunk	No Impact - (No Habitat Present)	No
Ferruginous Hawk	No Impact - (No Habitat Present)	No
Flammulated Owl	No Impact	No
Fringed Myotis	No Impact	No
Grasshopper Sparrow	No Impact - (No Habitat Present)	No
Greater Sage-Grouse	No Impact - (No Habitat Present)	No
Gunnison Sage-Grouse	No Impact - (No Habitat Present)	No
Gunnison's Prairie Dog	No Impact	No
Harlequin Duck	No Impact - (Species Not Present)	No
Lesser Prairie-Chicken	No Impact - (No Habitat Present)	No
Lewis Woodpecker	No Impact	No
Loggerhead Shrike	No Impact - (No Habitat Present)	No
Long-billed Curlew	No Impact - (No Habitat Present)	No
N. Leopard Frog	May Impact	No
Northern Goshawk	May Impact	Yes
Northern Harrier	No Impact - (No Habitat Present)	No
American Marten	No Impact – (No Habitat Present)	No
Massasauga	No Impact – (No Habitat Present)	No
Mountain Plover	No Impact - (No Habitat Present)	No
Olive Sided Flycatcher	No Impact	No
Ottoe Skipper	No Impact - (No Habitat Present)	No
Plains Leopard Frog	No Impact - (No Habitat Present)	No
Peregrine Falcon	No Impact - (Species Not Present)	No
Purple Martin	No Impact - (No Habitat Present)	No
Regal Fritillary Butterfly	No Impact - (No Habitat Present)	No
River Otter	No Impact – (Species Not Present)	No
Rocky Mtn. Capshell Snail	No Impact - (No Habitat Present)	No
Sage Sparrow	No Impact – (No Habitat Present)	No
Short-eared Owl	No Impact – (No Habitat Present)	No
Spotted Bat	No Impact – (No Habitat Present)	No
Swift Fox	No Impact – (No Habitat Present)	No
Three-toed Woodpecker	No Impact	No
Townsend's big-eared bat	No Impact	No
White-tailed ptarmigan	No Impact – (No Habitat Present)	No
Yellow-billed Cuckoo	No Impact - (No Habitat Present)	No
Wolverine	No Impact – (No Habitat Present)	No
Rydberg's golden columbine	May Impact	No
Narrowleaf grapefern	May Impact	No
Lesser yellow-lady's-slipper	May Impact	No
White adder's-mouth orchid	May Impact	No
Rocky Mountain monkeyflower	May Impact	No
Rock cinquefoil	May Impact	No
Dwarf raspberry	May Impact	No
Selkirk's violet	May Impact	No

Definition of Terms:
No Impact: No measureable impact on individuals.
May Impact: May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.
Beneficial Impact: Beneficial impact anticipated for individuals.
Likely Impact: Likely to result in a loss of viability in the Planning Area, or in a trend toward federal listing.

Noxious Weeds

Effects Common to All Alternatives

Under all alternatives, decommission and maintenance of roads in the burn area would have the adverse effect of creating sites for the invasion of noxious weeds. It is reasonable to assume that maintenance equipment used for work that disturbs the ground would transport weed seed more readily than recreational vehicles. The biology of noxious weed plants: production of a large quantity of seed, long term viability of the seed, and the ability to spread from vegetative propagules are important factors that help weeds become established and spread. Seed of most perennial noxious weeds such as leafy spurge, oxeye daisy and spotted knapweed can remain viable longer than 5 years (Liao et al., 2000, Davis et al., 1993; Wicks and Dersheid, 1964, Toole and Brown, 1946). Vegetative propagules such as plant root fragments, stolons (runners), and stem fragments can spread weed infestations. Species such as leafy spurge, purple loosestrife and all varieties of hawkweed can be transported vegetatively. Plant parts moved about during road maintenance can spread weed infestations nearly as effectively as seed (Ferguson et al., 2003). Parendes and Jones (2000) found the presence of exotic plant species was highly correlated with sunlit soil and frequent, severe disturbances, such as those resulting from road traffic and from road maintenance activities such as grading. Since seeds and vegetative fragments are present in the infested soil at all times of the year, road maintenance and other soil-disturbing activities can transport weeds at any time of the year – not just when plants are setting seed.

Road maintenance and decommission, involves a variety of activities such as road grading; installation, maintenance, replacement and removal of drainage structures; ditch cleaning; maintenance and replacement of structures such as gates and signs; and crushing, storage and placement of aggregate. An increase risk of noxious weed infestations is associated with all roads work. Roads are high-risk sites for the introduction and spread of noxious weeds. Transporting seeds and plant parts by vehicles (Lonsdale and Lane, 1994), and removing vegetation and mixing soil during road construction and maintenance, provide ideal conditions for the introduction, germination and establishment of weed seeds. Road corridors are also prolific sources of weeds seeds that may be carried to other locations (Tyser and Worley, 1992) or that may colonize adjacent vulnerable habitats. In Glacier National Park, exotic plant species showed a continuous distribution along road and trail corridors (Tyser and Worley, 1992). Chicoine (1984) found that spotted knapweed was readily disseminated along transportation corridors.

Road construction and maintenance activities mix soil layers, increasing soil microbial activity. Weeds exploit these newly available nutrients efficiently (Best et al., 1980, Belcher and Wilson, 1989). Road grading typical moves surface material up and down the road system. This process disturbs soil and vegetation on the roadway and shoulders, transporting soil and gravel that may carry weed seeds or vegetative propagules. The freshly graded road provides a disturbed soil seed bed suitable for weed germination. This may be one reason that the density of weedy plants increases as intensity of disturbance increases (Jensen, 1995). No published studies of transport of seeds during grading have been completed, so it is not known how far weed seeds may be transported after they have been picked up by the grader's blade. Grading a series of roads without washing the blade may transport weeds from one road to the next. Cleaning roadside ditches also moves soil from place to place, creating a seedbed by disturbing the soil and removing competitive, desirable vegetation.

Equipment used to maintain road drainage structures can spread weeds by transporting soil and weed seeds from one culvert to another. Seeds from equipment can be deposited in stream crossings and washed downstream, creating infestations along the riparian corridor. Treatment of weeds in riparian zones may be more difficult.

Excavators, road graders and other road maintenance equipment are often used in highly disturbed sites infested with noxious weeds, providing ample opportunity for seeds to adhere to machinery.

Stockpiles of crushed aggregate often become infested with weeds. Seeds may be brought in on unwashed rock-crushing equipment and mixed into the aggregate during operations. Weeds from adjacent infested areas may also infect the stockpile. Seeds produced by infestations on the stockpile are transported with the aggregate when it is hauled and placed on roads.

Road decommissioning is expected to generate approximately 0.24 acres of noxious weeds per mile annually. Maintenance of existing roads is expected to generate annually approximately 0.12 acres of new noxious weed infestation per mile (USDA Forest Service, 2003b). Road closure through the use of gates and different types of barriers would not increase the spread of noxious weeds unless a large amount of bare soil was exposed or the barriers were obtained from infested sites. Table 15 compares the acres of noxious weeds generated by alternative.

Table 15. Acres of noxious weeds generated by alternative

Alternative	Acres of noxious weeds generated by road maintenance	Acres of noxious weeds generated by road closure and/or decommissioning	Total Noxious Weed Acres
A	6.4	0.00	6.4
B	14	11.64	25.64
C	9	21.96	30.96
D	6.1	27.72	33.82

Closure and decommision of roads may limit accessibility for noxious weed treatments. This may increase the cost of treatments in the future because of the differences in labor cost of using a truck or ATV-mounted sprayer and backpack pump.

The closure of roads and decommission may actually assist in the slowing the spread of noxious weeds. Lack of access by vehicles would reduce the transport of seeds into the area, limit the amount of continued disturbance by vehicles and allow for growth of native species. Monitoring of the closed roads and obliterated roads would need to occur to reduce the hazard of the long term viability of noxious weed seed. These areas would still need to be considered for treatment in future years.

Cumulative Effects Common to All Alternatives

Over the long term, (approximately 50 to 100 years), without control measures, nonnative plant species would be expected to persist or dominate in the long disturbance corridors such as roads. Smaller patches of nonnative plants may be expected to persist but not dominate less favorable sites (drier, farther from roads and trails) and thus provide additional, dispersed seed sources that could be expected to aid in the establishment of new patches of invasive species following future fires, treefall events, or other disturbances.

Roads, trails and areas that received ground-disturbing treatments (for example, ATV travel, hazard tree removal, straw bale placement) and areas that received other potentially contaminating treatments (seeding, straw mulching) are areas that may be at risk for nonnative species establishment or invasion. Areas that experienced prefire disturbances, such as logging, fuel treatments, grazing; may be at increased risk for nonnative invasion following wildfire because those areas may already have nonnative species present in their seed banks (Graham, 2003). Areas that experienced high burn severities may also be at increased risk for nonnative species establishment if, for examples the native seed bank is effectively destroyed and the majority of seeds available postfire are nonnative. All of these scenarios may be expected to continue into the long term as non-natives continue to occupy sites and contribute to seed banks.

Transportation

The desired future condition of the transportation system provided by the Forest Plan is to manage the transportation system for increased cost effectiveness, efficiency and utility. The roads in the Hayman burn area should provide efficient and adequate access while maintaining public safety and minimizing negative environmental impacts. Estimated costs for gates and barricades, road decommissioning, general rehabilitation, minor reconstruction and major reconstruction, were used to evaluate the approximate implementation, annual and deferred maintenance cost for each alternative.

Table 25: Comparison of Estimated Road Management Costs by Alternative

ALTERNATIVE	IMPLEMENTATION COST*	ANNUAL MAINTENANCE COST	DEFERRED MAINTENANCE COST
A	$15,000	$128,076	$380,913
B	$669,010	$161,448	$435,938
C	$1,729,000	$141,241	0**
D	$1,429,480	$132,485	0**

***For an explanation of the type and amount of estimated costs see the Effects Analysis below, the Transportation Section in Chapter 3, and Appendix E and F.**

**** Deferred Maintenance Costs are taken care of in the one-time Implementation Cost.**

EFFECTS COMMON TO ALL ALTERNATIVES

The Forest Plan requires limits for maximum road densities for certain Management Areas on the forest. A GIS analysis was done using the Hayman burn perimter and classified roads information and the results indicate that current road densities within the burn perimeter are less than the maximum allowed in those management areas. Therefore, all of the alternatives being considered are consistent with the requirements of the Forest Plan with respect to allowable road densities in certain management areas.

The use of volunteer groups to help with decommissioning, rehabilitation, reconstructing and maintaining roads under any of these alternatives is a good possibility in light of comments received during the scoping process. Any future collaboration, partnerships or contributions from volunteer groups could offset some costs and could accelerate the timing on opening roads proposed by each alternative. There are several successful partnerships on the Pike NF with road and trail user groups, but it would be difficult to include non-binding agreements in this analysis. Under any alternative, partnerships will always be considered as a valuable method for completing road maintenance work, educating user groups, and involvement opportunities.

ALTERNATIVE A - NO ACTION

Under the no action alternative, the project roads that are currently closed to motorized use would remain closed to motorized use. The only work required to keep these roads closed would be to install gates or physically block the entrances to these roads with fences, barricades or signs. No maintenance, mitigation or specific monitoring measures would be implemented for the closed roads except for periodic monitoring of the closed roads to make sure the gates, fences, signs, etc. are still in place. Roads that are currently open would remain open and would be maintained as needed and as funding allows. Unclassified roads would remain closed but would not be decommissioned.

Direct and Indirect Effects

Erosion would continue on the closed roads because no preventative measures would be implemented (see Soil and Water Section and Fisheries Section). Motorized recreation on the closed roads would continue to be prohibited (see Recreation section). The cost to implement this alternative is approximately $15,000, which is the least of the four alternatives (see Table 25 above). The cost for maintenance of the open roads (combined annual and deferred maintenance) is approximately $509,000 (see Table 25 and Appendix E and F).

Even though the implementation cost is lower, the cost effectiveness of this alternative is offset by the large maintenance costs. This alternative does not increase the efficiency (i.e. access and safety) of the transportation system, nor does it increase the utility (i.e. usefulness and environmental sensitivity) of the transportation system.

ALTERNATIVE B - PRE-FIRE CONDITION

This alternative proposes to put the roads back to the approximate condition, maintenance level and location that they were in before the fire. General rehabilitation work will include some improvements, such as increased amount of drainage structures along a road so that the higher runoff due to the lack of vegetation would be better handled. Unclassified roads are proposed to be decommissioned. Almost all of the roads would be reopened to the public under this alternative, except for those roads that were already closed before the fire. Maintenance would be accomplished as needed and as funding allows.

Direct and Indirect Effects

With this alternative, there would be the largest maintenance costs of all the alternatives ($161,448 annual and $435,938 deferred) for a total of $597,386 (see Table 25). Since some roads would still be located in poor locations that are hydrologically-connected, future rain events could likely cause accelerated damage and require increased maintenance work. Erosion potential would be less than Alternative A because drainage structures would be constructed with this alternative. There would likely be a significant amount of 4-wheel drive recreation occurring on these roads, which could cause more wear and tear on the roads and more safety concerns. Based on past trends on the Pike National Forest, the likelihood of newly created unclassified roads is high, along with potential damage to riparian areas.

The cost to implement this alternative would be approximately $669,010 (see Table 25) which is much higher than Alternative A, but much lower than Alternatives C and D. Even though the one-time implementation cost is lower than C and D, the long-term cost effectiveness of this alternative is offset by the large maintenance costs, especially the deferred maintenance costs which would continue to increase since many of the roads proposed to be opened under this alternative are susceptible to flooding and erosion due to their poor location.

Mitigations and Monitoring

In addition to the Mitigations listed in Chapter 2, road maintenance activities should be adequate enough to prevent resource deterioration, despite the fact that many road segments would still be located in drainage bottoms and other poor locations. Best Management Practices (Appendix C) would be followed during the implementation of any road maintenance activities.

Increased monitoring would be necessary under this alternative to determine the effectiveness of the road maintenance activities. Regular site visits, especially after rain events would be needed to determine if roads and associated drainage structures have worked properly and to assess the need for temporary roads closures if the safety of the general public is in question.

ALTERNATIVE C – PROPOSED ACTION

This alternative involves maintaining and upgrading roads, as well as closing, restricting and decommissioning specified roads. Of the 130 miles of classified roads to be addressed, approximately 55% are proposed to be open and maintained as is and 45% are proposed to be restricted, closed, decommissioned or converted to other uses. There are also 36.5 miles of unclassified roads proposed to be decommissioned. This alternative is based primarily on the results of the Hayman Roads Analysis.

Direct and Indirect Effects

All classified roads would be brought up to Forest Service (FS) standards before they are opened for public use. The timing for road work will depend on the availability of funding sources. General rehabilitation work would be performed on all roads that are currently open for public use. General rehabilitation would not include any realignments. However, minor reconstruction work would include minor realignments, installation of drainage structures and surfacing as necessary. Major reconstruction work would include major realignments along with other drainage and surface improvements as needed. The work would be enough to take care of all deferred maintenance needs so that the roads would be up to FS standards therefore deferred maintenance costs for Alternative C are 0 in Table 25 above.

The potential road work is further broken down to account for three different levels of steepness (slope) of the roads. Gentle (0-5%), Moderate (6-20%), and Steep (21% and greater) sloped roads require different amounts of work and costs to decommission, rehabilitate or reconstruct.

A percentage of the total for each of these levels was determined by evaluating the slopes for all the roads in the burn area utilizing existing information such as Geographic Information System (GIS) maps. The percentages determined for the roads affected by this project are: Gentle category – 4% of roads, Moderate category – 86% of roads, and Steep category – 10% of roads. Based on these numbers, the estimated cost for implementation of this alternative would be $1.7 million This is the highest implementation cost of all the alternatives being evaluated since this alternative requires the greatest amount of road reconstruction work (see Appendix F).

Since there would be 49 miles of classified roads decommissioned or converted to another use, the annual maintenance costs would be less than Alternatives A and B. Since all the roads would be brought up to FS standards, there would be no deferred maintenance costs for these roads unless funding was not available and deferred maintenance costs accrue due to further road deterioration. Nevertheless, under Alternative C the total estimated maintenance costs would be much less than Alternatives A and B (see Table 25 above).

Mitigations and Monitoring

With all the decommissioning and reconstruction work associated with this alternative, it would be essential for strict adherence to those mitigations listed in Chapter 2 and Best Management Practices (see Appendix C).

The reduction of the amount of roads available for recreational use may cause overcrowding and increased wear and tear to the roads (see Recreation section). Because the roads would be brought up to FS standards, they should be able to handle the extra volume of traffic and increased public safety concerns. Ongoing monitoring of these concerns would be necessary to determine the safety and efficiency of the road system under Alternative C.

ALTERNATIVE D – PROPOSED ACTION PLUS MORE ROAD CLOSURES AND DECOMMISSIONS

This alternative involves maintaining and upgrading roads, as well as closing, restricting and decommissioning specified roads. Of the 130 miles of classified roads to be addressed, approximately 36% are proposed to be open and maintained as is and 64% are proposed to be restricted, closed, decommissioned or converted to other uses. There are also 36.5 miles of unclassified roads proposed to be decommissioned.

Direct and Indirect Effects

The direct and indirect effects for this alternative would essentially be the same as with Alternative C except that the implementation cost for this alternative would be $1.4 million which is slightly less than Alternative C ($1.7 million).

There would be approximately 79 miles of classified roads that would be closed or decommissioned under this alternative. Therefore, the annual maintenance costs for Alternative D would be slightly less than Alternative C (see Table 25 above).

The recreational access and opportunities for public use would be less in variety and quantity under this alternative (see Recreation section). This could create overcrowding issues and increased wear and tear on the roads that are open. Because of potential overcrowding, additional unclassified roads may be created by users to access roads that are closed or decommissioned under this alternative.

Mitigations and Monitoring
With all the decommissioning and reconstruction work associated with this alternative, it would be essential for strict adherence to those mitigations listed in Chapter 2 and Best Management Practices (see Appendix C).

Under this alternative, more monitoring of road conditions would be required than with Alternative C, but less than Alternative B. The decreased amount of roads available for public use would mean an increased possibility for overcrowding and wear and tear on the roads (see Recreation section also). Ongoing monitoring of these concerns would be necessary to determine the safety and efficiency of the road system under Alternative D.

Cumulative Effects Common to All Alternatives
Under Alternative A, closed roads would continue to deteriorate and would continue to cause resource damage for years to come.

Under Alternatives B, C and D, future and/or ongoing actions would not significantly affect these roads, especially when the mitigation measures listed in Chapter 2 of this EA and the BMPs in Appendix C are implemented for road decommission, reconstruction, and maintenance activities.

Temporary roads associated with Hayman salvage timber sales and fuels reduction projects may temporarily increase sedimentation and erosion. Annual road maintenance activities would help alleviate problems associated with drainage along and across roadways. Ongoing reforestation activities in the Hayman burn area will help reduce erosion and sedimentation

Recreation

Evaluation Criteria
The following issue indicators were used to evaluate the direct, indirect and cumulative impacts of the alternatives:

- Public access
- Recreation opportunities and experiences
- Crowding and Density issues
- Affects to Forest Plan Management Areas and ROS direction

ALTERNATIVE A – NO ACTION
This project addresses 130 miles of classified Forest road miles and 36.5 unclassified road miles in the Hayman burn area. Under this Alternative, a total of 77 classified Forest road miles would be closed to motorized use but no road decommission would take place. This includes 12 miles that were already closed to motorized use before the Hayman Fire. The 53 classified Forest road miles that would continue to be open to motorized use under this alternative are roads currently

open as indicated in Appendix D. The 36.5 miles of unclassified roads would continue to be signed as closed and/or fenced off under this alternative but would not be decommissioned.

DIRECT AND INDIRECT EFFECTS

1. Public Access – Under this alternative, many areas of the Hayman area would remain accessible by motorized vehicles with the exception of the Wildcat Canyon, 9J Road Corridor, Turkey Creek and Turkey Track areas and various spur roads. Roads in the areas just mentioned have been closed to motorized use since the Hayman Fire began in June 2002. The 9J Road (Forest Road 523) would remain open to authorized motorized use under this alternative. All National Forest System (NFS) lands in the Hayman area would continue to be open for nonmotorized uses under this alternative. All Forest roads currently closed to motorized vehicles would remain closed under this alternative except to nonmotorized uses as is occurring now.

The major effects to public access under this alternative would be the loss of motorized recreation access to the Wildcat Canyon and South Platte River corridor area via Metberry Gulch (Forest Road 205), Longwater (Forest Road 221), Hackett (Forest Road 220), Crossover (Forest Road 220A) and Corral Creek (Forest Road 540). All-terrain vehicles (ATV) (i.e., quad-runners) and motorcycle access in the Wildcat Canyon area may be available in the future by the “730” motorized trails (i.e., Forest Trails 730, 731, 732, etc.) when these trails are rehabilitated and opened on the South Park Ranger District. A Colorado State Parks OHV Grant submitted in 2003 to rehabilitate these trails was recently awarded.

2. Recreation Opportunities – Under Alternative A, there would be a loss of motorized recreation opportunities on all three ranger districts. The recreation opportunities and experiences associated with roaded-recreation including driving for pleasure, sightseeing, dispersed camping, fishing, hunting and rock climbing access would be curtailed on 77 miles of classified Forest Roads. Unique recreation values associated with Wildcat Canyon including the proximity to the Front Range, challenging Off-Highway Vehicle (OHV) terrain, access to the Custer Cabin site (burned down in fire), dispersed camping, fishing, hunting and rock climbing access would also be lost. Access to the area would continue to be allowed by nonmotorized means including horseback, hiking and bicycle. Under this alternative, there would be an overall loss in motorized recreation opportunities and an increase in nonmotorized recreation opportunities.

3. Crowding and Density – Since 77 miles of classified roads would be closed to motorized vehicles under this alternative, visitors who have historically frequented the area for driving for pleasure, sightseeing (from a vehicle), or OHV riding would be displaced, or forced to find other areas to carry out their recreation activity. This is already occurring since the roads in Wildcat Canyon (e.g., Hackett, Metberry, Longwater, etc.) have been closed to motorized vehicles because of safety and resource concerns resulting from the Hayman Fire.

Many motorized recreationists are now carrying out their activities at other locations on the Pike National Forest such as Rainbow Falls, Rampart Range, Badger Flats – China Wall, and Breakneck Pass. In these alternate or *substitute* locations, visitor density has most likely increased which could lead to management issues such as visitor conflicts, public safety issues, perceived crowding – or the feeling of too many people in one place, resource damage, creation of unclassified roads, and a reduction in quality of the visitor experience. For example, since the Hayman Fire, the Badger Flats – China Wall area west of the Tarryall Road (Park Co. Road 77) has become very popular with motorized recreationists and there has been a reported six new motorized hill climbs in the area, vehicles going around road barriers onto closed roads, and vehicles crossing riparian areas including the Tarryall River (Thibodeaux, pers. comm., 2004). Similar motorized issues are also reported to be occurring on those roads in Hayman that are currently open and at Breakneck Pass in the alpine tundra environment of the Mosquito Range (Thibodeaux, pers. comm., 2004).

Substitution involves replacing one recreation activity or resource with another which provides the same benefits that were provided by the original (Shelby and Vaske, 1991). Kurtz and King (1979) suggest that even when two resources or locations provide similar experiences, they may not be perceived as substitutes if the costs associated with participation differ greatly. Costs can be practically measured in two ways: time and money. A frequent visitor to Wildcat Canyon may not want to substitute the original resource if it means longer driving time and/or more gas money. Shelby and Vaske (1991) found that fishing angler's perceptions of substitutes were determined more by driving time that anything else; crowding and lack of scenery were the least often mentioned reasons. Shelby and Vaske (1991) conclude that it is often hard to find good resource substitutes and public agencies may be obligated to provide an alternative setting which offers the same activity. Shelby and Vaske (1991) go on to say that it may not be good enough to displace users and simply say, "they can participate in other recreation activities." As we are seeing at other places on the Pike NF outside of Hayman, the results of too many displaced users in areas not managed for increased or intensive use could be damaging.

4. Affects to MA and ROS direction – Under Alternative A, many areas of the Hayman burn area such as Wildcat Canyon, the 9J road corridor, Turkey Creek and Turkey Tracks would be closed to motorized vehicles but open to nonmotorized uses. (Note: the 9J road is open to local landowners only). The areas mentioned are in either the 2A or 2B Forest Plan Management Area (MA) category which emphasizes semiprimitive, rural, and roaded-natural recreation opportunities respectively. Furthermore, the Recreational Opportunity Spectrum (ROS) category identified in the Forest Plan for these areas is either Semi-Primitive Motorized (SPM) or Roaded Natural (RN), which again emphasizes access by motorized vehicles. Alternative A would not meet the requirements of the Forest Plan MA direction for MA 2A and 2B if motorized travel is prohibited in the areas mentioned above. If Alternative A was selected, a Forest Plan Amendment would probably be necessary to emphasize the new recreation use in these areas.

ALTERNATIVE B – PRE-FIRE CONDITION

This project addresses 130 miles of classified Forest road miles and 36.5 unclassified road miles in the Hayman burn area. Under this Alternative, a total of 12 classified Forest road miles would be closed to public motorized use and 118 miles would be open to public motorized use. The 12 miles to be closed were already closed to motorized use before the Hayman Fire. The 36.5 miles of unclassified roads would be signed as closed and/or fenced off under this alternative and would be decommissioned as funding allows.

DIRECT AND INDIRECT EFFECTS

1. Public Access – Under this alternative, recreation access would be restored to the level it was before the Hayman Fire. Many of the roads under this Alternative would require extensive repair and rehabilitation to get them back to a safe level (see Transportation section). Any road repair or relocation work that is required outside of the existing road location, or "road prism", may require additional NEPA analysis. Depending on the extent of road rehabiliation work required (see Transportation section) current road closures would remain in place until resources are obtained and the road is fixed. Many local OHV groups have offered their time and financial resources to accelerate the opening of roads in the burn area especially Hackett, Longwater, Metberry, Corral Creek and Crossover.

Alternative B addresses the access concerns from motorized recreation users. The roads in Wildcat Canyon (e.g., Hackett, Metberry, Longwater, Corral Creek, Crossover, etc.) would all be opened. Forest roads 205A, 207 and 215 would be opened which provides motorized access to Quartz Hill, an area popular with mineral collectors and hunters. Metberry and 9J road would be opened to provide motorized access to popular rock climbing areas. Forest roads 340.B, 343.A1, 343.A2, 343.B, 362.C, 362.D, 366.B and 366.C would all be opened for continued motorized access into traditional hunting areas. Forest road 542 would be opened for dispersed camping opportunities off of the 211 or Matukat Road. Forest road 522.A would be opened to provide an alternate access for recreation residence permittees in Bell Rock SH. Forest roads in the Turkey Creek area - 524, 525 and 526 would be opened to provide dispersed recreation opportunities.

2. Recreation Opportunities – Under Alternative B, the recreation opportunities available in the Hayman area before the fire would be made available following the required road work. This process could take from a few months to a few years depending on the extent of road rehabilitation required and the amount and timing of funds available (see Transportation section). There would be no net loss of motorized recreation opportunities and no increase in nonmotorized recreation opportunities.

3. Crowding and Density – Under Alternative B, recreation access and opportunities would be restored to pre-fire levels. Alternative B will reopen all classified roads that were open for access before the fire occurred. Recreation visitor pressure and impacts would probably decrease in the areas where visitors have been displaced to. Perceived crowding and high visitor density probably would not be an issue in the Hayman area once roads are reopened unless their opening is staggered. For example, if Corral Creek Road (FR 540) were open to the South Platte River but the other connecting Wildcat roads were not open, there could be issues with crowding, safety, conflicts and resource damage. To avoid this situation, popular Forest roads, especially those that provide connections or loops should be opened in coordination to avoid these potential issues.

4. Affects to MA and ROS direction – Under Alternative B, there would be no change in the current MA and ROS designation for the area.

ALTERNATIVE C – PROPOSED ACTION

Alternative C is the proposed action based on recommendations from the Hayman Roads Analysis Project (RAP) Report. The Hayman RAP provides recommendations for a road system that is safe, responsive to public and agency needs, is environmentally sound, and is affordable and efficient to manage. Under this Alternative, a total of 55 classified Forest road miles would not be available for motorized uses. This includes 12 classified road miles that were already closed to motorized use before the Hayman Fire. In addition, 36.5 miles of unclassified roads would be signed as closed and/or fenced off under this alternative and would be decommissioned as funding allows.

DIRECT AND INDIRECT EFFECTS

1. Public Access – Under this alternative, the closure or decommission of 55 miles of classified Forest roads would reduce the number of miles available for motorized vehicle access but would not eliminate motorized access to traditional recreation areas. Motorized access in the Wildcat Canyon area would be provided on Longwater, Hackett, and the upper segment of Corral Creek Road. Furthermore, ATV and motorcycle access in the Wildcat Canyon area would be available by the “730” motorized trails (i.e., Forest Trails 730, 731, 732, etc.) when these trails are rehabilitated and opened on the South Park Ranger District. A Colorado State Parks OHV Grant submitted in 2003 to rehabilitate these trails was recently awarded.

Many of the roads under this Alternative will require extensive repair and rehabilitation to get them back to a safe level (see Transportation section). Any road repair or relocation work that is required outside of the existing road location, or “road prism”, may require additional NEPA analysis. Depending on the extent of road rehabilitation work required (see Transportation section) current road closures would remain in place until resources and funding are obtained and the road is fixed. Many local OHV groups have offered their time and financial resources to accelerate the opening of roads in the burn area especially Hackett, Longwater, and Corral Creek.

Alternative C addresses many of the access concerns from motorized recreation users. For example, popular roads in Rainbow Falls and in Wildcat Canyon (e.g., Hackett and Longwater) would be opened. However, many roads would also be closed under Alternative C in order to address resource, safety and management concerns. Roads to be closed under Alternative C include: Forest roads 205A, 207 and 215 which provide motorized access to Quartz Hill, an area popular with mineral collectors and hunters; Metberry road which provides motorized access to popular rock climbing, dispersed recreation areas and the Custer Cabin site (burned in fire); Forest roads 343.A1, 343.A2, 362.C, 362.D, 366.B and 366.C which provide motorized access into traditional hunting areas; Forest road 542 which provides dispersed camping opportunities off of the 211 or Matukat Road; Forest road 522.A which provides an alternate access for recreation residence permittees in Bell Rock SH; Forest roads in the Turkey Creek area - 524, 525 and 526 which provide dispersed recreation opportunities; and several spur roads off of Forest Road 211 (Matukat Road) including 211.A, 211.A1, 211.D, 211.D1 and 211.G which provide dispersed recreation opportunties.

2. Recreation Opportunities – Under Alternative C, many of the recreation opportunities available in the Hayman area before the fire would be made available following the required road rehabilitation work. This process could take from a few months to a few years depending on the extent of road rehabilitation required and the amount of funding availabe (see

Transportation section). The recreation opportunities associated with roaded-recreation including driving for pleasure, sightseeing, dispersed camping, fishing, hunting and rock climbing would be lost on approximately 55 miles of classified Forest roads. However, many of the roads such as Metberry (Forest road 205) that are closed under this alternative would continue to be open to nonmotorized uses until any planned decommission activities took place or the road is converted to a Forest trail.

An option under this alternative is to convert roads to motorized or nonmotorized Forest trails. Conversion to motorized trails is being proposed for Forest roads 343.B and 340.B in order to provide a motorized travel link between the Rainbow Falls and Rule Ridge – 717 motorized trail areas. Conversion to nonmotorized trails is being planned for the lower 2 miles of Corral Creek Road (Forest road 540) to provide walk-in fishing and hiking access. Under this alternative, there would be an overall loss of motorized recreation opportunities and a possible increase in nonmotorized recreation opportunities. Any nonmotorized trail conversions would have to comply with current federal accessibility standards and guidelines.

3. Crowding and Density – Under Alternative C, visitor density would probably increase on those roads slated for opening unless regular visitors choose to recreate somewhere else, or are displaced, to other recreation areas. Crowding on the other hand may or may not occur. Crowding is an individual value judgment that the number of visitors to an area is too many (Shelby et al., 1989). Thus, some visitors may not be bothered by the number of people recreating on the roads left open under Alternative C or some may perceive there to be too many people. For those that feel "crowded" they may choose to recreate someplace else, change their schedule to visit the area on a weekday or earlier in the day to avoid peak use, or they may decide to do a different activity (like ATV-riding instead of jeeping) in the same area and using the motorized trails instead of the roads.

Since the Hayman area is close to the Colorado Front Range and so accessible to many, there is most likely a high threshold of acceptance for more visitors to the area. The Wildcat Canyon was an especially popular and heavily visited area, primarily on weekends and holidays, so an increased level of visitors on those roads left open under Alternative C would probably not affect the recreation visitor experience to this area.

Under Alternative C, there would be less displacement of visitors to motorized areas outside of the Hayman area since many popular Forest roads would be reopened. By keeping more classified Forest roads open to motorized use in the Hayman area, this could help reduce the potential for crowding and the visitor pressure and impacts being felt at areas on other parts of the Pike National Forest such as Badger Flats, China Wall, Rainbow Falls, and Breakneck Pass.

4. Affects to MA and ROS direction – Under Alternative C, approximately 79% of the total 260 classified road miles in the Hayman burn area would be open to motorized use. The majority of classified Forest roads recommended for closure or decommission are in the 2A and 2B Management Area (MA) category which emphasizes semiprimitive motorized, roaded, and roaded natural recreation opportunities respectively. Furthermore, the Recreational Opportunity Spectrum (ROS) category for these MA's is either Semi-Primitive Motorized (SPM) or Roaded-Natural (RN), which again emphasizes access by motorized vehicles.

However, MA direction for 2A and 2B also states that motorized travel may be prohibited, restricted or seasonally prohibited to designated routes to protect physical and biological resources. There is also broad Forest Plan direction to close roads to public motorized use if use causes unacceptable damage to soils and water resources; financing is not available to maintain the road; use results in unsafe conditions; or use conflicts with wildlife management objectives (USDA Forest Service, 1984).

Alternative C would still adhere to MA and ROS direction by proposing continued motorized recreation access to many areas of Hayman including Wildcat Canyon. At the same time, Alternative C addresses the most urgent resource and management concerns as identified in the Hayman Roads Analysis Report. To address specific resource concerns, existing management tools, such as seasonal road closures or other timing restrictions, should also be considered.

ALTERNATIVE D – PROPOSED ACTION PLUS ADDITIONAL ROAD CLOSURES AND DECOMMISSIONS

Alternative D is the proposed action based on recommendations from the Hayman Roads Analysis Report (RAP) plus additional road closures and decommissions. The Hayman RAP provides recommendations for a road system that is safe, responsive to public and agency needs, is environmentally sound, and is affordable and efficient to manage. Under this Alternative, a total of 79 classified Forest road miles would not be available for public motorized use. This includes 12 miles that were already closed to motorized use before the Hayman Fire. The 36.5 miles of unclassified roads would be signed as closed and/or fenced off under this alternative and would be decommissioned as funding allows.

DIRECT AND INDIRECT EFFECTS

1. Public Access – Under this alternative, many areas of the Hayman area would remain accessible by motorized vehicles with the exception of the Wildcat Canyon, No Name ATV, Turkey Creek areas and various spur roads.

The major effects to public access under this alternative would be the loss of motorized recreation access to the Wildcat Canyon and South Platte River corridor area via Metberry Gulch (Forest Road 205), Longwater (Forest Road 221), Hackett (Forest Road 220), Crossover (Forest Road 220A), Widow Maker (Forest Road 220B) and Corral Creek (Forest Road 540). ATV and motorcycle access in the Wildcat Canyon area might be available by the “730” motorized trails (i.e., Forest Trails 730, 731, 732, etc.) when these trails are rehabilitated and opened on the South Park Ranger District. A Colorado State Parks OHV Grant submitted in 2003 to rehabilitate these trails was recently awarded.

The Signal Butte Multi-Use Trail, or 717 Trail, which is currently open, also provides motorized recreation access in the No Name ATV area (Forest road 366 and spurs). Furthemore, under this alternative, Forest roads 362.C and 362.D would be closed on a seasonal basis to address resource concerns while still providing traditional hunting access.

Alternative D addresses the resource concerns associated with current post-fire road conditions but does not address many of the access concerns from motorized recreation users. In addition to the Wildcat Canyon roads, the following roads would also be closed or decommissioned: Forest roads 205A, 207 and 215 which provide motorized access to Quartz Hill, an area popular with mineral collectors and hunters; Metberry road which provides motorized access to popular rock climbing, dispersed recreation areas and the Custer Cabin site (burned in fire); Forest roads 332.CA, 343.A1, 343.A2, 366, 366.A, 366.AA, 366.AB, 366.B, 366.C and 366.D which provide motorized access into traditional hunting and dispersed recreation areas; Forest road 294 which provides trailhead access to the Longwater Foot Trail; Forest road 542 which provides dispersed camping opportunities off of the 211 or Matukat Road; Forest road 522.A which provides an alternate access for recreation residence permittees in Bell Rock SH; Forest roads in the Turkey Creek area - 524, 525 and 526 which provide dispersed recreation opportunities; and several spur roads off of Forest Road 211 (Matukat Road) including 211.A, 211.A1, 211.D, 211.D1 and 211.G which provide dispersed recreation opportunties.

2. Recreation Opportunities – Under Alternative D, there would be a loss of motorized recreation opportunities on all three ranger districts. The recreation opportunities and experiences associated with roaded-recreation including driving for pleasure, sightseeing, dispersed camping, fishing, hunting and rock climbing access would be curtailed on 79 miles of classified Forest Roads. Unique recreation values associated with Wildcat Canyon including the proximity to the Front Range, challenging OHV terrain, dispersed camping, fishing, hunting and rock climbing access would also be lost. Many of the roads such as Metberry (Forest road 205) that are closed under this alternative would continue to be open to nonmotorized uses until any planned decommission activities took place or the road is converted to a Forest trail.

An option under this alternative is to convert roads to nonmotorized trails which would allow such uses as hiking, backpacking, hunting, horseback riding, mountain biking, etc. Under this alternative, conversion to nonmotorized trails is being planned for the Corral Creek Road (Forest Road 540) to provide walk-in fishing, camping and hiking access and the Approach Road (Forest Road 294) to extend the Longwater Foot Trail to the Platte Springs Road (Forest Road 210). Under this alternative, there would be an overall loss of motorized recreation opportunities and an increase in nonmotorized recreation opportunities. Any nonmotorized trail conversions would have to comply with current federal accessibility standards and guidelines.

3. Crowding and Density – Since 79 miles of classified roads would not be availabe to motorized vehicles under this alternative, visitors who have historically frequented the area for driving for pleasure, sightseeing, or OHV riding would be displaced, or forced to find other areas to carry out their recreation activity. This is already occurring since the roads in Wildcat Canyon (e.g., Hackett, Metberry, Longwater, etc.) have been closed to motorized vehicles because of safety and resource concerns resulting from the Hayman Fire.

Many motorized recreationists are now carrying out their activities at other locations on the Pike National Forest such as Rainbow Falls, Rampart Range, Badger Flats – China Wall, and Breakneck Pass. In these alternate or *substitute* locations, visitor density has most likely increased which could lead to management issues such as visitor conflicts, public safety issues, perceived crowding – or the feeling of too many people in one place, resource damage, creation of unclassified roads, and a reduction in quality of the visitor experience. For example, since the Hayman Fire, the Badger Flats – China Wall area west of the Tarryall Road (Park Co. Road 77) has become very popular with motorized recreationists and there has been a reported six new motorized hill climbs in the area, vehicles going around road barriers onto closed roads, and vehicles crossing riparian areas including the Tarryall River (Thibodeaux, pers. comm., 2004). Similar motorized issues are also reported to be occurring on those roads in Hayman that are currently open and at Breakneck Pass in the alpine tundra environment of the Mosquito Range (Thibodeaux, pers. comm., 2004).

Under Alternative D, there would be more displacement of visitors to motorized areas outside of the Hayman area since many popular Forest roads would be closed and there are few comparable substitute motorized recreation sites within the Hayman area. By keeping more classified Forest roads open to motorized use in the Hayman area, this could help reduce the visitor pressure and impacts being felt at other areas on the Pike National Forest such as Badger Flats, China Wall, Rainbow Falls, and Breakneck Pass.

4. Affects to MA and ROS direction – Under Alternative D, about 70% of the total 260 classified road miles in the Hayman burn area would be open. The majority of classified Forest roads recommended for closure or decommission are in the 2A and 2B Management Area (MA) category which emphasizes semiprimitive motorized, roaded, and roaded natural recreation opportunities respectively. Furthermore, the Recreational Opportunity Spectrum (ROS) category for these MA's is either Semi-Primitive Motorized (SPM) or Roaded-Natural (RN), which again emphasizes access by motorized vehicles.

Similar to Alternative A, Alternative D would not meet the requirements of the PSICC Forest Plan MA direction for MA 2A and 2B if motorized travel is prohibited in large, traditional motorized recreation areas like Wildcat Canyon. If Alternative D was selected, a Forest Plan Amendment would probably be necessary to emphasize the new nonmotorized recreation use in these areas. To address resource concerns, existing management tools, such as seasonal road closures or other timing restrictions, should be considered.

CUMULATIVE EFFECTS

The cumulative long and short-term effects to recreation are composed of effects caused by past, present and future actions plus the effects predicted for the proposed action. The Forest lands where the Hayman Fire occurred have traditionally been used for recreation access by the burgeoning Colorado Front Range population (see Appendix G: Recreation Trends). The PSICC Forest Plan prescribes much of the Hayman area as suitable for motorized recreation. Approximately 64% of the Hayman area is under the 2A and 2B management direction and about 92% of the Hayman area is within the ROS settings of Roaded-Natural (RN) and Semi-Primitive Motorized (SPM). Although the management prescription of these lands has changed very little if any, the number of registered All-terrain Vehicles (ATVs) skyrocketed from 11,700 in 1991 to more than 62,000 by 2001 (Denver Post, 2003). Nationwide, the number of Off-highway Vehicle (OHV) (includes ATVs) users has grown from about 5 million in 1972 to almost 36 million in 2000 (Bosworth, 2004) That's a 600 percent increase!

USDA Forest Service Chief Dale Bosworth has identified unmanaged recreation, especially the undesirable impacts from OHVs, as one of the key threats facing the Nation's Forests and Grasslands today (USDA Forest Service, 2004e). Concerns have been expressed over the number of unplanned roads and trails, erosion, lack of quality OHV recreation opportunities, water degradation and habitat destruction (USDA Forest Service, 2004e). In response to this issue the Chief has chartered two National Teams to develop contemporary policy and tools to address this issue effectively at the field level (USDA Forest Service, 2004e). As stated by Chief Bosworth (USDA Forest Service, 2004e), “This is not an easy issue to tackle, but if we wait a day, a week, or even a year, the impact on the land and issues surrounding the problem will become even harder to deal with. We need to address the issue now.” The national policy being developed would require OHVs to stay on designated roads, trails, and specifically defined off-highway use areas, and would generally prohibit cross-country travel by OHVs (USDA Forest Service, 2004e).

PSICC Travel Order 91-07 signed in 1991 already prohibits motorized vehicles from traveling off of designated Forest roads and trails so therefore should not have an impact to recreation within the project area. This Travel Order has been in place for almost 15 years and for the most part has worked well to keep vehicles on designated routes in order to avoid damaging cross-country vehicle travel.

Another recreation strategy initiative currently in the planning stages is the Front Range Recreation Alignment which would serve to coordinate recreation management and services on the Pike, Arapaho and Roosevelt National Forests and Pawnee National Grasslands. These National Forests and Grasslands are adjacent to heavily-populated urban areas and are experiencing major social and resource impacts such as uncontrolled shooting and vehicle use, and uncontrolled dispersed recreation use which are causing vegetation destruction, soil erosion and stream sedimentation (Valenzuela, 2004). The Front Range Recreation Alignment will attempt to provide seamless recreation management with consistent rules and regulations such as motor vehicles on designated roads and trails only, designated sites to park and camp and consistent travel management signing. Pursuant to PSICC Travel Order 03-04 signed by the Forest Supervisor in July 2003, visitors to the Hayman burn area are already required to park and camp in designated sites only and to remain only on those roads and trails designated for motorized vehicle use so the Front Range Recreation Alignment Strategy should not have an impact to recreation in the project area.

Several Pike NF projects that could potentially affect future recreation access and opportunities are (1) the Hayman Campground Closure and Decommission Project; (2) the Missouri Gulch Travel Management Project on the Pikes Peak Ranger District, (3) Rampart Range Travel Management Project on the South Platte Ranger District; and (4) Temporary Road and Trail Closures on the Pike National Forest.

- A Decision Memo has already been issued to close and decommission two campgrounds on the Pikes Peak Ranger District and two campgrounds on the South Platte Ranger District that were affected by the Hayman Fire. The two campgrounds on the Pikes Peak RD are Wildhorn Campground and Trail Creek Campground. The two campgrounds on the South Platte RD are Molly Gulch and Goose Creek Campground. A decision is still pending on the potential closure and decommission of the Big Turkey Campground located on the South Platte RD.

- The Missouri Gulch project will look at the existing transportation system in the Manitou Experimental Forest to determine appropriate road locations, relocations and potential road and trail closures. Roads and trails to be included in this project are Forest Roads 347, 348 and Forest Trail 650.
- The Rampart Range Project will also look at the existing transportation system in the Rampart Range Motorized Recreation Area to determine appropriate road locations and potential road relocations or closures.
- The goal of the Temporary Road and Trail Closures project is to implement temporary closures only when necessary to avoid resource damage, especially during the spring when frequent snow and rain showers add to the snowmelt, making forest roads and trails soft and muddy.

Although the exact outcome of the above projects is unpredictable at this time, the potential short-term cumulative effects on recreation is the loss of motorized recreation access and motorized recreation opportunities which could ultimately result in decreased recreational satisfaction, visitor displacement and increased visitor impacts at other locations. However, the likely long-term cumulative effect of these different projects and initiatives is improved OHV management on National Forest system lands without compromising basic forest resources and closer working relationships with local motorized and nonmotorized groups to formulate better travel management plans.

CONCLUSION

Alternatives A and D are similar in the amount of roads they propose to make unavailable to motorized use. Alternative A is the current management scenario in the Hayman burn area but would not implement any road decommission work on the closed roads. Alternative D would close and decommission the most number of road miles to motorized use and would also address most of the resource concerns. Alternative B is the pre-fire condition scenario and would open up the most road miles to motorized uses but would not address many of the resource concerns brought up in the Hayman Roads Analysis Report. Alternative C is the proposed action and represents a good balance of recreation access and natural resource concerns in the burn area.

Alternative C would also maintain an efficient flow of motorized routes throughout the burn area thus providing adequate public access to NFS lands, including a connecting route between Corral Creek Road (Forest road 540) and Longwater Gulch (Forest road 221), and the Hackett Gulch (Forest road 220-897) loop, both in the Wildcat Canyon area.

South Platte Wild and Scenic River Study

The key eligibility-related values in the project area are fisheries and recreation. Although other values were also identified in various segments within the project area, they do not appear to be very involved in the activities of this project. Fisheries are affected by sediment delivered to the river by the road system, while recreation is affected by the range of available recreational experiences. Accordingly, rather than generating new analyses, this discussion draws upon analyses disclosed in other sections of this assessment.

Fisheries

The dominant threat to the fisheries value is sediment delivered via roads that are hydrologically-connected and lead down to the South Platte River. Therefore there is a direct correlation between decommissioning of roads and protection of water quality and the fisheries value: the greater the amount of road rehabilitation, closure and decommissioning, the more protection for the fisheries value. All alternatives except Alternative A have a common feature of decommissioning unclassified roads and consequent reduction of sediment deliveries. Considering the road closure and decommission mileages listed in Chapter 2 and in Appendix B as well as the analyses under Soil and Water and Fisheries & Aquatics sections, Alternative D offers the most protection for the fisheries value, Alternative C offers somewhat less protection, while Alternatives A and B offer the least protection. Even under Alternatives A and B, however, it does not appear that eligibility or classification of the South Platte River would be jeopardized due to the low use levels and/or extensive repair and rehabilitation that would be associated with those two alternatives.

Recreation

Above Cheesman Reservoir the key recreation variable related to eligibility and classification of the South Platte River is motorized access in the Wildcat Canyon area. The recreation value is thus best served by those alternatives providing the widest range of recreation opportunities combined with a high level of user satisfaction. In this respect, Alternatives B and C best protect the recreation value. Alternatives A and D are less protective of the recreation value, yet they do not threaten the “Scenic” classification in the Wildcat Canyon area because their effects are strongly protective and cause no trend toward the “Recreation” classification.

Below the reservoir the alternatives have largely the same effect within the management area. None of the proposed activities appear to have an adverse effect on the recreation value, which means that all of the alternatives will protect river eligibility and maintain classification.

Conclusion

All of the alternatives appear to protect the finding of eligibility and maintain the classifications identified in the South Platte Wild and Scenic River Study.

Social Economics

Potential Social and Economic Consequences

Table 26 highlights the changes in road miles by alternative in total. (For a more complete roads table see Table 1 in Chapter 2 of this EA). The estimated costs of implementing each alternative are presented in Table 25 of the Transportation section above and in Appendix F and are not repeated here. This analysis does not include the possibility of volunteer efforts and grant moneys to support the reconstruction, closure, or maintenance of any part of the road system. There are several successful partnerships with road and trail user groups, but it would be difficult to include non-binding agreements in this analysis. Under any alternative, partnerships will always be considered as a valuable method for completed maintenance work, educating user groups, and community involvement opportunities.

Table 26: Total road miles open, closed and decommissioned by alternative

	Alt A	Alt B	Alt C	Alt D
Total classified road miles in Hayman Area	260	260	260	260
Classified road miles to be addressed in this EA	130	130	130	130
Classified road miles to be opened	53	118	72	47
Classified road miles to be closed or decommissioned	77	12	55	79
Unclassified road miles to be closed or decommissioned	36.5*	36.5	36.5	36.5

*Under Alternative A, unclassified roads would remain closed (gated or signed) but not decommissioned.

Effects Common to All Alternatives

In terms of total road miles available (see Table 26), it is difficult to estimate that there would be a significant change in any use because the overall change in total classified road miles is relatively small. But potential changes to *specific* roads can be of great importance to people who desire that access or who have a relationship with the places accessed by the road, or with the road itself. Many people have been coming to the area affected by the Hayman Fire throughout their lives and have memories of visiting the Forest with their parents and are now bringing their own children to the same area for family gatherings. Some of the roads that served as some of the more challenging routes before the fire like Hackett and Crossover, would serve primarily as expert-only terrain in those alternatives that reopen the routes; this would serve to limit use to a smaller specialized group. Closure or decommission of any road may open that area to nonmotorized users, but there are no statistics available to indicate if total use would increase or decrease.

ALTERNATIVE A

Alternative A will manage the road system as it currently is, with 77 classified miles to be closed (30 percent of the total 260 miles of system road). This alternative does not address the concerns of many motorized users about specific areas that would not be accessible. Roads closed to motorized access include Metberry, Northrup, Longwater, Hackett Gulch, and Corral Creek. Many nonmotorized users were also concerned about gaining access to areas for hunting, fishing, rock climbing and camping activities specifically the Turkey Rocks area and roads with access to the South Platte River. In most cases, closure or decommission of these roads does address the many resource concerns associated with road conditions post-fire and desires for additional nonmotorized opportunities.

ALTERNATIVE B

Alternative B will reopen the majority of classified roads that were open for motorized access before the Hayman Fire occurred. This alternative addresses many of the access concerns both motorized and nonmotorized recreationsits had for specific areas, but does not address the resource concerns or desires for more nonmotorized opportunities. Of the total 260 classified road miles in the Hayman area, alternative B would close only five percent.

ALTERNATIVE C

Alternative C will reopen 79 percent of the total 260 classified road miles in the area. Areas that will be open to motorized use include the upper part of Corral Creek, Longwater Gulch and Hackett Gulch. Areas that will remain closed to motorized use to address resource concerns include Metberry, Northrup, Helen’s Rock, and Turkey Creek.

ALTERNATIVE D

Alternative D closes the most miles of classified roads; 30 percent of the total 260 miles of classified system roads in the Hayman area. This alternative addresses most of the resource concerns associated with road conditions post-fire, increases nonmotorized opportunities, but restricts motorized access in some popular areas. Alternative D would close areas to motorized access including Metberry, Northrup, Hackett Gulch, Longwater, Approach, Corral Creek, and Turkey Creek.

Local Economic Effects

In terms of tourism there would be little change to spending patterns by visitors and little change in overall tourism activity in the local area. This is not to say that the use in the Hayman area is not important to the local economy, but that current users of the area would not likely change their use of the overall area under any of the alternatives. For those motorized areas that would be closed or decommissioned, nonmotorized use would likely increase, and there are other motorized opportunities for people to substitute for any closures or decommissions in the selected alternative (see Recreation section). The potential change in allowable use and miles of use by alternative are unlikely to change general use of the area.

There is information that both motorized and nonmotorized users contribute to the local economy as they access the Forest for day and overnight trips. The USDA Forest Service National Visitor Use Monitoring (NVUM) (Kocis et al., 2002) survey indicates the average expenditures for goods and services within 50-miles of a site, per person per trip is about $280 (USDA Forest Service, 2002). The Colorado Off-Highway Vehicle Coalition (COHVCO) (2001) completed a survey of the economic contribution of OHV use in Colorado. The information is not specific to the area affected by the Hayman Fire, but in general, OHV users require many goods and services for their activities. The survey shows that residents can spend between $86 and $102 per person on a day trip and between $264 and $339 per person on an overnight trip (COHVCO, 2001). Day trips for non-residents are similar, and expenditures for overnight non-residents range between $712 and $923 (COHVCO, 2001). Depending on the use figures applied, visitors to the area affected by the Hayman Fire reflects an important link to the local economy. Recreational use is not expected to change by alternative, so the economic contribution of recreational use in the Hayman area to the surrounding economy would be comparable to the level of activity supported before the 2002 Hayman Fire.

Aside from the direct monetary contribution of visitors to the area, the Hayman area holds significant value for many people that cannot easily be measured in terms of dollars. These values vary greatly between different types of users. For those living around the area, the Forest is valued as scenery, open space, habitat for wildlife, water quality and quantity, air quality, and opportunities for themselves and future generations to participate in outdoor activities. For those who visit the area, the Forest is valued for the specific opportunities to recreate, both motorized and nonmotorized. These values are all important but often mutually exclusive, therefore, the decision maker must find a compromise between uses, values, costs and benefits when selecting an alternative for implementation.

Social Effects

The Recreation section of this document highlights those specific access and recreation use differences by alternative in terms of specific roads to be opened, closed or decommissioned and the type of use allowed. This consideration is probably more important than economic factors because individuals may be forced to find substitute sites if roads are unavailable for their particular recreation use. People have been using many of the places and roads affected by the Hayman Fire for generations and have strong attachments to these places. Substitute sites may offer continued activity, but would not replace the values, memories, and attachment people have accumulated in their original places.

The types of opportunities offered by the alternatives also needs to be considered. Alternatives B and C would leave more of the challenging 4x4 roads open for vehicle use, while Alternatives A and D would close or decommission several of these roads. People may find it difficult to find a substitute site within the same range of a day trip for challenge and technical motorized opportunities. On the other hand, converting those roads to motorized or nonmotorized trails would offer additional recreation opportunities to another user group. Both motorized and nonmotorized users are interested in maintaining access to the Hayman area as it is some of the most accessible terrain from the Colorado Front Range for day use trips.

Conclusions

The actual mileage differences between the alternatives are minor and it is unlikely that visitor use would change significantly; so economic impacts to the surrounding area are unlikely to change by alternative. The big difference between alternatives is the specific roads that would be unavailable to motorized uses. The roads in question vary from easy roaded access to carry out nonmotorized activities (trailhead, campgrounds, fishing sites, rock climbing opportunities) to technical 4x4-only roads that require specialized vehicles and skills and offer a sense of risk and challenge.

Each alternative addresses road use at a different level, while addressing resource concerns associated with roads and roaded use. Only Alterative B reopens the majority of pre-fire road opportunities. Alternative A closes areas to motorized access such as Wildcat Canyon such as Hackett and Metberry which are significant 4X4 routes. Alternative C reopens Hackett and Longwater Gulch but Metberry Road would remain unavailable for motorized use under all alternatives except B for resource concerns.

As with any decision, it will be difficult to meet the demands of all interested parties, but Alternatives C and D offer both access and resource protection.

Heritage Resources

Introduction

This section discusses the potential effects of the alternatives on cultural resources within the Hayman project area. Cultural properties identified through file and map searches from previous project inventories and through current ongoing road surveys will be considered as well as the potential for undiscovered cultural properties. All roads that are proposed to be decommissioned under the action alternatives were evaluated for cultural resources. For this project the area to be considered as the area of potential effect is the road corridor, which includes associated water drainage structures and ditches. The issue addressed in this section is the potential for damage or destruction to cultural properties.

ALTERNATIVE A: NO ACTION

Under this alternative no ground disturbing treatments would occur. The no action alternative would not directly impact any heritage resource, however, it would not provide for any new mitigation needed for sites currently being impacted.

ALTERNATIVES B, C AND D

To date only one potentially eligible site has been recorded in the project area that would be affected by this project. All of the action alternatives propose ground-disturbing activities that could potentially cause damage to heritage resource sites. However, road maintenance and decommission activities would mostly occur in areas that have already been disturbed by prior road construction, use, and maintenance. Additional effects to historic properties are not likely. If erosion from existing roads are impacting archaeological or historical sites, rehabilitation or decommission of these roads would prove beneficial to these sites.

Custer Cabin located at the bottom of Metberry Gulch Road (Forest Road 205) along the South Platte River completely burned down during the Hayman Fire and is not listed in either the National Register of Historic Places or Colorado State Registers of Historic Properies. Due to the fact that the cabin has burned down and is not listed as an official historic property, the alternatives including Alternative A would have no effect on Custer Cabin.

Although mitigations (see Mitigations section in Chapter 2) would be taken to ensure that any eligible or potentially eligible heritage sites are not disturbed, the possibility does exist that unknown (subsurface) sites could be disturbed. If any new sites are discovered during the implementation phase of this project, the District or Forest Archaeologist would be notified immediately and activities would cease until the site is reviewed.

Cumulative Effects Common to All Alternatives

Foreseeable activities within the Hayman Roads Management Project Area include timber harvest, recreation, road construction, range, and associated improvement projects. All of these activities may have a cumulative effect to heritage resources in the form of increased soil erosion, increased visitor use, traffic, and vandalism. These impacts are difficult to quantify, but can be avoided or minimized through the implementation of appropriate site-specific mitigation measures through consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation.

Under these alternatives the adverse cumulative effects from other associated activities with road use would be mitigated. Continued road access would open up cultural properties for damage through vandalism and personal collection of artifacts. Without proper monitoring and/or interpretation these resources are increasingly threatened by development, public use and vandalism and would remain in jeopardy.

Fuels and Fire

ALTERNATIVE A: NO ACTION
The no action alternative would have no effect on current fire prevention activities. Roads gated after the Hayman Fire would still allow access for suppression via keys or bolt cutters. Roads would still need to be maintained and hazards removed as they develop. Obstructions and hazards would need to be cleared before each fire season as needed.

ALTERNATIVE B
This alternative is essentially the same as "A" except that all roads gated and closed after the Hayman Fire would eventually be reopened. Issues of road maintenance and hazard removal would remain the same. This alternative could potentially speed up suppression response time as fire personnel would not have to deal with gates. However, the fire engines are not capable of manuevering on some of the more extreme 4x4 roads (e.g., Hackett, Metberry, Longwater, etc.) therefore, the response time would be similar whether those roads are opened or closed.

ALTERNATIVE C
The proposed action alternative would affect fire suppression response times due to fewer roads being available for ground fire suppression access. Roads with administrative access or seasonal access would be gated and road maintenance and hazard removal continued. Roads proposed to be converted to another use or decommissioned would initially be gated or barricaded to prevent motorized access. These roads would have to be reopened with heavy equipment to be utilized for fire suppression activities thus possibly slowing response time. Aerial resources such as helicopters and /or airplanes would have to be utilized more resulting in higher suppression costs.

ALTERNATIVE D
This alternative is more restrictive than all the alternatives in the number of road miles proposed for closure or decommission. This would reduce more areas to immediate ground fire suppression. More time would be spent opening roads or firelines with heavy equipment or relying more on aerial fire suppression resources such as airplanes and/or helicopters.

Cumulative Effects
Due to the removal of most ground fuels from such an intense fire, existing conditions present a low fire danger. There is little dead and downed material in areas that burned with high or moderate burn intensity. However, this hazard will gradually increase as grasses and other vegetation regenerate, standing dead trees fall, and ground fuel loading return to natural levels. Future fuel conditions will rise sharply in about three to five years as the standing dead timber in the area begins to fall. Once this begins to happen, dead fuel loading would generally range from 10-30 tons per acre. Most of this would not contribute greatly to fire spread rates, but during very dry years this could burn readily. Grasses and other live vegetation in the area is expected to regenerate well. Fires in grassy areas are likely to spread quickly, with low severity and low to moderate intensities.

Major increases in dead fuel loading, particulary 1,000 hour and larger time lag fuels, would likely occur in the longer term (ten years and beyond) as the fire-killed trees fall and accumulate on the forest floor (USDA Forest Service 2002a, USDA Forest Service 2002b). With large accumulations of 1,000 hour and larger time lag fuels, an ignition could result in a wildfire that was more difficult to control, increased severity, and increased residence time (USDA Forest Service, 2002b). The fuel loading within the project area will remain fairly continuous, though dependent on burn severity and size, amount, and type of live fuels present prior to the Hayman Fire.

The fire-killed trees that remain standing will continue to be a hazard to firefighters, Forest Service personnel, contractors, and other Forest users (USDA Forest Service, 2003d). Falling trees have claimed the lives of many firefighters and are a significant safety hazard (USDA Forest Service, 2002b). Fire suppression methods may be altered to provide for firefighter safety because of the large number of standing dead trees that will remain in the project area. Significant accumulations of dead and down fuels also impede construction of fire line reducing crew production rates (USDA Forest Service, 2003d).

Roadside hazard tree work has been done, or is planned along all sections of roads and trails within the Hayman Burn area. This work is being accomplished with a combination of roadside hazard tree sales, service contracts, and Forest Service crews. During hazard tree sales, hazard trees up to 100 feet from the roadside are removed and taken off site, and other forest fuels - limbs, tree tops, unmerchantable pieces of trees, etc. remain on the ground. This results in an overall reduction of large woody fuels within sale areas. The other roadside hazard tree removal methods – service contracts and Forest Service crews – are designed to leave the trees and parts upon the ground. These activities in general have increased both the ground cover and the large woody fuel load of treated areas which had been previously removed by the fire.

In addition to the roadside hazard tree work, ongoing timber salvage operations in the Hayman area and fuels reduction projects taking place on the Pikes Peak, South Park, and South Platte Ranger Districts are also reducing the long-term fuel loading and increasing forest heterogeneity.

Historically, humans are the primary cause of fires on the Pike National Forest, with escaped campfires being the main cause. The risk of fires from OHV's, are low because most OHVs operate on designated roads and trails devoid of vegetation and are not within fine fuel areas. The risk from human activities will remain as people camp and recreate throughout the area.

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The effects of the alternatives would be minimized by adhering to all the mitigation measures. Some effects, however, still cannot be avoided.

Soils

There may be some decrease in long-term soil productivity due to topsoil disturbance during road maintenance and decommission activities. There would also be a decrease in soil quality due to erosion. Roads that remain in poor locations that are hydrologically-connected may result in additional soil erosion in the long-term.

Hydrology
There may be some decrease in water quality due to sedimentation that may result during road maintenance or decommission activities or from increased peak flows caused by roads that are hydrologically-connected.

Fisheries and Aquatics
Sedimentation and decreased water quality resulting from road maintenance or decommission activities or increased peak flows from roads that are hydrologically-connected may affect the short-term productivity for fish bearing streams.

Wildlife
None of the activities proposed on NFS lands would have an adverse effect on wildlife species.

Recreation
Recreationists and forest visitors would notice the difference in roaded access but this would vary by alternative. Road maintenance and decommission activities may disrupt the normal recreational uses of the area.

Heritage Resources
There is no assurance that every cultural resource site would be located in advance of all planned road maintenance and decommission activities. Some ground-disturbing activity could unavoidable affect an undiscovered historic or prehistoric site. Sites discovered in this manner would be immediately protected from further disturbance as discussed in Chapter 2 mitigations. Some sites could be inadvertently destroyed or damaged.

SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

Soil Productivity
The soil resource is a key ingredient for maintaining the long-term productive potential for an area. Accelerated erosion and effects detrimental to the soil resource would be minimzed through use of BMPs. Alternatives C and D would reduce the most number of hydrologically-connected roads and decommission the most number of roads which would have a long-term beneficial affect on the soil resources of the area.

Hydrology
Short-term effects could include an increase in peak flows and total sediment yields. These effects could affect long-term productivity, channel stability and beneficial uses. Accelerated erosion and effects detrimental to the hydrologic resource would be minimzed through use of BMPs. Alternatives C and D would reduce the most number of hydrologically-connected roads and decommission the most number of roads which would have a long-term beneficial affect on the hydrology of the area.

Fisheries and Aquatics
Sedimentation and decreased water quality resulting from road maintenance or decommission activities or increased peak flows from roads that are hydrologically-connected may affect the

short-term productivity for fish bearing streams. Alternatives C and D would reduce the most number of hydrologically-connected roads and decommission the most number of roads which would have a long-term beneficial affect on the fisheries and aquatic resources of the area.

Wildlife
Alternatives A, C and D would limit roaded access which may have a long-term beneficial affect on wildlife species that prefer unfragmented forest habitat.

Recreation
The long-term recreational use patterns for the area would be affected by the alternatives due to the potential changes in roaded access for motorized vehicles. Short-term effects would include displacement, perceived crowding and changes in recreational satisfaction.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible commitment of resources results from a decision to use or modify resources that are not renewable, or are renewable only over a long period of time. The commitment is irretrievable if the use of a renewable resource is lost due to land allocation decisions or conflicts in scheduling activities. In this case, the opportunities are foregone for a given period of time.

Soils
Any soil lost to erosion would be considered an irreversible and irretrievable commitment of the soil resource. The majority of the accelerated erosion is due to the fire however, the implementation of any of the action alternatives would result in additional erosion in the short-term while road maintenance and decommissioning activities are taking place. Best Management Practices would be used to minimize soil productivity losses from road maintenance and decommission activities. Roads that remain in poor locations that are hydrologically-connected may result in additional soil erosion in the long-term.

Hydrology
Water quality, changes in channel width and channel stability, resulting from increased peak flows from roads that are hydrologically-connected may be considered an irreversible and irretrievable commitment of hydologic resources since channel recovery would take many years. Best Management Practices would be used to minimize the effects to hydrology from road maintenance and decommission activities.

Fisheries and Aquatics
Any fish kills or loss of aquatic organisms due to road maintenance or decommission activities or due to increased peak flows from roads that are hydrologically-connected may be considered an irretrievable commitment. Best Management Practices would be used to minimize the effects to fisheries and aquatic resources from road maintenance and decommission activities.

Wildlife
Loss or change of road access and human-wildlife contacts resulting from this project would not result in irretrievable or irreversible effects.

Recreation
Loss or change of road access for public motorized recreation may be considered an irretrievable effect but not an irreversible action.

Heritage Resources
There may be an irreversible commitment of heritage resources if artifacts are damaged or lost during road maintenance or decommission activities. Implementation of the mitigation measures would eliminate this potential commitment.

CHAPTER 5. LIST OF PREPARERS AND CONTRIBUTERS

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

ID Core Team Members:

Bill Jackson – Team Leader, Recreation, Writer/Editor - Recreation Solutions Enterprise Team
Pat Hessenflow – Noxious Weeds, NEPA Coordination – Hayman Fire Restoration Team
Gary Morrison – Transportation/Engineering – Hayman Fire Restoration Team
Dana Butler – Hydrology – Hayman Fire Restoration Team

Extended ID Team Members:

James Kinsman – Heritage Resources – Hayman Fire Restoration Team
James Behm – Fire/Fuels – Hayman Fire Restoration Team
Theresa Nallick – GIS Specialist – Hayman Fire Restoration Team
Marla Merkel – Lands Specialist – Hayman Fire Restoration Team
Julie Schaefers – Social/Economics – Regional Office (R2)
Randy Ghormley – Wildlife – Region 2 Enterprise Biologist
Steve Tapia – Wildlife – Rocky Mountain Research Station/Pike National Forest
Ken Kanaan – Soils – PSICC Supervisor's Office
Neal Weierbach – Landscape Architect – PSICC Supervisor's Office
John Hill – South Platte Wild and Scenic River Study – PSICC Supervisor's Office
Steve Culver – Fisheries/Aquatic Resources – South Platte Ranger District
Sherri Zufall – Secretary/Recorder – South Platte Ranger District
Terry McCann – Public Affairs – South Platte Ranger District

Federal, State and Local Agencies:

Bureau of Land Management
City and County of Denver
City of Colorado Springs
City of Manitou Springs
City of Woodland Park
Colorado Commission on Indian Affairs
Colorado Department of Transportation
Colorado Division of Wildlife
Colorado Department of Natural Resources
Colorado Mined Land Reclamation Division
Colorado State Forest Service
Douglas County Commissioners
El Paso County Commissioners
El Paso County Parks and Recreation
Environmental Protection Agency
Jefferson County Commissioners

Mountain Communities Fire Protection District
Mueller State Park
Park County Commissioners
Pikes Peak Area Council of Governments
Teller County Commissioners
Teller County Community Development Services
Teller County Division of Parks
Teller County Trails Committee
Teller – Park County Conservation District
US Air Force Academy
US Congressman Joel Hefley
US Fish and Wildlife Service
US Senator Ben Nighthorse Campbell
US Senator Wayne Allard
USDA Natural Resources Conservation Service
West Creek Lakes Water District

Tribes:

Eastern Shoshone Tribe
Jicarilla Apace Tribe
Kiowa Tribe of Oklahoma
Northern Cheyenne Tribe
Northern Arapahoe Tribe
Southern Cheyenne and Arapahoe Tribes of Oklahoma
Southern Ute Tribe
Ute Indian Tribe
Ute Mt. Ute Tribe of Indians

Others:

The following organized groups provided written input to the environmental analysis:

American Lands Alliance
Audubon Society
Bighorn 4x4 Club
Blue Ribbon Coalition
Bullhead 4 Wheelers, Inc.
Capital Trail Vehicle Association
Center for Native Ecosystems
Colorado Association of 4WD Clubs, Inc. (COA4WDCI)
Colorado 500
Colorado Four Wheelers
Colorado GO4 Four Wheel Drive
Colorado Land Cruisers
Colorado Motorcycle Trail Riders Association (CMTRA)

Colorado Mountain Club
Colorado Off-Highway Vehicle Coalition (COHVCO)
Colorado Quad Runners
Colorado Rockhoppers 4WD Club
Colorado Springs Christian 4 Wheelers (CSC4W)
Colorado Trout Unlimited
Colorado Wild
Hillbillies 4x4 Club
Lost Valley Ranch
Mile High Jeep Club Patrol 16
On the Rocks Patrol 6
Oshwego Jeepers
Pikes Peak Enduro Club
Predator 4WD, LLC
Rampart Range Motorcycle Committee
Rising Sun 4x4 Club
Rocky Mountain 4WD Club
Rocky Mountain Recreation Initiative
Rocky Mountain Trails Association
Sierra Club
Solihull Society
Trail Ridge Runners
United Four Wheel Drive Association
Upper Arkansas and South Platte Project
Ute Pass Iron Goats
Wild Yoats 4WD Club
Wilderness Society
Woodland Park Saddle Club

Including the above groups, approximately 1500 persons, clubs or organizations provided written input during the scoping process. The name of every person or organization that provided written input is not listed here due to space but is available in the project record located at the Hayman Fire Restoration Team office in Colorado Springs.