United States Department of Agriculture

Forest Service

March 2012

Environmental Assessment

TURKEY SPRINGS TRAIL MANAGEMENT PLAN

Responsible Official: Kevin Khung, District Ranger

Abstract:

This environmental assessment documents the environmental consequences of alternative ways to address recreation opportunities and existing problems relating to the network of system and non-system trails in the greater Turkey Springs area of the Pagosa Ranger District. Four alternatives are analyzed in detail. Alternative 1 (No Action) would retain the current trail system in the analysis area and not change existing designations; Alternatives 2, 3 and 4 propose varying levels of changes to and/or expansion of the current trail system, with Alternative 2 providing the least level of changes/improvements, Alternative 4 providing the most changes/improvements, and Alternative 3 being the District's Proposed Action.

Location:

Pagosa Ranger District, San Juan National Forest

Archuleta County, Colorado

Portions of Townships 34-36 North, Ranges 2-4 West, N.M.P.M.

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ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
AQCR	Air Quality Control Region
ATV	All Terrain Vehicle
BLM	Bureau of Land Management
CDOW	Colorado Division of Wildlife
CMT	Culturally-Modified Trees
CFR	Code of Federal Regulations
CRA	Colorado Roadless Areas
C&H	Cattle and Horse
EA	Environmental Assessment
EPA	Environmental Protection Agency, United States
ESA	Endangered Species Act
FSH	Forest Service Handbook
GIS	Geographic Information System
hp	Horsepower
HUC	Hydrologic Unit Code
ID	Interdisciplinary
IRA	Inventoried Roadless Areas
MA	Management Area
MIS	Management Indicator Species
ML	Maintenance Level
MSO	Mexican Spotted Owl
MVUM	Motor Vehicle Use Map
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFS	National Forest System
NFSR	National Forest System Road
NFST	National Forest System Trail
NHPA	National Historic Preservation Act
NMHC	Non-Methane Hydrocarbons
No.	Number
NO_2	Nitrogen Dioxide
NO_x	Oxides Of Nitrogen
OHV	Off Highway Vehicle

PLPOA	Pagosa Lakes Property Owners Association
PM	Particulate Matter
RARE	Roadless Area Review and Evaluation
ROS	Recreation Opportunity Spectrum
RU	Recovery Unit
SHPO	State Historical Preservation Officer
SI	Scenic Integrity
SJNF	San Juan National Forest
SJPL	San Juan Public Lands
SMS	Scenery Management System
SO2	Sulfur Dioxide
SRMCRU	Southern Rocky Mountains Colorado Recovery Unit
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
VQO	Visual Quality Objectives
VRM	Visual Resource Management

1 INTRODUCTION

1.1 Document Structure

The Forest Service has prepared this Environmental Assessment (EA) to document the environmental effects of implementing changes to existing motorized and non-motorized trail systems within the Turkey Springs, Middle Mountain, Horse Mountain, and Devil Mountain areas of the Pagosa Ranger District (District). This analysis complies with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental effects of the District's Proposed Action and three other alternatives, including a No Action Alternative. The document is organized into five parts:

- *Introduction:* This section includes information on the purpose of and need for the project, and the agency's proposal for achieving that purpose and need.
- *Alternatives, including the Proposed Action:* This section details how the Forest Service informed the public of the proposal and how the public responded. This section also provides a more detailed description of the proposed action as well as alternative methods for achieving the stated purpose. This discussion also includes possible design criteria.
- *Affected Environment and Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative (which provides a baseline for evaluation and comparison), and then the effects of the action alternatives.
- *List of Preparers:* This section provides a list of preparers of this analysis and associated assessment.
- *Literature Cited*: This section provides citations for documents referenced in this EA.

Additional analysis documentation is on file at the District Office in Pagosa Springs.

1.2 Best Available Science

This analysis is based on the best available science, as evidenced by the following:

- Recent site-specific field inspections and reviews of the analysis area by the Interdisciplinary (ID) Team,
- Use of research, scientific studies, and information as documented in the literature cited and references section of this document,
- San Juan National Forest Management Indicator Species (MIS) and Sensitive Species Assessments,
- Consultation with the State Historical Preservation Officer (SHPO),
- Consultation with the Colorado Division of Wildlife (CDOW),

- Expert opinions of ID Team resource specialists, and use of most recent geographic information system (GIS) resource layers, and
- Wildlife GIS modeling.

1.3 Analysis Area

The analysis area includes the Turkey Springs, Middle Mountain, Horse Mountain, and Devil Mountain areas of the District. The analysis area is 67,569 acres in size. Approximately 56,099 acres of the analysis area (83 percent) are on National Forest System (NFS) lands. Figure 1 displays the location of the analysis area relative to its location within the San Juan National Forest (SJNF).

1.4 Travel Management

In 2005, the Forest Service adopted the Travel Management Rule (36 Code of Federal Regulations [CFR] 212), which required National Forests to designate the roads, trails, and areas that are open to motor vehicle use (except for vehicles traveling over snow). To comply with the rule, the District completed an EA in November of 2008 (USDA Forest Service 2008) that proposed a variety changes to the District's road and motorized trail systems necessary to meet the stipulations provided by the rule. A Motor Vehicle Use Map (MVUM) was subsequently published displaying all of the routes on the District open to motorized travel.

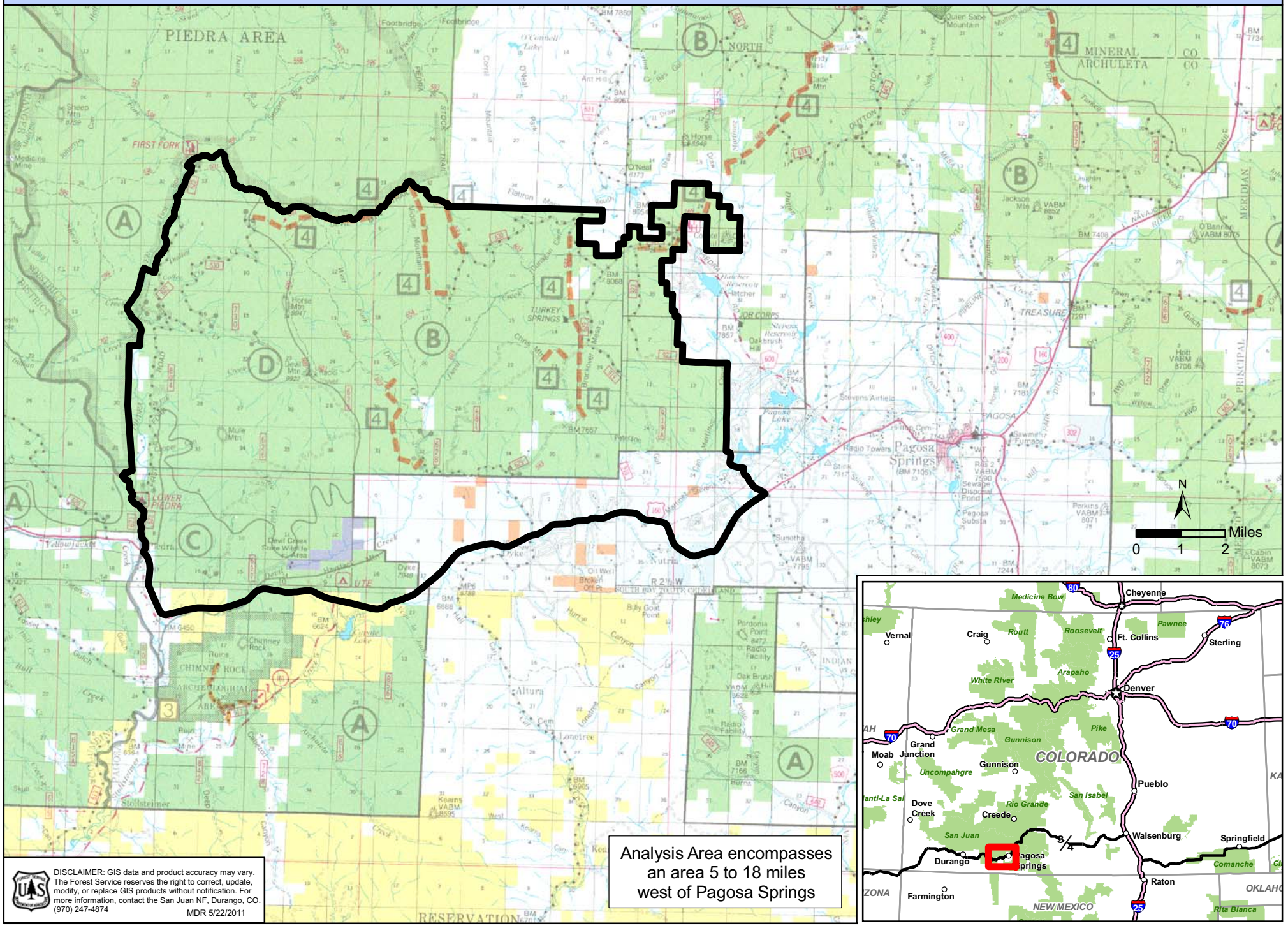
In the process of conducting the public outreach necessary to complete the EA, a variety of concerns were conveyed by the public that opportunities for motorized recreation were becoming increasingly limited on the District and that the existing opportunities were not meeting user preferences. Recognizing a need to address this public concern and other similar issues relating to non-motorized trail opportunities, the District identified the Turkey Springs/Devil Mountain landscape as a priority area of the District for examining trail-based recreation issues. Subsequently, the District began the initial phases of gathering route and resource data for the Turkey Springs/Devil Mountain landscape.

An additional component of the Travel Management Rule required the Forest Service to conduct a Travel Analysis in order to "identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands"; and to identify the roads that "are no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails" (36 CFR 212.5B). Direction for completing a Travel Analysis was subsequently set forth in the Forest Service Handbook (FSH) 7709.55 Chapter 20, which extended the process to include route-by-route analyses of motorized trails. In May 2011, the District completed a Travel Analysis Report for the existing system of roads and motorized trails on the District, which has aided in the development of this EA and is available at the District office.

Note on Terminology: A list of commonly used acronyms is found after the Table of Contents. Appendix A also contains a glossary of commonly used acronyms relating to the terminology employed throughout this analysis. A familiarity with commonly used acronyms and terminology is important in understanding the following discussions.

Figure 1: Analysis Area Vicinity Map -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest - Analysis Area 67,569 acres



DISCLAIMER: GIS data and product accuracy may vary. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. For more information, contact the San Juan NF, Durango, CO. (970) 247-4874

MDR 5/22/2011

1.5 Regulatory and Administrative Framework

1.5.1 National Environmental Policy Act

This EA has been prepared in accordance with NEPA of 1969, as amended (42 United States Code [U.S.C.] Sections [§§] 4321-4374), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and Forest Service NEPA procedures (36 CFR Part 220).

1.5.2 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531-1544) requires federal agencies, in consultation with the United States Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "take" of ESA-listed species. ESA Section 7 consultation has been initiated with the USFWS regarding potential effects to Pagosa skyrocket and Mexican spotted owl, the outcome of which is documented in this EA.

1.5.3 National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. §§ 470 et seq.) establishes as federal policy the protection of historic properties in cooperation with state and local governments, Indian tribes, and other stakeholders. Section 106 of the NHPA directs federal agencies to take into account the effect of federally funded or licensed undertakings on any district, site, building, structure, or object either listed or eligible for listing on the National Register of Historic Places. NHPA Section 106 consultation has been initiated with the SHPO regarding potential effects to historic properties, the outcome of which is documented in the Final EA.

1.5.4 National Forest Management Act

The National Forest Management Act of 1976 (16 U.S.C. §1600 et seq.) directs the Forest Service to prepare land management plans for units of the NFS. The SJNF Land and Resource Management Plan 1983, amended 1992, (the Forest Plan) establishes programmatic direction for the management of NFS lands. In addition to the Forest Plan, management direction for the Piedra Area is found in the San Juan and Rio Grande National Forests' Wilderness Management Direction, Decision Notice and associated EA (1998). The following Forest-wide General Direction statements relate to trail system management.

- Maintain all trails to the following minimum requirements: a) structures (bridges, corduroy, etc.) are structurally sound and safe for specified class of user; b) maintain drainage structures to prevent unacceptable resource damage; and c) remove hazards from trails to allow safe passage for specified class of users.
- Provide a full range of trail opportunities in coordination with other federal, state, and municipal jurisdictions and private industries both on and off NFS lands.
- Construct or reconstruct trails when needed as part of the transportation system.

1.5.4.1 Management Areas

The SJNF is broken into discrete Management Areas (MAs). MAs provide management direction by emphasizing a particular resource and identifying associated guidelines (prescriptions) for management activities. Figure 2 displays MAs in the analysis area. The following are MAs within the analysis area and applicable trail guidelines.

MA 2B – Emphasis on rural and roaded-natural recreation opportunities (374 acres)

- Close roads and trails to motorized travel when the surface would be damaged to the degree that resulting runoff into adjacent water bodies would exceed sediment yield threshold limits.
- Maintain existing motorized routes or construct new routes needed as part of the transportation system. Develop loop routes and coordinate them to complement semi-primitive motorized opportunities in and adjacent to semi-primitive motorized Recreation Opportunity Spectrum (ROS) class areas.
- On all non-forested areas, motorized trail density is not to exceed 4 miles per square mile.

MA 3A – Emphasis on semi-primitive, non-motorized recreation opportunities (287 acres)

- Emphasize trails for hikers, cross-country skiers, and horse use.
- Prohibit or restrict motorized vehicle use.

MA 4B – Emphasis on habitat for management indicator species (2,036 acres)

- Provide trails for cross-country skiing, snowmobile, foot, and horse travel where people/wildlife conflicts do not exist.
- Manage human recreational activities so they do not conflict with habitat needs of selected indicator species.

MA 5B – Emphasis on big game winter range in forested areas (11,121 acres)

- Provide trails only when needed to access other MAs.
- New motorized recreational use is managed to prevent unacceptable stress on big game animals during the primary big game use season.
- Restrict disruptive human activity in calving and fawning areas during May, June, and July.

MA 6B – Emphasis on livestock grazing (12,757 acres)

- Provide trails for cross-country skiing, snowmobile, foot, and horse travel.
- Restrict disruptive human activity in calving and fawning areas during the last two weeks of May and the first two weeks of June.

MA 7E – Emphasis on wood fiber production and utilization (27,629 acres)

- Provide parking areas for dispersed recreationists along system roads.
- Provide trails for cross-country skiing, snowmobile, foot, and horse travel.
- Emphasize opportunities for dispersed motorized recreation and direct people to lesser-used areas.

- Restrict disruptive human activity in calving and fawning areas during the last two weeks of May and the first two weeks of June.

MA 9A – Emphasis on riparian area management (not mapped)

- Vehicular travel is limited on roads and trails at times when the ecosystems would be unacceptably damaged.
- Locate roads and trails outside riparian areas unless alternative routes have been reviewed and rejected as being more environmentally damaging.

MA 10D – Wild and Scenic Rivers (1,707 acres)

- Wild river segments: Close existing trails to motorized vehicle use.

MA 1.11 – Pristine Wilderness Conditions (3 acres)

- Do not construct or reconstruct trails.

MA 1.12 – Primitive Wilderness Conditions (86 acres)

- Construct or reconstruct trails only when needed to meet objectives of the wilderness transportation system.

MA 1.13 – Semi-Primitive Wilderness Conditions (99 acres)

- Construct or reconstruct trails only when needed to meet objectives of the wilderness transportation system.

The ID Team reviewed this direction as well as additional direction found in the MA prescriptions and determined that the alternatives analyzed in detail comply with the Forest Plan.

1.5.5 Roadless Area Direction

Inventoried Roadless Areas (IRAs) – The Forest Plan (as amended) identified 24 potential roadless areas on the SJNF and generally refer to them as Roadless, Unroaded, RARE II Areas (Roadless Area Review and Evaluation), or IRAs (SJNF, 1992 p.IIa-5 - IIa-6). Portions of the analysis area are within the boundary of the Piedra IRA.

In January 2001, a Roadless Area Conservation Rule (2001 Roadless Rule) was adopted into regulations at 36 CFR Part 294. It provided specific protections for IRAs by prohibiting road construction, road reconstruction, and timber harvest in IRAs except under certain exceptions. It does not prohibit motorized trails. Since its promulgation, the 2001 Roadless Area Conservation Rule has continued to be the subject of litigation and is currently enjoined by a decision from the U.S. District Court for the District of Wyoming.

Colorado Roadless Areas (CRAs) – The State Petitions Rule was promulgated in May, 2005. In November 2006, Colorado Governor Bill Owens submitted a petition to the Secretary of Agriculture to undertake state-specific roadless rulemaking for Colorado. The State's petition was considered for rulemaking by the Secretary of Agriculture, and the Forest Service is currently developing a Colorado state-specific roadless

rule. The Colorado Petition does not prohibit motorized trails. Portions of the analysis area are within the boundary of the CRA.

A formal review process has been established, at the regional office level, to review and forward proposed projects to the Secretary for formal consideration prior to a decision. The Turkey Springs Trail Management Plan project has been reviewed as part of the formal regional review process within the context of the Secretary's re-delegation of authority.

1.6 Purpose and Need for Action

1.6.1 Purpose

The purpose of this action is to establish a trail system that will enhance and improve recreation opportunities in the analysis area in a manner that is both socially and ecologically sustainable.

1.6.2 Need

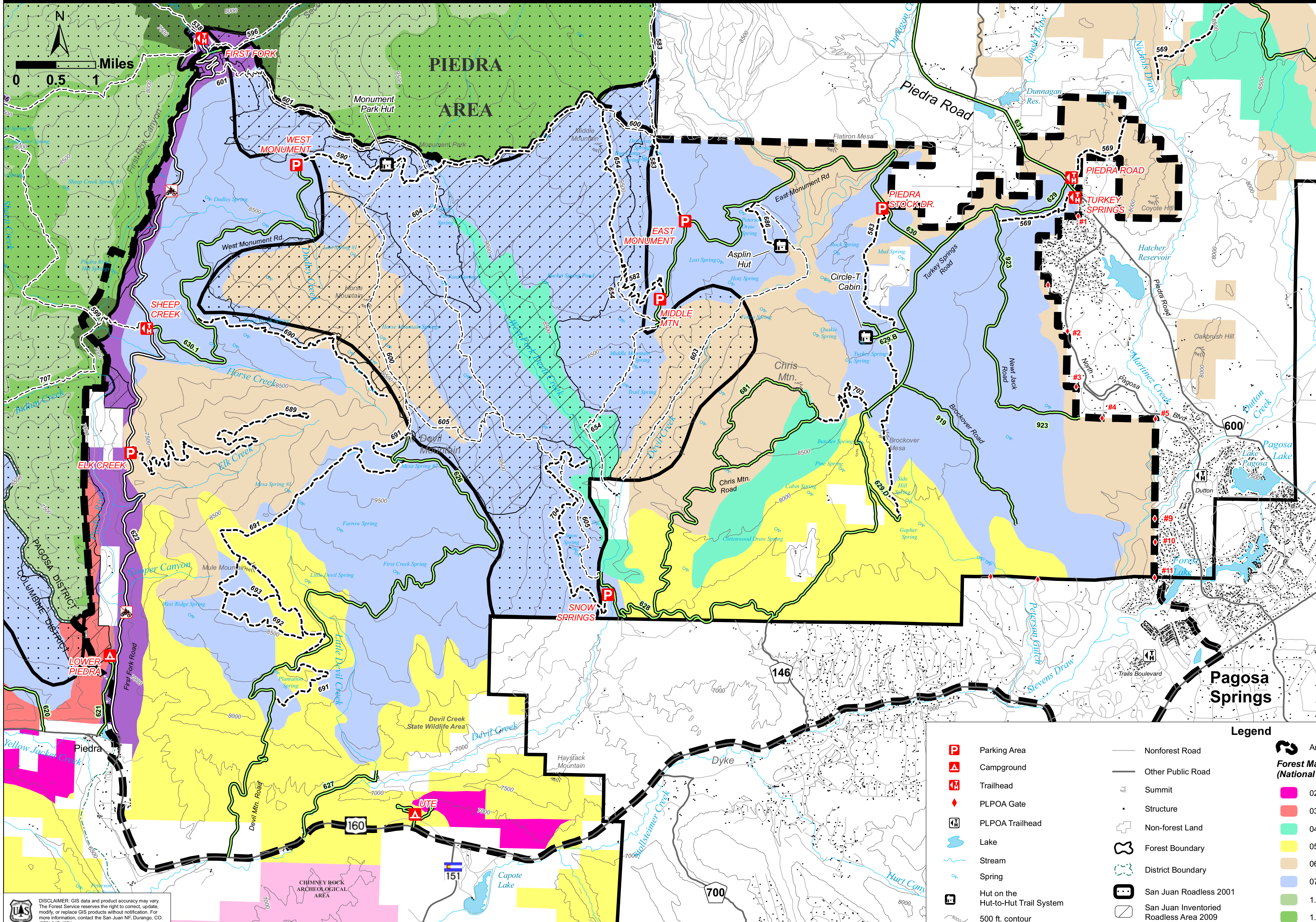
The need for this project is to address recreation opportunities and existing problems relating to the network of system and non-system trails in the Turkey Springs, Middle Mountain, Horse Mountain, and Devil Mountain areas, including a perceived lack of adequate opportunities for certain recreation activities and user groups, fragmented trail systems, proliferation of user-created routes, user-group conflicts, safety concerns, and unwanted impacts to forest resources. See map of existing conditions (Figure 3).

1.7 Proposed Action

In order to meet the purpose and need, the Proposed Action (Alternative 3) generally recommends a variety of changes to the types of use permitted on the current trail system within the analysis area, the formalization of non-system routes, reconstruction of system and non-system routes to accommodate changes in designation, new construction of trails and trail segments, and other changes to the current road and trail network.

Figure 2: Forest Management Areas, Roadless (2001 and 2009) and Open System Roads and Trails -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest



Analysis Area Summary

Analysis Area Size
67,569 acres

National Forest Lands
56,099 acres

Piedra Area (within Analysis Area)
188 acres

Management Area Summary

Mgt Area	NF Acres within Analysis Area
02B	374
03A	287
04B	2,036
05B	11,121
06B	12,757
07E	27,629
1.11	3
1.12	86
1.13	99
10C	0
10D	1,707

Roadless Area Summary

Roadless, San Juan 2001
14,343 acres

Roadless, San Juan Inventory 2009
9,515 acres

1.8 Decision Framework

1.8.1 Decisions to be Made

The Responsible Official will review the purpose and need, the proposed action and alternatives, and the environmental consequences in order to make decisions regarding:

1) Re-designation of system and non-system roads and/or trails
2) Removal and/or decommissioning of system and non-system roads and/or trails
3) Seasonal restrictions on motorized trails
4) Disposition of user-created routes
5) New trail construction
6) Closure of the area around the East Monument Road 630 parking area to camping, and
7) New parking areas

The decision document accompanying the Final EA will detail the decision. The MVUM will be updated subsequent to release of the Final EA if the decision results in changes to open system roads and motorized trails.

1.8.2 Framework for Decision-Making

The Turkey Springs Trail Management Plan will only make decisions for lands within the analysis area that are under National Forest jurisdiction. Decisions to be made within this EA will be consistent with the current Forest Plan (USDA Forest Service 1992); actions that would require a Forest Plan amendment are not proposed. Decisions to be made regarding open roads and motorized trails must also conform to the Travel Management Rule (36 CFR 212) and Executive Order number (No.) 11644, as amended by Executive Order No. 11989.

1.8.3 Responsible Official

The District Ranger is the Responsible Official for trail-based recreation decisions for the Pagosa Ranger District.

1.8.4 Public Involvement

The following are public involvement activities that have occurred for this project proposal.

- The proposal was first listed in the Schedule of Proposed Actions in the July-September 2010 edition and has been in every subsequent edition.
- A scoping letter was mailed to known interested parties, local businesses, and government entities on September 17, 2010, announcing a public scoping period that commenced September 17, 2010 and ended October 20, 2010.
- A media release describing the project and upcoming open house was submitted to local and regional media outlets September 17, 2010.

- A public open house (scoping) meeting was held at the Pagosa Springs Community Center on September 28, 2010.
- An opportunity to comment legal notice was published in the Durango Herald on July 15, 2011.
- A letter was mailed to the project mailing list announcing a 30-day public comment period for the Draft EA that commenced July 15, 2011 and ended August 15, 2011.
- A public open house meeting was held at the Pagosa Springs Community Center on July 28, 2011.

1.8.5 Issues

The ID Team used information from the scoping process to identify issues related to the initial proposal. Issues identified by the ID Team during scoping were separated into two groups: issues and key issues.

Issues were determined to be within the scope of the EA if they addressed: 1) the NEPA process or other regulatory requirements, 2) existing recreational uses or preferences, 3) environmental effects or conflicts that would result from implementing the proposal, or 4) the methodology to be used to analyze impacts. Key issues are those issues of public or agency concern that become the focus of the NEPA analysis and guide the development of alternatives. Key issues serve to highlight the effects or unintended consequences that may result from an action, giving opportunities during the analysis to reduce adverse effects and to compare trade-offs between the alternatives.

All public scoping comments were considered by the ID Team and the Responsible Official, and are documented in the project record. Issues raised during the public scoping period are summarized in Appendix B. Those key issues that guided the development of alternatives are described in Section 2.1, Alternative Development.

2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This section presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Details regarding each of the alternatives' specific action items may be found in Appendix C.

2.1 Alternatives Development

Alternative development sought to: 1) incorporate public comments regarding inclusion/exclusion of specific motorized and non-motorized trails, 2) identify those key connections that could convert dead-end trails to loop trails, while minimizing new trail construction, 3) add recreational opportunities for underserved user groups, 4) develop a range of alternatives with regard to trail mileages, and 5) develop a range of alternatives with regard to key issues identified during scoping.

These key issues included:

- Trail sustainability and impacts of trail-based recreation to forest resources (i.e., soils, hydrology, wildlife, and vegetation);
- Inadequate opportunities for trail-based recreation in the analysis area and disposition of user-created trails;
- Impacts to big game calving and fawning and migration corridors;
- Minimization of motorized/non-motorized user group conflicts, including conflicts with special permit holders and recreational hunting in the Horse Mountain area; and
- Consistency of proposed uses with private property to the east and south of the analysis area.

2.2 EA Figures, Outputs, Displays: Intended Use and Limitations

The figures in this document are intended to show approximate locations and juxtaposition of the features displayed. Given their small scale, these figures are not intended to be used to locate features on the ground with any degree of precision, similar to what is required during project implementation. As part of the environmental analysis process, ID Team members field verified features before making impact assessments and findings.

2.3 Alternatives Considered in Detail

The four alternatives considered are explained in Sections 2.3.1 through 2.3.4 and shown on Figure 4 through Figure 7. Table 1 provides a tabular comparison of each of the alternatives.

Table 1: Alternative Comparison (in miles)

	Alternative 1 No Action	Alternative 2	Alternative 3 Proposed Action	Alternative 4
Non-motorized trail system	29.8	44.5	57.6	59.6
ATV trail system	45.0	55.0	57.1	59.6
Single-track motorized trail system	0.0	0.0	13.6	29.5
Road system open to full-sized vehicles	69.3	68.2	65.8	65.8
ML1 (closed) road system	81.6	82.6	85.0	85.0
Non-system routes adopted as non-motorized system trails	-	12.2	28.3	42.4
Non-system routes adopted as ATV system trails	-	2.3	2.9	2.9
Non-system routes adopted as single-track motorized system trails	-	0.0	1.1	3.4
Non-motorized trail converted to single-track motorized system trail	-	0.0	9.2	20.2
ATV trail converted to non-motorized system trail	-	1.4	1.2	1.1
Open road converted to non-motorized system trail	-	0.0	2.8	2.8
Open road converted to ATV system trail	-	0.7	0.7	0.7
Open road converted to single-track motorized system trail	-	0.0	0.0	0.0
Currently open system roads being closed to full-sized vehicles	-	1.1	3.6	3.6
ML1 system road designated as new non-motorized trail	-	0.0	5.5	5.4
ML1 road designated as new ATV system trail	-	4.2	6.8	6.8
ML1 road designated as new single-track motorized system trail	-	0.0	0.0	0.0
New construction non-motorized system trail	-	1.1	6.1	6.3
New construction ATV system trail	-	5.0	6.0	7.5
New construction single-track motorized system trail	-	0.0	3.3	5.9
Decommission/remove from system non-motorized system trail	-	0	4.0	5.2
Decommission/remove from system ATV system trail	-	0	2.4	1.5
Decommission non-system route	-	15.0	4.4	2.3

2.3.1 Alternative 1 – No Action

This alternative would retain existing road and trail designations and not propose any changes (additions or subtractions) to the existing road and trail system in the analysis area. Motorized use of non-system routes would continue to be prohibited, in accordance with existing policy. Non-motorized non-system routes would be monitored for resource damage resulting from continued use and evaluated for decommissioning, if necessary (see Figure 4).

2.3.2 Alternative 2

This alternative proposes a variety of changes to the existing trail system, including the adoption of non-system trails, changes in the managed use permitted on existing trails, and new construction of trails and trail segments.

2.3.2.1 General

New trail design, survey, and construction will be undertaken in accordance with Forest Service direction specified in EM 7720.103 and FSH 2309.18. All new construction of all terrain vehicle (ATV) trails will be designed (and constructed accordingly) to meet Forest Service Trail Class 3 specifications (see Table 2) by a qualified engineer or trail planner. All new construction of mountain bike trails will be designed (and constructed accordingly) to meet Forest Service Trail Class 2 specifications by a qualified engineer or trail planner.

In the event that a route proposed for new construction cannot be designed and/or constructed to its prescribed Trail Class specifications within the corridor that was surveyed as part of this analysis, the appropriate level of environmental analysis of the new route location will be completed prior to construction.

All new motorized trails will have seasonal closure dates when they are closed to all motorized vehicles, with the exception of snowmobiles operating on snow within existing areas designated as open to snowmobiles. These closure dates will vary, based on the type of motorized use. All new ATV trails will have seasonal closure dates of December 1 through May 14 annually, in accordance with existing District policy governing seasonal closures for motorized trails.

All non-system routes proposed for inclusion in the trail system that require repairs or reconstruction to meet Forest Service standards for the assigned trail type, class, and managed use being prescribed for the route will receive the needed improvements prior to the route being formally designated and opened to public use.

All system trails proposed for changes in their managed use that require repairs or reconstruction to meet Forest Service standards for the managed use prescribed for the trail will receive the needed improvements prior to the route being reclassified and opened to the new use(s).

Motorized use of non-system routes not proposed for inclusion in the transportation system would continue to be prohibited, in accordance with existing policy. Non-motorized use of non-system trails being proposed for decommissioning would be discouraged through such methods as informational signage, barrier installation, and/or tread obliteration, as particular trail situations warrant. Non-motorized non-system trails not proposed for decommissioning or inclusion in the transportation system would be

monitored for resource damage resulting from continued use and evaluated for decommissioning if necessary.

2.3.2.2 Specific Actions

- Add 11.4 miles of ATV trails to transportation system (4.1 miles from designation of trails on Maintenance Level (ML)1 roads, retaining ML1 roads on system; 2.3 miles from adoption of non-system routes; and 5.0 miles from new ATV trail construction)
- Add 14.7 miles of non-motorized trails to transportation system (1.4 miles from conversion of system motorized trails to non-motorized trails; 12.2 miles from adoption of non-system routes; and 1.1 miles from new non-motorized trail construction)
- Remove from transportation system and decommission 0.1 miles of system road
- Decommission 0.5 miles of non-system roads
- Decommission 15.0 miles of non-system trails
- Prohibit camping within 100 feet of the East Monument Road (National Forest System Road [NFSR] 630) parking area

2.3.3 Alternative 3 – Proposed Action

This alternative would be similar to Alternative 2 with the following exceptions.

2.3.3.1 General

All new construction of single-track motorized trails (i.e., motorcycle trails) will be designed (and constructed accordingly) to meet Forest Service Trail Class 2 specifications (see Table 2) by a qualified engineer or trail planner.

All new motorcycle trails will have seasonal closure dates of September 1 through June 14 annually to provide for wildlife security during spring fawning and calving periods, and to provide for non-motorized recreation opportunities during the fall season.

2.3.3.2 Specific Actions

- Add 15.7 miles of ATV trails to transportation system (6.8 miles from designation of trails on ML1 roads, retaining ML1 roads on system; 2.9 miles from adoption of non-system routes; and 6.0 miles from new ATV trail construction).
- Add 13.6 miles of single-track motorized trails to transportation system (9.2 miles from conversion of system non-motorized trails to single-track motorized trails; 1.1 miles from adoption of non-system routes; and 3.3 miles from new motorized single-track trail construction).
- Add 41.0 miles of non-motorized trails to transportation system (5.4 miles from designation of trails on ML1 roads, retaining ML1 roads on system; 1.2 miles from conversion of system motorized trails to non-motorized trails; 28.3 miles from adoption of non-system routes; and 6.1 miles from new non-motorized trail construction).
- Close 0.1 miles of system road to motorized travel.

- Remove 2.4 miles of motorized trails from the transportation system.
- Remove 4.0 miles of non-motorized trails from the transportation system.
- Remove from transportation system and decommission 0.1 miles of closed system (ML1) road.
- Decommission 0.5 miles of non-system roads.
- Decommission 4.4 miles of non-system trails.
- Prohibit camping within 100 feet of the East Monument Road (NFSR 630) parking area.
- Re-classify 11.7 miles of First Fork Road (NFSR 622) as open to all motorized vehicles instead of open to highway-legal vehicles only.
- Improve parking areas on Brockover Road (NFSR 919) and Newt Jack Road (NFSR 923) through installation of signage, grading, and surface hardening (gravel).

2.3.4 Alternative 4

This alternative would be similar to Alternative 2 and 3 with the following exceptions.

2.3.4.1 Specific Actions

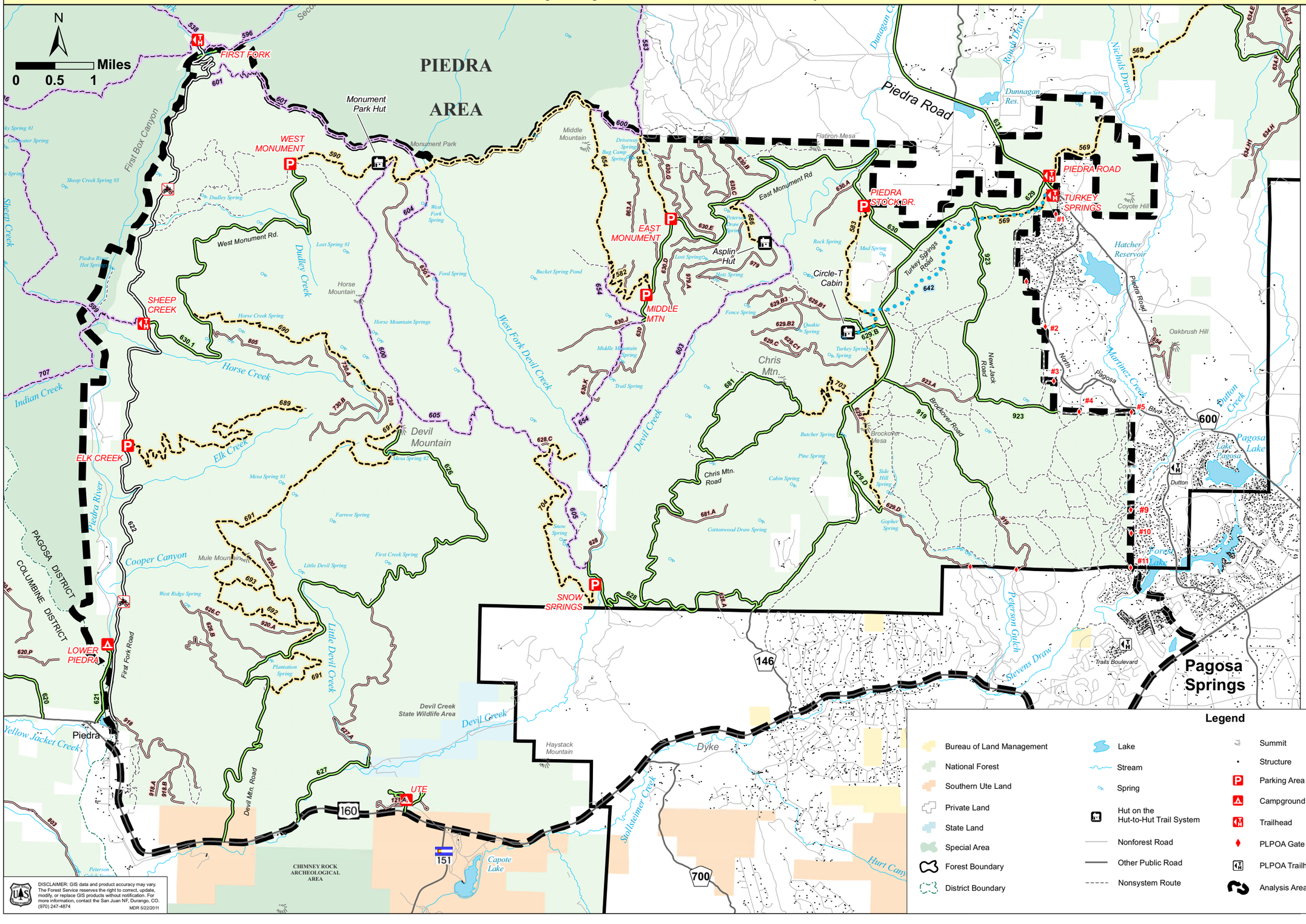
- Add 17.2 miles of ATV trails to transportation system (6.8 miles from designation of trails on ML1 roads, retaining ML1 roads on system; 2.9 miles from adoption of non-system routes; and 7.5 miles from new ATV trail construction).
- Add 29.5 miles of single-track motorized trails to transportation system (20.2 miles from conversion of system non-motorized trails to single-track motorized trails; 3.0 miles from adoption of non-system routes; and 5.9 miles from new construction of motorized single-track trails).
- Add 55.2 miles of non-motorized trails to transportation system (5.4 miles from designation of trails on ML1 roads, retaining ML1 roads on system; 1.1 miles from conversion of existing motorized system trails to non-motorized system trails; 39.9 miles from adoption of non-system routes; and 6.3 miles from new non-motorized trail construction).
- Close 0.1 miles of system road to motorized travel.
- Remove 1.5 miles of motorized trails from the transportation system.
- Remove 5.2 miles of non-motorized trails from the transportation system.
- Remove from the system and decommission 0.1 miles of closed system (ML1) road.
- Decommission 0.5 miles of non-system roads.
- Decommission 2.3 miles of non-system trails.
- Prohibit camping within 100 feet of the East Monument Road (NFSR 630) parking area.
- Re-classify 11.7 miles of First Fork Road (NFSR 622) as open to all motorized vehicles instead of open to highway-legal vehicles only.

Table 2: Forest Service Trail Design Parameters (FSH 2309.18)

Designed Use		Bicycle Trail Class 2	Motorcycle Trail Class 2	ATV Trail Class 3
Design Tread Width	Single Lane	12” – 24”	8” – 24”	60”
	Double Lane	36” – 48”	48”	96” – 108”
	Structures (Minimum Width)	18”	36”	60”
Design Surface	Type	Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common	Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous	Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present
	Protrusions	≤ 6” May be common and continuous	≤ 6” May be common and continuous	≤ 3” May be common, but not continuous
	Obstacles (Maximum Height)	12”	18” May be common or placed for increased challenge	6” May be common and left for increased challenge
Design Grade	Target Grade	5% – 12%	10% – 25%	5% – 15%
	Short Pitch Maximum	25% 35% on downhill segments only	40%	25%
	Maximum Pitch Density	10% – 30% of trail	20% – 40% of trail	15% – 30% of trail
Design Cross Slope	Target Cross Slope	5% – 8%	5% – 10%	3% – 8%
	Maximum Cross Slope	10%	15%	10%
Design Clearing	Height	6’ – 8’	6’ – 7’	6’ – 8’
	Width (On steep side hills, increase clearing on uphill side by 6” – 12”)	36” – 48” Some light vegetation may encroach into clearing area	36” – 48” Some light vegetation may encroach into clearing area	60” – 72”
	Shoulder Clearance	6” – 12”	6” – 12”	6” – 12”
Design Turn	Radius	3’ – 6’	3’ – 4’	8’ – 10’

Figure 3: Existing Condition, Roads and Trails -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest - Analysis Area 67,569 acres



Travel Management Category

Current Route Designaton	Miles
Non-motorized trail system	29.8
ATV trail system	45
Single-track motorized trail system	0
Road system open to full-sized vehicles	69.3
ML 1 (closed) road system	81.6

Legend

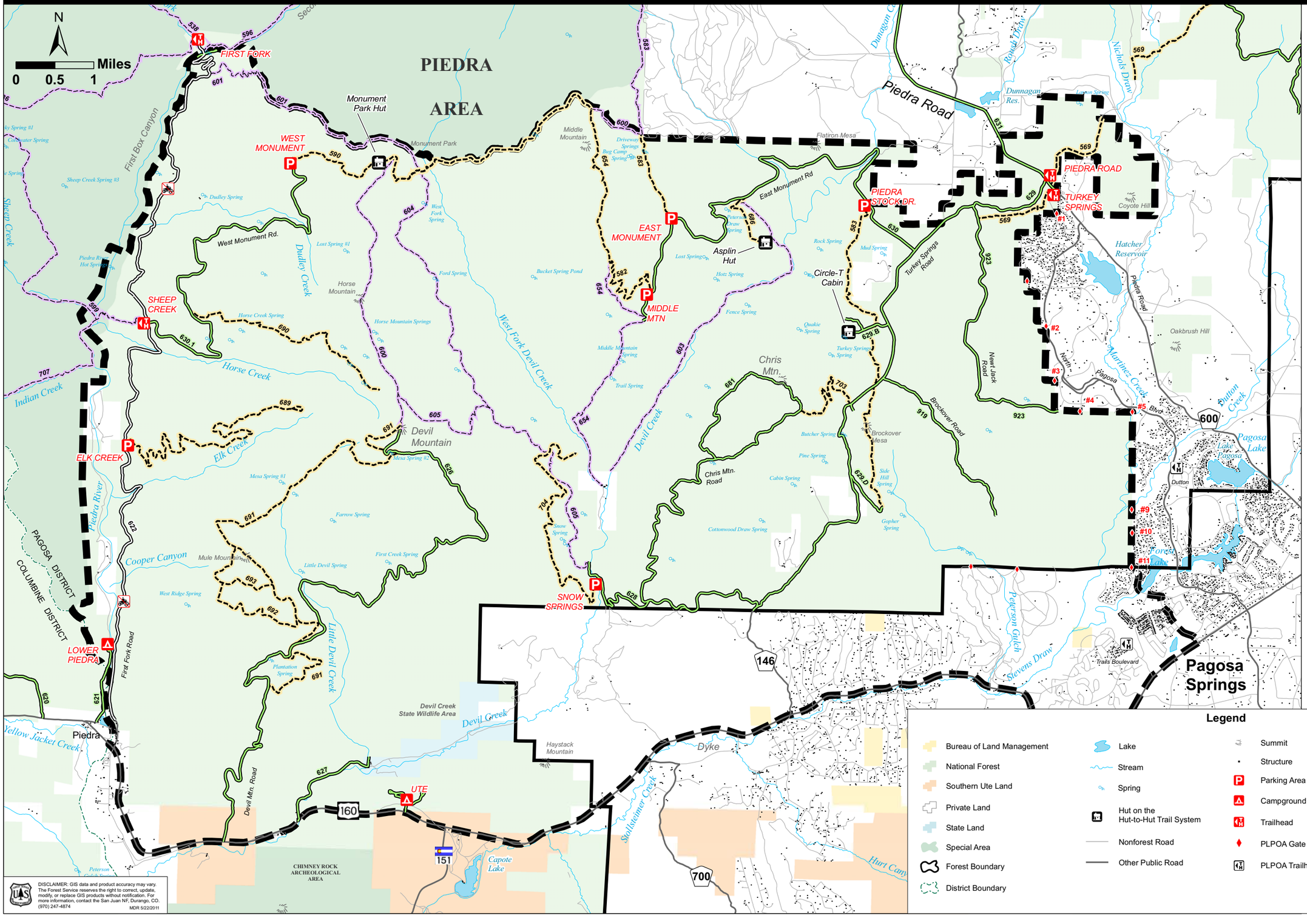
- Bureau of Land Management
- National Forest
- Southern Ute Land
- Private Land
- State Land
- Special Area
- Forest Boundary
- District Boundary
- Lake
- Stream
- Spring
- Hut on the Hut-to-Hut Trail System
- Nonforest Road
- Other Public Road
- Nonsystem Route
- Summit
- Structure
- Parking Area
- Campground
- Trailhead
- PLPOA Gate
- PLPOA Trailhead
- Analysis Area

Existing USFS Transportation

- 630 Open System Road
- 630 Closed System Road
- 622 System Road Open to Highway-Legal Vehicles Only
- 582 Motorized Trail - Existing ATV Designation
- 603 Non-motorized Trail - Existing Designation
- 642 Winter Ski Trail

Figure 4: Alternative 1 (No Action) Trails System Proposal -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest - Analysis Area 67,569 acres

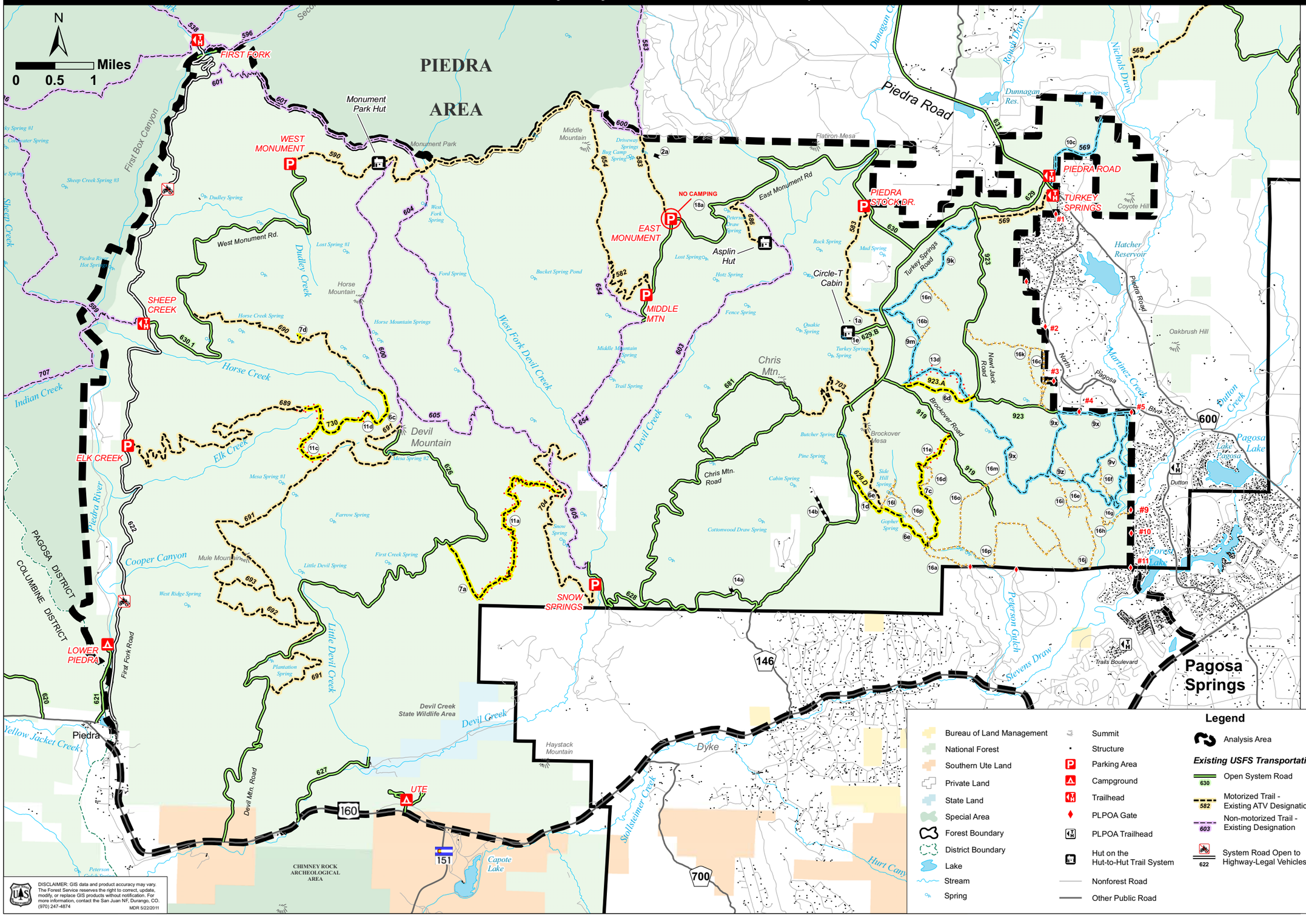


Travel Management Category

Existing National Forest System Road and Trail Designations are maintained.

Figure 5: Alternative 2 Trails System Proposal -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest - Analysis Area 67,569 acres



Travel Management Category

(1) - Close Open System Road to all motorized travel
(a, d, e)

(2) - Decommission System Road
(a)

(3) - Convert non-motorized system trail to Single-track Motorized Trail
(----)

(4) - Convert nonsystem trail to Single-track Motorized Trail
(----)

(5) - Add Parking Area
(----)

(6) - Convert System Road to ATV trail (retaining ML1 portion of road)
(c, d, e)

(7) - Convert nonsystem road/trail to ATV trail
(a, c, d)

(8) - Convert System Road to Non-motorized System trail (retaining ML1 portion of road)
(----)

(9) - Convert nonsystem trail to Non-motorized System trail
(k, m, v, x, z)

(10) - Convert Motorized System trail to Non-motorized System trail
(c)

(11) - New ATV System trail construction
(a, c, d, e)

(12) - New Single-track System trail construction
(----)

(13) - New Non-motorized System trail construction
(d)

(14) - Decommission nonsystem road
(a, b)

(15) - Remove from system and/or Decommission System trail
(----)

(16) - Decommission nonsystem trail
(a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p)

(17) - Convert System Road Open to Highway Legal Vehicles Only to Road Open to All Vehicles
(----)

(18) - Establish No Camping Zone
(a)

Legend

- Bureau of Land Management
- National Forest
- Southern Ute Land
- Private Land
- State Land
- Special Area
- Forest Boundary
- District Boundary
- Lake
- Stream
- Spring
- Summit
- Structure
- Parking Area
- Campground
- Trailhead
- PLPOA Gate
- PLPOA Trailhead
- Hut on the Hut-to-Hut Trail System
- Nonforest Road
- Other Public Road
- Analysis Area

Existing USFS Transportation

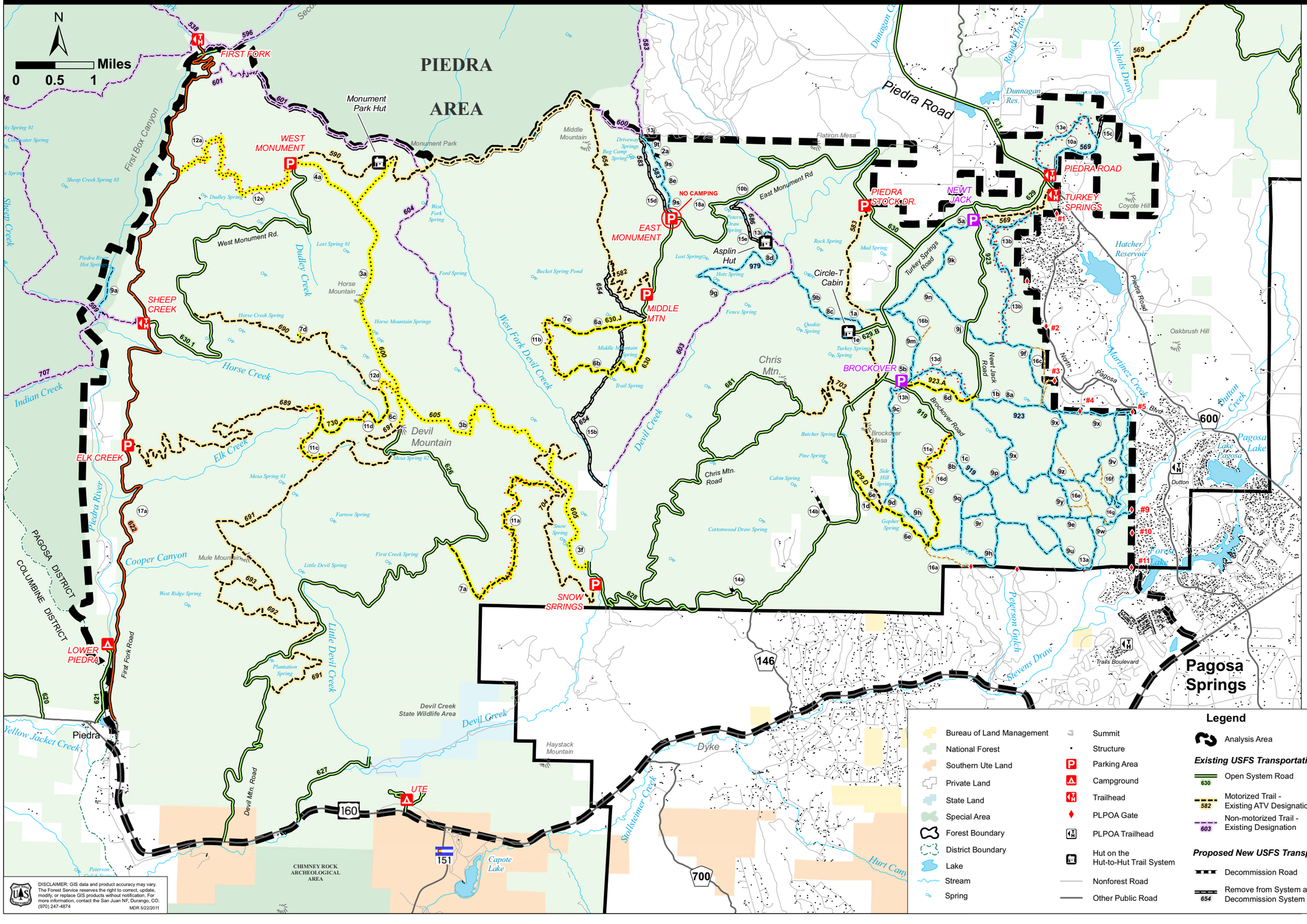
- Open System Road (630)
- Motorized Trail - Existing ATV Designation (582)
- Non-motorized Trail - Existing Designation (603)
- System Road Open to Highway-Legal Vehicles Only (622)

Proposed New USFS Transportation

- Decommission Road
- Decommission Nonsystem Trail
- New Trail Construction
- Non-motorized Trail - New Designation (603)
- Motorized Trail - New ATV Designation (603)
- 9a — ID of Travel Mgt Category change as described in related Word document

Figure 6: Alternative 3 (Proposed Action) Trails System Proposal -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest - Analysis Area 67,569 acres



Travel Management Category

(1) - Close Open System Road to all motorized travel
(a, b, c, d, e)

(2) - Decommission System Road
(a)

(3) - Convert non-motorized system trail to Single-track Motorized Trail
(a, b, f)

(4) - Convert nonsystem trail to Single-track Motorized Trail
(a)

(5) - Add Parking Area
(a, b)

(6) - Convert System Road to ATV trail (retaining ML1 portion of road)
(a, b, c, d, e)

(7) - Convert nonsystem road/trail to ATV trail
(a, c, d, e)

(8) - Convert System Road to Non-motorized System trail (retaining ML1 portion of road)
(a, b, c, d, e)

(9) - Convert nonsystem trail to Non-motorized System trail
(a, b, c, d, e, f, g, h, j, k, m, n, p, q, r, s, t, u) (v, w, x, y, z)

(10) - Convert Motorized System trail to Non-motorized System trail
(a, b)

(11) - New ATV System trail construction
(a, b, c, d, e)

(12) - New Single-track System trail construction
(a, d, e)

(13) - New Non-motorized System trail construction
(a, b, d, e, h, i, j)

(14) - Decommission nonsystem road
(a, b)

(15) - Remove from system and/or Decommission System trail
(b, c, d, e)

(16) - Decommission nonsystem trail
(a, b, c, d, e, f, g)

(17) - Convert System Road Open to Highway Legal Vehicles Only to Road Open to All Vehicles
(a)

(18) - Establish No Camping Zone
(a)

Legend

- Bureau of Land Management
- National Forest
- Southern Ute Land
- Private Land
- State Land
- Special Area
- Forest Boundary
- District Boundary
- Lake
- Stream
- Spring
- Summit
- Structure
- Parking Area
- Campground
- Trailhead
- PLPOA Gate
- PLPOA Trailhead
- Hut on the Hut-to-Hut Trail System
- Nonforest Road
- Other Public Road
- Analysis Area

Existing USFS Transportation

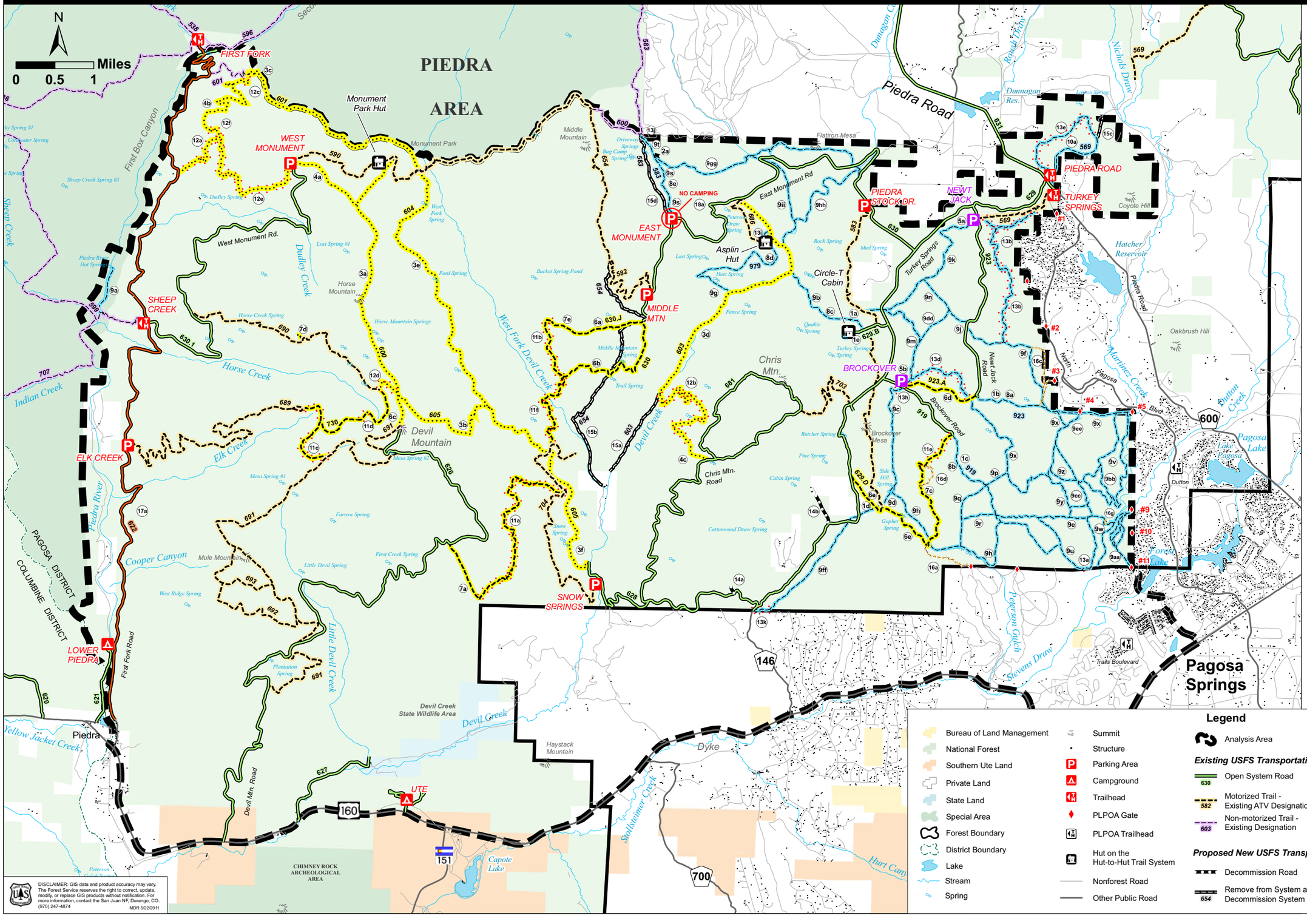
- Open System Road (630)
- Motorized Trail - Existing ATV Designation (582)
- Non-motorized Trail - Existing Designation (603)

Proposed New USFS Transportation

- Decommission Road
- Remove from System and/or Decommission System Trail (654)
- Decommission Nonsystem Trail
- New Trail Construction
- Non-motorized Trail - New Designation (603)
- Motorized Trail - New ATV Designation (603)
- Motorized Trail - New Single Track Designation (730)
- Open System Road to All Vehicles (622)
- Parking Area (new)
- ID of Travel Mgt Category change as described in related Word document (9a)

Figure 7: Alternative 4 Trails System Proposal -- Turkey Springs Trail Management Plan

Pagosa Ranger District - San Juan National Forest - Analysis Area 67,569 acres



Travel Management Category

- (1) - Close Open System Road to all motorized travel
  (a, b, c, d, e)
- (2) - Decommission System Road
  (a)
- (3) - Convert non-motorized system trail to Single-track Motorized Trail
  (a, b, c, d, e, f)
- (4) - Convert nonsystem trail to Single-track Motorized Trail
  (a, b, c)
- (5) - Add Parking Area
  (a, b)
- (6) - Convert System Road to ATV trail (retaining ML1 portion of road)
  (a, b, c, d, e)
- (7) - Convert nonsystem road/trail to ATV trail
  (a, c, d, e)
- (8) - Convert System Road to Non-motorized System trail (retaining ML1 portion of road)
  (a, b, c, d, e)
- (9) - Convert nonsystem trail to Non-motorized System trail
  (a, b, c, d, e, f, g, h, j, k, m, n, p, q, r, s, t, u) (v, w, x, y, z, aa, bb, cc, dd, ee, ff, gg, hh, ii)
- (10) - Convert Motorized System trail to Non-motorized System trail
  (a)
- (11) - New ATV System trail construction
  (a, b, c, d, e, f)
- (12) - New Single-track System trail construction
  (a, b, c, d, e, f)
- (13) - New Non-motorized System trail construction
  (a, b, d, e, h, i, j. k)
- (14) - Decommission nonsystem road
  (a, b)
- (15) - Remove from system and/or Decommission System trail
  (a, b, c, d)
- (16) - Decommission nonsystem trail
  (a, c, d, g)
- (17) - Convert System Road Open to Highway Legal Vehicles Only to Road Open to All Vehicles
  (a)
- (18) - Establish No Camping Zone
  (a)

2.3.5 Design Criteria

Design criteria apply to all action alternatives unless otherwise stated.

2.3.5.1 Recreation and Wilderness

- To reduce the strain placed on already limited trail management resources, the majority of funding for new trail design and construction must be provided through sources other than annual District appropriations for trail maintenance.
- To reduce the strain placed on already limited trail management resources and to limit unwanted resource impacts, all trails subject to changes in designations (including new construction, adoption of non-system routes, and conversions from current designations) will have condition surveys completed annually for five years to determine if resource damage is occurring as a result of the changes in use. In the event that an unacceptable level of resource damage is found to be occurring, the trail will be closed to all new uses until such time as conditions are satisfactorily improved (to be determined by affected agency resource specialists).
- To ensure compliance with travel regulations, including seasonal restrictions on newly designated motorized trails, the District will focus travel management related law enforcement and monitoring efforts on the newly designated motorized trails during the first three years following implementation. This will be accomplished through regular patrols of the trails by Forest Protection Officers and volunteers. If violations are observed, possible actions that can be taken to correct violations include increasing education efforts, additional signage, installation of barriers, issuing violation notices, or reverting back to prior non-motorized designations.
- On Trails 600 and 605, if monitoring shows that the seasonal motorized restrictions established for these trails are repeatedly being violated, these trails will revert to their designations prior to this analysis (i.e., the trail segments will be re-designated as non-motorized).
- To improve user safety on multi-use trails, adequate cautionary and information signage will be installed on trail sections with extensive exposure concerns, and trail tread should be widened at the beginning and end of such sections to allow users to safely pass. "Share the trail" signage will be employed liberally at relevant multi-use trailheads.
- Prior to designating Trail 600 as open to motorcycle use, the barbed wire fence that runs along the ridgeline will be moved to a location that will not affect trail users.

2.3.5.2 Vegetation

- Prior to commencement of construction activities, all equipment used in the construction of new trails will be cleaned of soil, seeds, vegetative matter, or other debris that could contain or hold noxious weed seeds.
- Prior to project activities, known sites of weed infestation will be treated within the project area.
- New infestations of noxious weeds identified by either the Forest Service or trail construction personnel will be promptly reported to the Forest Service noxious weed coordinator to ensure that treatment can occur. Post-treatment noxious weeds shall be treated following termination of project

activities. Generally, after the second year of treatment, monitoring will determine the need for subsequent treatments.

- Disturbed areas should be seeded as needed to discourage establishment of noxious weeds. Seed mixes will not include aggressive, persistent, non-native species.

2.3.5.3 Rangeland Management

- Where possible, schedule pasture moves to avoid high use recreation weekends, holidays, and special events.
- Inform range permittees of the dates of special events or expected times of high recreational use.
- Install ATV cattle guards, mountain bike cattle guards, self-closing gates, or similar structures at all trail/fence intersections. Livestock friendly gates shall be installed adjacent to these structures that will allow livestock movement from one side of the fence to the other.

2.3.5.4 Watershed, Soils, and Geology

Stream Crossings

- Install stream crossings to meet Corps of Engineers and state permits, pass normal flows, and be armored to withstand design flows.
- Install stream crossings on straight and resilient stream reaches, as perpendicular to flow as practicable, to provide passage of fish and other aquatic life.
- Install stream crossings to sustain bankfull dimensions of width, depth, and slope and keep streambeds and banks resilient. Favor armored fords for those streams where vehicle traffic is either seasonal or temporary, or the ford design maintains the channel pattern, profile and dimension.

Trail Criteria

- Keep roads and trails out of wetlands unless there is no other practicable alternative. If roads or trails must enter wetlands, avoid actions that may dewater or reduce water budgets in wetlands.
- Install cross drains to disperse runoff into filter strips and minimize connected disturbed areas. Make cuts, fills, and road surfaces strongly resistant to erosion between each stream crossing and at least the nearest cross drain. Disturbed areas should be seeded as necessary to minimize erosion .
- To the maximum extent possible retain stabilizing vegetation on unstable soils.
- Designate, construct, and maintain trails for proper drainage and armor their stream crossings as needed to control sediment.
- Design all trails, and other soil disturbances to the minimum standard for their use and to "roll" with the terrain as feasible.
- Use filter strips, and sediment traps if needed, to keep all sand-sized sediment on the land and disconnect disturbed soil from streams, lakes, and wetlands. Disperse runoff into filter strips.
- Key sediment traps into the ground. Clean them out when 50 percent full. Remove sediment to a stable, gentle, upland site and revegetate.

- **Alternative 4 Only:** NFST 601 and NFST 603 will require minor re-routes, extensive armoring and drains, reclamation of entrenched sections, and hardened turnpikes to comply with direction found in EM 7720.103 and FSH 2309.18 and Forest Plan standards and guidelines pertaining to soil and hydrological resources.
- **Alternative 4 Only:** Proposed Trails 11f and 12b will require the use of retaining walls, armored switchbacks, and the careful redirection of surface runoff to armored drainage outlets to prevent discharge onto the trail below and protect hillsides from gully erosion.

Construction Specific

- During construction, when soils are saturated, equipment operation will cease until the ground dries out or freezes. Soils are considered saturated when ruts 4 inches deep or deeper are created by equipment or vehicles on native surface roads or off-road. Ruts deeper than 4 inches would be rehabilitated.
- Keep heavy equipment out of streams, swales, and wet meadows.
- Maintain the organic ground cover of each activity area so that pedestals, rills, and surface runoff from the activity area are not increased. The amount of organic ground cover needed will vary by different ecological types and should be commensurate with the potential of the site.
- Keep ground vehicles out of wetlands. Do not disrupt water supply or drainage patterns into wetlands.
- Establish effective ground cover on disturbed sites to prevent accelerated on-site soil loss and sediment delivery to streams. Restore ground cover using certified native plants as practicable to meet revegetation objectives. Avoid persistent or invasive exotic plants.

2.3.5.5 Wildlife and Fish

- *Mexican spotted owl* (MSO) Alternative 3 – USFWS protocol surveys for MSO have not been completed for the proposed action in the West Devil Creek area. Protocol surveys were initiated springs of 2011 and will be completed summer 2012. The completion of surveys will determine MSO habitat occupancy in the area, and the need to identify a Protected Activity Center (PAC) as described in the MSO Recovery Plan (USDI Fish and Wildlife Service, 1995). There will be no trails constructed in a PAC should one be identified in the West Fork Devil Creek area. Re-initiation of Section 7 consultation with USFWS will occur if MSOs are detected and expected to be influenced by activities associated with the proposed action. If there are no owls detected upon the completion of protocol surveys, no PAC will be identified, no design criteria applied, and no re-initiation of Section 7 consultation.
- *Mexican spotted owl* Alternative 4 – USFWS protocol surveys for MSO will be conducted during the 2012 and 2013 breeding seasons if activities are proposed in MSO habitat in the Devil Creek drainage. Alternative 4 includes new trail construction and motorized use (ATV) in potential habitat located in the Devil Creek drainage (Trail 12b). There will be no ground disturbance or motorized use of Trail 12b prior to completion of surveys. Re-initiation of Section 7 consultation with USFWS will occur if MSOs are detected and expected to be influenced by activities associated with Alternative 4.

- *Northern goshawk* – Surveys for northern goshawk will be conducted prior to new trail construction in suitable habitat under Alternatives 3 and 4. Surveys for northern goshawk will also be conducted under Alternatives 3 and 4 on trails where use designations change from non-motorized to motorized. If active territories are detected, measures will be taken to minimize impacts from construction activities and changes in use designations.
- *Northern leopard frog* – Surveys for northern leopard frog will be conducted prior to new trail construction under Alternatives 3 and 4 in order to minimize impacts to habitat. If the species is detected, measures will be taken to minimize impacts to habitat.
- *Big game* – Proposed new trail construction and motorized use (ATV) of Trail 11f under Alternative 4 is located in quality calving and fawning habitat for big game. The construction and motorized use of Trail 11f will occur outside the months of May, June, and July in order to minimize adverse impacts to big game calving and fawning.

2.3.5.6 Cultural Resources

Culturally Modified Trees

- Some recorded Culturally-Modified Trees (CMTs) are located along trails; another is located near a dispersed recreational site (within site 5AA1152). Additional CMTs could be located within the project area. At present, no CMTs along trails show any evidence that they are being impacted by trail or recreational use. Erosion along a trail, trail construction, or trail clearing activities could impact trees. Crews will avoid felling Culturally Modified Trees (CMTs) and will take note of degraded soils near the base of these trees so that trails may be rerouted away from trees in the event degraded trail conditions began to impact root balls. In the event a CMT dies (and becomes a hazard tree) or falls across the trail or within a dispersed recreation site, the District Archaeologist will be notified and efforts will be made to collect dateable samples (pending approval through tribal consultation). In the event that the Forest Service becomes aware of degraded conditions near CMT's along non-motorized non-system trails (i.e., 5AA2630, 5AA2646, 5AA2654, 5AA3489), or they become hazard trees, and/or fall, the Forest Service would apply the same rules to these as to those within the formal trail system.

Decommissioning Routes through Historic Properties

- In the event trails are decommissioned through historic properties (i.e., 5AA2598, along route 9w, Alternative 2; 5AA760, Alternative 2), no ground disturbing activities will occur within the sites.

Use of Historic Trails

- Site 5AA2998.1, which is a historic lumber road, should be retained as a trail to preserve the historic route. It is one of two braided trails (with 9w), one of which will be decommissioned. Major reroutes should not be considered along this route.

Ground Disturbance (Road/Trail Maintenance, Gate & Cattle Guard Construction)

- Ground disturbing construction (e.g., construction of trails or gate) or trail maintenance activities (e.g., water bar construction) will generally not be permitted within historic properties along trails. Road maintenance will occur only within the current disturbance. Trail maintenance and construction

activities (e.g., water bars and gates) along historic trails are permitted along segments which are considered non-contributing to overall eligibility or which contribute in location only. Maintenance/construction is permitted along 5AA528, 5AA1247, and 5AA3414 (within project area).

Reroutes to Avoid Historic Properties

- Short sections of trails 9hh and 9ii will be rerouted to avoid historic properties. The short sections of trails 9hh and 9ii which cross 5AA1593 would be incorporated into the system under Alternative 4; rerouting the trails around 5AA1593 will be required in the event Alternative 4 is selected. At 5AA2598, continued use of the portion of the non-system trail that crosses the site constitutes an adverse effect (route 9w). A re-route of this portion of trail is required for Alternatives 1, 3, and 4. Any subsequent decommissioning of the portion of the trail(s) across site(s) will avoid ground disturbance.

Monitoring

- Sites identified as requiring monitoring at 10 year intervals are: 5AA760 (Alternative 1, 3 and 4), 5AA962 (Alternative 4) and 5AA1479 (all alternatives). Monitoring at 10-year intervals is already in place at site 5AA877/878. Monitoring is also in place at a 5-year interval for site 5AA1755. Should monitoring show that these sites are being adversely impacted by recreational use of trails, additional mitigation will be developed in consultation with Colorado SHPO.

Camping Closure

- Parking area 18a will be closed to camping (Alternatives 2, 3, and 4). This closure is required to address impacts to a site. A similar closure would be required in the event Alternative 1 was selected.

Design Modifications & Additional Cultural Resource Inventory

- Additional inventory of route 11f will be required prior to commencement of any construction activities. Full compliance with the NHPA, requiring further consultation with SHPO and (possibly) additional fieldwork, will be required in the event of any substantial reroutes.

General Design Criteria

- Should subsurface archaeological or historical materials be encountered during project activities, work should be halted and the SJNF District archaeologist notified immediately.

2.3.6 Monitoring

- Conduct trail condition surveys on all routes with changes in designation (including new construction) annually for five years to determine if resource damage is occurring as a result of the changes in use.
- Monitor all newly designated routes for compliance with seasonal restrictions for the first three years following route designation changes.
- The following archeological sites require monitoring at 10-year intervals: 5AA760 (Alternative 1 and Alternatives 3 and 4), 5AA962 (Alternative 4) and 5AA1479 (all alternatives).

- Active northern goshawk territories discovered in the analysis area and influenced by the proposed action, will be monitored to assess occupancy and effectiveness of measures taken to reduce disturbance impacts.

- Active northern leopard frog breeding sites discovered in the analysis area and influenced by the proposed action, will be monitored to assess occupancy and effectiveness of measures taken to reduce disturbance impacts.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Recreation and Wilderness

3.1.1 Affected Environment

3.1.1.1 General

Recreational use within the analysis area is highly varied, both in terms of activity types and use levels. Recreationists seek out urban-interface, front-country recreation experiences within the eastern portion of the analysis area, while the western portion affords opportunities for more remote, backcountry endeavors. Many different recreational user groups choose the environs of this area in which to recreate, especially during the spring and fall when higher elevations on the District are under snow. Popular activities include hiking, biking, horseback riding, Off-Highway Vehicle use (OHV) (ATV, motorcycle, 4x4), driving for pleasure, rafting/kayaking, hunting, fishing, and camping.

Within the analysis area, there is one developed campground (Ute Campground), four developed trailheads, and six parking areas. Roughly 200 acres of the Congressionally-designated Piedra Area lies on the westernmost boundary of the analysis area, wherein motorized and mechanical forms of transportation are prohibited. Approximately 70 miles of open roads, 45 miles of motorized trails open to vehicles less than 50 inches in width (referred to as ATV trails, though they are also open to motorcycles), and 30 miles of non-motorized trails provide access to the area. In addition to these system routes, numerous non-system routes have evolved that are frequently used by recreationists to gain access to the Forest (primarily mountain bikers, horseback riders, hikers, and runners).

Thirteen outfitter/guides are permitted to operate within the analysis area. Permitted activities include horseback rides, backpacking, river rafting (on the Piedra River), guided fly-fishing, big and small game hunting outfitting and guiding, mountain biking, and 4x4 tours. Several outfitter/guide hunting camps are scattered throughout the analysis area. Approximately five recreation events are permitted in the area, most of which are running races.

3.1.1.2 Visitation

While there is little existing baseline quantitative data on visitation and use patterns in the analysis area, extensive and regular field observations by Forest Service personnel have indicated that the majority of recreational use in the area occurs in or along trails (both system and non-system), roads, and trailheads, and that with some exceptions, average overall use is low-to-moderate relative to the rest of the District. That being said, some specific areas and/or routes do receive moderate to heavy recreation pressure at certain times of the year, while some areas and routes receive only a handful of users all year long and can best be described as having very low use.

Instances of high use occur on weekends along the network of system and non-system trails in the Turkey Springs/Martinez Canyon area adjacent to the Pagosa Lakes subdivision, the First Fork trailhead area during the spring and fall, and the Brockover (NFSR 919), Newt Jack (NFSR 923), Turkey Springs (NFSR

629), and East Monument (NFSR 630) road network during the spring and fall. Each of these locations receives regular use throughout the snow-free seasons, with spikes in use occurring during the noted timeframes that are comparable to other high use areas on the District, where encounters with other users are frequent during recreation outings and total visitors per day may exceed 100.

By contrast, the majority of the Devil Mountain, Horse Mountain, Mule Mountain, Snow Springs, and West Fork Devil Creek areas, and the roads and trails located therein, receive very little use except during hunting seasons, with many system trails having on average fewer than five users per week. Spikes in use do occur at times, but generally speaking these areas provide a high degree of solitude and few, if any, encounters with other users. Other locations and trails in the analysis area are typical of moderately used sites elsewhere on the District, where weekends and big game hunting seasons bring marked increases in visitation, but visitors per day rarely exceed 30. This includes the majority of the area's system roads and trails, other than those referenced above.

3.1.1.3 Non-motorized Recreation

Virtually all of the non-motorized trails within the analysis area are classified as "Pack and Stock" trails and historically have been managed primarily for horse use and hiking. With the advent and increase in popularity of mountain biking, trails in the eastern portion of the analysis area have become increasingly popular with this user group, likely due to the proximity of the area to the Pagosa Lakes subdivision and the suitability of the terrain to this activity. (Much of the District is inaccessible to mountain bikes either by virtue of terrain limitations or through the mechanized travel prohibitions associated with formal Wilderness and special area designations: over 30 percent of the District has such a designation.)

During the past decade, close to 50 miles of user-created routes have evolved in the Turkey Springs/Martinez Canyon areas through repetitive use by non-motorized recreationists, the installation of numerous forest access gates by the Pagosa Lakes Property Owners Association (PLPOA), and in some cases, unauthorized trail construction by bicycling enthusiasts. Responses to formal and informal outreach efforts conducted by the Forest Service, coupled with the extensive creation and use of non-system routes, attest to the fact that the existing system of trails and roads on the District has not provided the experiences sought by mountain bikers.

The further west one travels in the analysis area, the more remote and rugged the terrain becomes. As such, non-motorized use levels drop considerably and use types tend to favor horseback riding, long-distance hiking and running, and hunting. Some trails, such as Beaver Ponds (National Forest System Trail [NFST] 605), Devil Creek (NFST 603), portions of Devil Mountain (NFST 600), and Dudley Creek (NFST 601) generally receive very little use except during the big game hunting seasons, organized recreation events, and during guided trail rides provided by Backcountry Outfitters under special use permit with the Forest Service. Further west, non-motorized recreational use again diversifies and increases in the vicinity of the Piedra River, where several popular trails originate including the Sheep Creek trail (NFST 599), which provides access to a series of natural hot springs, and the Piedra River trail (NFST 596), popular with hikers, horseback riders, anglers, and hunters.

3.1.1.4 Motorized Recreation

The analysis area is also popular with ATV riders, motorcyclists, and 4x4 users. Several trailheads, parking areas, and turnouts scattered throughout the analysis area provide access to the network of motorized trails and Forest roads utilized by motorized recreationists. Most popular among these routes are the Fourmile Stock Drive (NFST 629), Piedra Stock Drive (583), Middle Mountain (NFST 654), and Devil Mountain (NFST 600) trails.

Prior to 1997, the portion of the analysis area west of the West Fork Devil Creek was open to cross-country motorized travel, and motorized use was allowed on all system trails in the analysis area. The 1997 Pagosa Hut and Trail System Environmental Assessment and Decision Notice closed several system trails east of the West Fork Devil Creek to motorized use and moved the boundary of the area open to cross-country motorized travel further west to the Devil Mountain ridgeline. Then, in order to comply with the 2005 Travel Management Rule, the District completed an Environmental Assessment and Decision Notice in 2008 that eliminated cross-country motorized travel District-wide (except for accessing dispersed campsites within 300 feet of an open road) and designated 18 additional miles of ATV trails in the analysis area.

As evidenced by the comments received during these analyses, motorized recreationists generally viewed these changes negatively, as it was perceived that they further restricted and limited where motorized users could enjoy their preferred form of recreation. Exacerbating their concerns has been that, while there are 45 miles of motorized trails and 70 miles of roads open to motorized travel in the analysis area, opportunities to connect different routes to make loops are very limited, and where they in fact exist, such opportunities rely on the extensive use of open graveled roads to make connections between trails. (Like non-motorized trail enthusiasts, the overwhelming majority of forest ATV and motorcycle users prefer travelling on trails over roads due to the vastly different experiences each type of route affords.) Similarly, numerous comments have been provided to the District, both formally and informally, expressing dissatisfaction with the fact that there are no trails devoted to single-track motorized use (i.e., motorcycle trails) anywhere on the District, despite these types of trails being the preferred choice of the majority of forest motorcycle users (as opposed to the wider ATV trails and roads). Finally, it may be noted that although the total mileage of motorized trails exceeds that of non-motorized trails in the analysis area (45 to 30), District-wide the opposite is the case, with the District having 359 miles of non-motorized trails compared to 76 miles of motorized trails; and of the District's motorized trails, 15 trails are shorter than 3.0 miles in length, and only five trails have lengths in excess of 5.0 miles (the longest being 8.5 miles).

While there are a variety of reasons behind the ratio of motorized to non-motorized trails on the District, the lack of motorized loop and single-track opportunities, and the changes implemented by the two previous travel management decisions, suffice it to say that many motorized enthusiasts view the opportunities on the District as inadequate and in need of both improvement and expansion.

3.1.1.5 Recreation Conflicts

As is well documented, differing expectations and desires of forest users can result in competing values as to how recreation should be conducted in a forest environment. Anecdotal evidence suggests the presence of some degree of user-group conflict in the analysis area, primarily between horseback riders and

mountain bikers, and motorized users and non-motorized users. In the case of the analysis area, the following concerns have been voiced by users:

- ATVs, and to a lesser extent motorcycles, have degraded some trails to the point of making them unusable for bicycles, runners, and horses.
- ATVs and motorcycles can negatively impact the experiences of recreationists who prefer slower, quieter forms of recreation.
- ATVs and motorcycles disrupt hunting activities.
- ATVs and motorcycles create safety concerns on shared-use trails, especially for horseback riders.
- Horse manure along trails negatively impacts bicycle riding experiences.
- Horse use has degraded some trails to such an extent as to make them unusable for bicycling.
- Bicycle use can present hazards to horseback riders due to the speeds and quietness at which many bicyclists travel.

While these instances of recreation conflicts have been noted by users of the analysis area, outreach efforts have also revealed that such instances are fairly isolated and have not detracted considerably from the experiences of the majority of users of this area. In recent years, partnerships have been formed between several advocacy clubs (most notably the local ATV, horseback, and mountain biking clubs) to promote shared use and care of the trails in this area. Additionally, comments were provided during the scoping period for this project praising the degree of cooperation among the different groups and a general lack of contentiousness that has been perceived to be occurring between user groups on other Forests and Districts.

3.1.1.6 Recreation-related Resource Impacts

While this topic is addressed elsewhere in this chapter by other resource specialists, two components of recreation-caused resource impacts and concerns are worth noting in this section: impacts to system trails, and impacts resulting from off-road/off-trail travel (including the use of non-system routes).

With few exceptions, most of the system trails within the analysis area evolved through historic, repetitive use by the public and permittees seeking access to the Forest, and were not constructed with the aid of engineering design. (This is in direct contrast to the majority of roads found in the analysis area, which were at one time designed and constructed according to agency specifications.) Over time, because they were never designed for continuous recreational use and located accordingly, some trails in the area began to show signs of extensive wear such as erosion, rutting, and entrenchment. Coupled with increases in use, local soils naturally prone to erosion, and a lack of regular maintenance, many of the system trails in the analysis area became degraded. In recent years, considerable efforts by the Forest Service, its partners, and volunteers have been made to reclaim and/or repair many of these trails: re-routing segments to avoid wet, boggy areas, installing drainage structures, resurfacing heavily eroded trail sections, and the like. While these efforts have resulted in noticeable improvements, problems do remain on those trail sections that are poorly located (in terms of sustainability) and have not yet received needed reconstruction. This is especially true for certain ATV trails that were never properly located and/or constructed.

Off-route travel and its associated resource impacts have been a concern for National Forests for many years now, the modern extent of which prompted the Chief of the Forest Service to proclaim "unmanaged recreation" as one of the four greatest threats facing the NFS. The District has not been immune to the impacts of unmanaged recreation, nor has the analysis area, though its effects to date appear to have not reached the proportions documented on some other National Forest units.

As noted above, a large network of non-system trails has evolved/been developed in the eastern portion of the analysis area during the past decade that is utilized by many non-motorized recreation groups, most notably mountain bikers. Inventories and condition surveys have revealed that the tread of these trails is generally in good condition, with minimal signs of erosion. Similarly, the impacts of unauthorized off-road travel—by ATVs, motorcycles, and 4x4s—have been relatively limited in the analysis area compared to other areas on the District and other Districts and Forests. In the analysis area, the majority of resource damage has resulted from either the occasional 4x4 "mud-bogging" incident, or from the "extension" of motorized trails and roads from their official termini. The pioneering of new motorized routes, usually at the designated end of an approved route, is also a recurring event in the analysis area, but with a few exceptions such activities have resulted in only short extensions (less than⅛ th of a mile) and for the most part have been successfully mitigated through a variety of closure mechanisms.

3.1.1.7 The Recreation Opportunity Spectrum (ROS)

The ROS is a planning system utilized by land managers to classify areas according to the types of recreational opportunities available therein. ROS classifications may range from Primitive inside a designated wilderness to Urban in forests adjacent to metropolitan areas, thereby enabling managers to provide a variety of settings in which to recreate, each with their own characteristics and opportunities. Five recreation settings may be found within the analysis area: Roaded Natural (45,727 acres), Semi-primitive Non-Motorized (2,060 acres), Semi-primitive Motorized (6,941 acres), Rural (1,236 acres), and Primitive (135 acres).

3.1.1.8 Forest Plan Direction

As noted in Section 1.5.4, current Forest Plan direction for the management of recreation resources and travel management in the analysis area is fairly generalized and primarily dependent on individual MA prescriptions, with only minimal guidance being provided forest-wide. The most restrictive MAs relating to trail-based recreation are the following:

- MA 3A, which prohibits or restricts motorized use;
- MA 5B, which restricts the development of trails except as needed to access other MAs;
- MA 10D, which prohibits motorized trails (wild segments only);
- MA 1.11, which prohibits motorized use, and prohibits the construction or reconstruction of trails; and,
- MA 1.13, which prohibits motorized use, and allows for the construction and reconstruction of trails only necessary to meet Wilderness management objectives.

A variety of other management directions affecting travel management and recreation is provided in each of the MA prescriptions and incorporated into the alternative proposals.

3.1.2 Environmental Consequences

As noted above, there is little existing baseline quantitative data on the recreation usage patterns within the analysis area. However, through recurring field observation, professional judgment, ROS management prescriptions, Forest Plan direction, and technical reports, the consequences of the alternatives on recreational opportunities and experiences may be predicted with a fair degree of certainty.

3.1.2.1 Alternative 1 – No Action

Under this alternative, recreational opportunities and experiences in the analysis area would remain consistent with their present characteristics and anticipated future trends. Recreational opportunities would be neither enhanced nor improved from the current condition if no action is taken. The inadequacies of the existing system would continue to detract from the experiences of mountain bike, ATV, and motorcycle users (both within the analysis area and the greater District), and unmanaged recreation, along with its resultant resource impacts, would either remain at current levels or potentially increase in the future.

As documented above, the fragmented nature and limited length of the current **motorized** trail system, both within the analysis area and District-wide, is viewed by many motorized recreationists as insufficient to meet their recreation preferences. In taking no action to address this matter, this alternative not only would result in continuing user dissatisfaction, but would likely have the added detrimental effect of increased unauthorized, off-route travel and its accompanying resource impacts and management concerns. This reflects the understanding that by failing to provide at least a basic, interconnected trail system as a means for OHV users to derive some of the backcountry motorized experiences they seek, users will be inclined to participate in unauthorized travel (Blahna 2006, Crimmins 2006, USDA Forest Service 2005a, Yankoviak 2005, Crimmins 1999). Similarly, routes that rely extensively on graveled, road-based travel rarely provide the experiences most forest ATV and motorcycle users seek (Crimmins 2006; Cordell, Betz, Green, and Owens 2005; Fisher, Blahna, and Bahr 2001; Crimmins 1999; Nelson 1990), and as a result can contribute to unauthorized travel. But regardless of the exact cause and effect relationship between unauthorized route pioneering and the provision of adequate motorized recreational opportunities, the current lack of connectivity and shortness of the motorized trails remains an unresolved problem under this alternative.

Regarding the **non-motorized** recreation issues discussed above, problems similar to those facing motorized recreation would continue in this alternative. Because non-system routes would not be decommissioned in this alternative, non-motorized use of these routes would at a minimum be comparable to current levels, and may increase in the future as public awareness of the trails expands and overall forest use increases. Such unmanaged recreation, while perhaps meeting the desires of some forest users in the short term, is likely not sustainable in the long term: resource degradation resultant from the lack of management (i.e., no maintenance, signage, relocation of problem areas, or other managerial controls) would almost certainly increase over time if a coherent, effective system is not adopted in this area. From a recreation planning perspective, the No Action Alternative does not address the underlying issue behind the creation and use of such an extensive network of non-system trails: the District's failure

to provide a legitimate mechanism for this recreation group to realize at least some of the experiences they seek. Consequently, the No Action Alternative fails not only to address the unmanaged recreation issues present in the Turkey Springs/Martinez Canyon area, but also fails to provide this user group with some reasonable measure of legitimate opportunities for their preferred form of recreation.

Benefits to recreation resources associated with the No Action Alternative generally involve those individuals and groups who tend to view the current recreation environment within the analysis area as either adequate and not in need of change, and/or those who are leery of the changes being proposed in the action alternatives. This includes some horseback riders who do not wish to see trails they utilize re-opened to motorized use (generally out of safety, aesthetic, and ecological concerns), outfitter/guides who view motorized recreation as a threat to their businesses, and big game hunters concerned with the effects of increased motorized use on hunting opportunities.

3.1.2.2 Alternative 2

Under this alternative, the overall trail system within the analysis area would be expanded by approximately 25 miles, with 15 miles of additional non-motorized trails and 10 miles of additional ATV trails. While this would improve the recreation opportunities for mountain biking, ATV riding, and motorcycle riding over the current condition, it would provide less additional opportunities and improvements than the other action alternatives. Use of non-system routes and cross-country travel and the impacts associated with these activities would continue to occur in the analysis area, though to a lesser extent than if no action was taken. This alternative does not conflict with current ROS prescriptions.

The addition of **non-motorized** system trails—the majority of which would be added via the adoption of existing non-system routes—would offer mountain bikers and other non-motorized users several loop opportunities in the Turkey Springs/Martinez Canyon area and would therefore improve experiences for this group by virtue of additional loop connections, regular maintenance, directional signage, and the like. Use levels along these trails would likely increase from the current condition and could be expected to be in the moderate to high range relative to the rest of the District. Occasional crowding on these trails might be possible because this alternative calls for decommissioning 15 miles of non-system routes currently receiving use, which would have the effect of focusing use on the system routes. This, and the fact that several popular user-created routes would not be adopted in this alternative, would likely result in some continuing use of non-system routes by mountain bikers despite efforts aimed at decommissioning. Use of non-system routes not proposed for decommissioning would also continue, though use levels should remain low.

The addition of **motorized** system trails would similarly benefit ATV and motorcycle users as compared to the current condition and No Action Alternative, but less so than the other action alternatives. Perhaps most critical to improving rider experiences, this alternative includes several new trail segments that would connect existing trails and roads, thereby making opportunities for loop travel between the eastern and western portions of the analysis area possible. While this alternative does rely heavily on users traveling on open roads to make loops, the connectivity this system would afford between different areas of the District and the elimination of the necessity for users to travel "out-and-back" on any given trail they ride, would still constitute a considerable improvement over current conditions for these users. Use levels along existing system trails would increase as a result of the new connectivity, but overall use levels of the

motorized trail system would still remain in the low to moderate range relative to overall recreation use on the rest of the District, with some potential for high use days during summer holidays. Instances of route pioneering by motorized users would likely decrease from the current condition by virtue of the provision of routes that do not dead end abruptly, and illegal motorized use on designated non-motorized trails would also decrease for similar reasons (Blahna 2006, Crimmins 2006, USDA Forest Service 2005a, Yankoviak 2005, Crimmins 1999). Neither would be totally eliminated, however, nor would they decrease as much as they would in the other two action alternatives.

Because this alternative does not contain any motorized single-track trails, motorcyclists would continue to be frustrated by the lack of these types of opportunities. Like ATV users, motorcyclists would have more opportunities for trail and loop travel than are currently possible, but none of these would be on single-track tread, which is vastly preferred by these users over ATV trails and roads. As a result, continuing user dissatisfaction can be expected under this alternative, though to a lesser extent than the No Action Alternative.

This alternative has the potential to negatively affect several aspects of recreation resources in the analysis area. The greatest potential impact involves disruptions to hunters and hunting experiences, especially in areas that currently receive little to no motorized use but are known to be used by big game hunters (primarily the Devil Mountain, Horse Mountain, Horse Creek, and Elk Creek areas). As is well documented, the presence of motorized vehicles and users in forest environments can detract from the experiences of non-motorized users during encounters, including hunters (Yankoviak 2005 and Moore 1994). It can be reasonably anticipated that, because hunters would be exposed to greater levels of motorized use as a result of this alternative (both by virtue of the new trails being designated and the overall increase in motorized use predicted), some measure of impact to hunting experiences and opportunities is probable relating to the sounds of motorized vehicles, the potential effects on game presence in certain areas, and direct encounters with motorized users. Based on current hunter usage patterns and the locations of the motorized trails in this alternative, it is unlikely that this alternative would result in any off-forest displacement of hunters and that numbers of hunters being impacted would be few. (For a detailed analysis of the effects of each of the alternatives on wildlife habitat and species, see Section 3.8, Wildlife and Fish). It should be noted that while increased motorized use has the potential to negatively impact hunting experiences and opportunities, some hunters that utilize ATVs would view the additional opportunities provided by the new trail system as a positive change.

Other recreationists that could be negatively affected by this alternative include non-motorized users of existing motorized system trails (primarily horseback riders, runners, and hikers) that may view the increase in motorized use unfavorably for one or a combination of the following reasons: safety concerns relating to dual use of the trails, detractions from the experiences of users who prefer to recreate in forest environs that are free from the sounds of motorized vehicles, general increase in use of trails by virtue of opening them to new use types, and/or additional negative perceptions of motorized use of these trails. No off-forest displacement of these users is likely, though some may elect to avoid certain motorized trails that they currently utilize. The number of users affected in this manner should be fairly small, since use on the trails in question is estimated to be very low relative to the rest of the District (though, as is often the case in situations such as these, some users may find their "favorite" trail affected by these changes).

As noted above, concerns have been raised by the public as to the ability of the District to address the maintenance issues and costs of an expanded system. This concern is shared by local land managers, since appropriated funds are seldom, if ever, viewed as sufficient to address all trail needs. It is not, however, anticipated that this alternative would measurably impact the District's ability to maintain its current or proposed trail system for several reasons. First, local recreation clubs (mountain biking and ATV) have pledged to adopt and assist in the maintenance all new trails added to the system. Second, motorized trails are eligible to receive grant funding for maintenance and construction from the Colorado State Parks OHV Program. Third, as specified in the Design Criteria for all action alternatives, any major new construction and reconstruction of motorized trails would be subject to the availability of external funding sources for the majority of costs. (For more detailed costing information associated with the implementation of each alternative, see Section 3.9, Socioeconomics.)

No measurable negative impacts to outfitter/guide activities are expected under this alternative, as the majority of changes that could potentially adversely affect outfitter/guide operations (including the disturbances associated with the sound of motorized vehicles and direct encounters with motorized users) are not proposed in locations utilized by permittees under this alternative. The prohibition of camping at this trailhead would benefit the hunting outfitter/guide that operates in this area.

A variety of users may have their experiences adversely affected in association with trail construction and reconstruction activities, closures to camping, conversions of ATV trails to non-motorized trails, and closures of open roads to full-sized vehicles, but such effects would generally be limited in quantity and extent. One possible exception involves the proposed closure to full-sized vehicles of segments of the Newt Jack (NFSR 923) and Brockover (NFSR 919) roads, as these are fairly popular 4x4 destinations. These closures can be expected to negatively affect this user group for multiple years, though no off-forest displacement should occur as a result.

3.1.2.3 Alternative 3 – Proposed Action

The effects of this alternative on recreation resources would be similar to Alternative 2, with the following exceptions. Under this alternative, approximately 54 miles of additional trails would be added to the system, with 28 miles of additional non-motorized trails, 12 miles of new ATV trails, and 14 miles of single-track motorized trails. This alternative would provide more new recreational opportunities and improvements than Alternative 2 for these activities, though less than what is proposed in Alternative 4. In light of these additions, the Proposed Action would likely further reduce the use of non-system routes and route pioneering, along with their associated resource impacts, as compared to Alternative 2. This alternative does not conflict with current ROS prescriptions.

The Proposed Action would incorporate the majority of non-system, non-motorized routes currently receiving use in the Turkey Springs/Martinez Canyon area that are not duplicative of one another. Use levels along these trails would be similar to those predicted in Alternative 2, though dispersal of users would be greater and the probability of crowding lower. Because this alternative provides a coherent and spacious network of trails, use of non-system routes not being proposed for inclusion in the system is expected to be minimal, as would be any future construction of new non-system routes.

The addition of single-track motorized trails in this alternative would offer motorcyclists opportunities for single-track riding and access to challenging terrain, though not as extensively as Alternative 4.

Opportunities for loop travel would increase for motorcyclists in this alternative as compared to Alternative 2, though they would still rely on ATV trails and roads to make the majority of connections needed to complete loops. The bulk of single-track trails would be added to the system through the conversion of existing non-motorized trails, and as such, would not incur significant additional costs compared to Alternative 2 (a local club has pledged to adopt and assist in the maintenance of these trails). Use levels should remain low relative to general recreation use on the rest of the District, with some moderate use occurring on summer weekends. This alternative would likely still result in some measure of user dissatisfaction due to its reliance on the use of ATV trails and roads for loop travel and the relatively short use season being proposed of June 15 through August 30. Consequently, some continuing unauthorized travel and/or route pioneering can be expected, but less so than under Alternatives 1 or 2.

The negative impacts of this alternative on other recreation resources would be more extensive and widespread than those discussed for Alternative 2. The nature of the potential negative effects (such as impacts to "quiet" forms recreation use, etc.) would be the same as that described for Alternative 2, but by virtue of the increase in miles of trails opened to motorized use and the additional areas that would be used by motorized vehicles under this alternative, the likelihood and extent of the impacts to other recreation resources would be greater compared to Alternatives 1 and 2. Most notably, the conversion of non-motorized system trails 600 and 605 to single-track motorized has the potential to displace non-motorized recreationists from the area, but not likely off-forest. These trails are very popular with a small group of horseback riders and hikers who have worked to reclaim and maintain the trails for several years. The restrictive season of use being proposed for motorized travel on these trails should offset these concerns to a certain extent by providing opportunities for non-motorized recreationists to enjoy these trails without the presence of motorized vehicles early and late in the season, but this is unlikely to eliminate the impact completely. (It is perhaps worth noting that with over 370 miles of trails closed to motorized use and a ratio of non-motorized trails to motorized trails of almost 4:1, opportunities for hiking and horseback riding on the District free from the impacts of motorized recreation are plentiful.) The potential for this alternative to negatively affect users of other non-motorized trails within the analysis area, or users of trails and areas outside of the analysis area but in relative proximity to the analysis area (including the Piedra Area and the Weminuche Wilderness), is unlikely, as the only potential negative effect in these instances—disruption to quiet use—will be confined largely to motorized trail corridors and should not extend to these other areas and trails.

With respect to the concerns expressed by scoping respondents that opening these trails to motorized use would result in unsafe conditions for horseback riders, research suggests that managerial controls implemented on multi-use trails can reduce risks posed to other users considerably (Moore 1994), and in many instances greater risks are posed to horseback riders from other non-motorized trail users, such as mountain bikers, hikers with dogs, and llama packers (Shribner 2009, and Smith and Blahna 1995). Whether this actually alters the perceptions of risk for this user group and results in their continuing use of these trails cannot be predicted. But, between the season of use restrictions proposed for these trails, the relatively low levels of trail use, and the implementation of Design Criteria to reduce risk exposure, actual risk levels to horseback riders should be comparable to most other trails on the District.

The likelihood of disruptions to hunting activities in the Horse Mountain, Devil Mountain, Elk Creek, First Fork, and Horse Creek areas also increases in this alternative, though the seasonal restrictions placed on motorized use of single-track trails should largely offset this for rifle season hunters. Most likely to be

impacted are early-season archery and muzzle-loading hunters, whose activities may overlap with or closely follow the open season for motorized use on these trails. Some area and off-forest displacement of these users is possible as a result.

Similarly, impacts to hunting outfitter/guides, especially Backcountry Outfitters, increases in potential with this alternative, as well as to Backcountry Outfitters' trail rides that have been historically conducted along NFST 600 and 605. However, the potential for this alternative to result in a measurable loss in revenue for Backcountry Outfitters is minimal given the proposed seasonal restrictions on motorized use, the locations of outfitter/guide hunting camps and areas, and the additional hunting and trail-riding opportunities available to the permittee in compartments not subject to effects from this alternative.

3.1.2.4 Alternative 4

The effects of this alternative are expected to be similar to the Proposed Action, with the following exceptions. This alternative represents the maximum proposed alteration of the existing condition, through the net addition of 74 miles of system trails (29 miles of non-motorized trails, 15 miles of ATV trails, and 30 miles of motorized single-track trails). While this alternative would maximize opportunities available to ATV, motorcycle, and mountain bike recreationists in the analysis area, it also would result in more extensive potential impacts to existing recreation resources. This alternative does not conflict with current ROS prescriptions.

Under this alternative, almost all of the known non-system routes in the Turkey Springs/Martinez Canyon area would be incorporated into the **non-motorized** trail system, as well as several other routes scattered throughout the analysis area. Many of these routes currently receive little use and/or are duplicative of other routes. Use levels would be comparable to those described in the other action alternatives, with reduced potential for crowding and increased dispersal of users.

The addition of a connecting ATV trail between the Snow Springs and West Fork Devil Creek areas would provide **motorized** users with another opportunity for loop travel that accesses challenging, scenic terrain. Field reconnaissance of this route revealed that to make the connection would require extensive armoring, use of retaining walls, and other intensive design strategies to meet Forest Service specifications for new trail construction, in light of the extremely steep slopes on which the trail must travel and the erosive soils found therein. Questions have also been raised as to the sustainability of such a trail even if constructed to standard specifications (see Section 3.7, Watershed, Soils, and Geology). Regardless, the construction of this short route would entail considerable costs relative to the other ATV trails being proposed for new construction, and maintenance needs would be similarly extensive.

The addition of motorized single-track trails under this alternative would vastly improve opportunities for this user group by creating several additional loop options, access to new and challenging terrain, and loops that are exclusively single-track in nature. With such a challenging system of trails, this alternative would further reduce instances of route-pioneering and illegal off-route travel for this user group. Use levels would be similar to those described in Alternative 3, with greater dispersal of users likely.

The new construction of single-track motorized trail proposed between the Devil Creek and Chris Mountain areas, while opening up a large extent of desirable terrain for this user group, would necessitate the use of similar design mechanisms described previously for the West Fork Devil Creek ATV connector. Extremely steep slopes would require substantial improvements to ensure sustainability (again,

see Section 3.7, Watershed, Soils, and Geology), and maintenance needs would be extensive and costly. Terrain is a highly limiting factor in this canyon environment and opportunities to utilize gentler slopes are simply not available (though minor re-routes within the surveyed corridor are possible and could potentially improve trail grades). As such, the addition and expansion of motorized routes proposed in this alternative would affect limited resources available for trail management activities more so than the other action alternatives, despite the availability of external resources to offset impacts to standard Forest Service trail allocations due to the unique needs of these two trail segments.

The addition of motorized single track trails proposed in this alternative has the potential to negatively affect other recreation resources to a greater extent than the other action alternatives. The nature of the potential negative effects would be the same as the other action alternatives, but by virtue of the increase in miles of trails opened to motorized use and the additional areas that would be used by motorized vehicles under this alternative, the likelihood and extent of impacts to other recreation resources would be greater compared to the other alternatives. While seasonal restrictions would offset possible impacts to big game hunters for much of the hunting season, the new motorized single-track trails would potentially negatively impact archery and muzzle-loading hunters to a much greater extent than that of the other action alternatives. Displacement of hunters from the analysis area would be probable over time during the early hunting seasons, and some off-forest displacement would also be possible.

Big game hunting outfitter/guides in the analysis area would similarly see an increase in potential negative effects to their business operations in this alternative by virtue of the introduction of motorized use into areas that have not had such use in many years. Backcountry Outfitters and Fawn Gulch Outfitters both maintain heavily used camps along trails affected by this alternative, with Backcountry Outfitters having camps located on multiple trails. Consequently, a loss in revenue during the archery and muzzle-loading seasons is possible under this alternative, especially for Backcountry Outfitters. The opening of these trails to motorized use would also further affect Backcountry Outfitters' trail riding operations. Relocating the camps, hunting areas, and trail ride locations is not a viable option due to the nature of the permits in question and terrain limitations.

3.2 Transportation

3.2.1 Affected Environment

Roads within the analysis area were originally developed primarily for forest management activities. Currently, the road system supports a variety of uses including vegetation management, access to range allotments and private properties, hunting, and both motorized and non-motorized recreation.

The existing Forest road system in the analysis area consists of 69.3 miles of roads open to full-size vehicles; of these, 11.7 miles are open to licensed vehicles only and 57.6 miles are open to all vehicles. There are also 54.2 miles of roads maintained for forest management or special use but closed to public motorized use. There are approximately 45 miles of system motorized trails open to all motor vehicles less than 50 inches in width.

3.2.1.1 Road and Trail Management

NFSR are managed in accordance with the Road Management Objectives established for the each road. Road Management Objectives stipulate the uses for which the road was designed and currently managed, maintenance levels, and target maintenance frequencies and tasks.

NFSR are assigned a specific maintenance level that is based on a set of criteria that describes how each individual road would be maintained. This criteria includes considerations for resource protection, user comfort, design speed, season of use, traffic volume and type, and need for dust abatement.

The Forest Service defines ML 1-5 as follows: Level 1 (closed roads); Level 2 (high clearance vehicles); Level 3 (suitable for passenger car travel); Level 4 (suitable for passenger car travel, provides comfort at moderate speeds); and Level 5 (paved, or chip sealed). On the District, Level 1 and 2 roads are usually native surface and Level 3 and 4 roads are usually surfaced with material, such as gravel.

NFST are managed in accordance with the Trail Management Objectives established for the trail. Trail Management Objectives stipulate the uses for which the trail was designed and currently managed, prohibited uses, seasons of use, target maintenance frequencies and tasks, trail class, and design parameters. Trail classes range from 1 through 5, with 1 being the most undeveloped and 5 being the most highly developed. Target design parameters and maintenance frequencies are based on the trail class and level of development. Designed and managed uses for standard terra (i.e., summer) trails are as follows: hiker/pedestrian, pack and saddle, bicycle, motorcycle, and ATV. A trail is considered to be *designed* for one use (the highest use based on the intensiveness of management required, with ATV trails being the most intensive and hiker/pedestrian being the least), though it may be *managed* for multiple uses (e.g., a trail with a designed use for ATVs may be open and managed for all other uses).

It should be noted that following the implementation of the Travel Rule, trail terminology relating to accepted and prohibited uses was refined and differs slightly from the terminology used in Trail Management Objectives. Motorized trails on the SJNF may be designated as open to all motor vehicles less than 50 inches in width (which includes ATVs and motorcycles), or they may be designated as open only to motorcycles (referred to as "single track" motorized trails).

3.2.1.2 Road and Trail Maintenance

Road and trail maintenance includes both annual maintenance and deferred maintenance. Annual maintenance is maintenance activities that occur on an annual basis. Annual maintenance activities for roads include blading, cleaning culverts and cattleguards, maintaining drainage structures, and maintaining signing. Blade patching would be added on Level 5 roads. Annual trail maintenance tasks include trail opening, logging out, brushing, tread drainage, and tread maintenance. This recurring maintenance is important for keeping the surface suitable for travel, and limiting resource damage that could occur from, but is not limited to, blocked culverts, improper drainage, or fallen trees across trails.

Deferred maintenance is maintenance that was not performed when it should have been or when it was scheduled and, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. The appropriated funding is adequate to perform annual maintenance on many, but not all, roads on the District. The deferred maintenance costs are

considerably higher than the appropriated funding. As a result, most of the deferred maintenance needs are not currently being addressed.

The annual cost to maintain the entire District trail system to standard is presently higher than the amount appropriated and allocated to the District. The District has been able to increase its annual trail maintenance targets, despite declining budgets, through the expanded use of volunteers and partnering organizations. Priorities for trail maintenance are set on the local level, with no predetermined method for dividing resources between motorized and non-motorized trails, and summer and winter trails. With roughly 50 percent of trails being maintained to standard each year, the majority of system trails receive maintenance at least once every other year, with the most popular and heavily used trails receiving maintenance yearly (USDA Forest Service 2011a).

3.2.1.3 Road and Motorized Trail Density

Road Density

The Forest Plan provides a desired level of road density for many of the MAs across the Forest. These mile/square mile guidelines reflect the management emphasis of a particular area. The guidelines focus on Forest Service roads open to public use only. Open road densities in the analysis area are within Forest Plan desired levels in all MAs (Table 3).

Table 3: Open Road Densities in the Analysis Area by Management Area

MA	Emphasis	Forest Plan (mi/sq mile)	Analysis Area (mi/sq mile)
2B	Rural and Roaded Natural Recreation	0.5-1	0.3
3A	Semi-primitive Non-motorized Recreation in Roaded or Non-roaded areas	Not specified	0.1
4B	Habitat for Management Indicator Species	0.5-1	0.3
5B	Big-Game Winter Range in Forested Areas	0-0.5	0.5
6B	Livestock Grazing	0.5-1	0.6
7E	Wood-Fiber Production and Utilization	1-3	0.8
10D	Wild and Scenic Rivers	Not specified	3.2
1.11	Wilderness – Pristine	Not specified*	0.0
1.12	Wilderness – Primitive	Not specified*	0.0
1.13	Wilderness – Semi-primitive	Not specified*	0.0

*Use of motor vehicles is prohibited in the Weminuche Wilderness, South San Juan Wilderness, and Piedra Area.

Motorized Trail Density

Direction in the Forest Plan addressing motorized trail density is limited. Of the MAs in the analysis area, specific standards and guidelines are only provided for MA 2B (Rural and Roaded-Natural Recreation Opportunities). The Forest Plan specifies that on all non-forested areas within MA 2B, motorized trail and local road density is not to exceed 4 miles per square mile. Motorized trail and road densities in the analysis area are well below the limits established for this MA.

3.2.2 Environmental Consequences

Open road densities within the analysis area by MA and alternative are summarized in Table 4 below. Open road densities are the same across alternatives, except that all action alternatives propose a slightly

lower road density (0.7 mile/square mile) in MA 7E compared to Alternative 1 (0.8 mile/square mile). All alternatives propose open road densities that are consistent with the Forest Plan (Table 4).

Table 4: Open Road Densities by Management Area and Alternative

MA	Forest Plan (mi/sq mile)	Alternative 1 (mi/sq mile)	Alternative 2 (mi/sq mile)	Alternative 3 (mi/sq mile)	Alternative 4 (mi/sq mile)
2B	0.5-1	0.3	0.3	0.3	0.3
3A	Not specified	0.1	0.1	0.1	0.1
4B	0.5-1	0.3	0.3	0.3	0.3
5B	0-0.5	0.5	0.5	0.5	0.5
6B	0.5-1	0.6	0.6	0.6	0.6
7E	1-3	0.8	0.7	0.7	0.7
10D	Not specified	3.2	3.2	3.2	3.2
1.11	Not specified*	0.0	0.0	0.0	0.0
1.12	Not specified*	0.0	0.0	0.0	0.0
1.13	Not specified*	0.0	0.0	0.0	0.0

*Use of motor vehicles is prohibited in the Weminuche Wilderness, South San Juan Wilderness, and Piedra Area.

3.2.2.1 Alternative 1 – No Action

Under Alternative 1, 69.3 miles of road would remain open to full-size vehicles (consistent with the current condition), and there would be no effect on the District's road maintenance budget. There would be no change in the miles of motorized or non-motorized trails requiring maintenance. Open road densities proposed under this alternative are consistent with the Forest Plan (Table 4). No motorized trails are proposed within MA 2B, and motorized trail and local road densities would remain within limits established for this MA.

3.2.2.2 Alternative 2

Under Alternative 2, 68.2 miles of road would remain open to full-size vehicles. A reduction of 1.1 miles of open road in the analysis area would have negligible effects on the District's road maintenance budget. Alternative 2 would increase the miles of motorized and non-motorized trails requiring maintenance by 10 miles and 14.7 miles, respectively. Open road densities proposed under this alternative are consistent with the Forest Plan (Table 4). No motorized trails are proposed within MA 2B, and motorized trail and local road densities would remain within limits established for this MA.

3.2.2.3 Alternative 3 – Proposed Action

Under Alternative 3, 65.8 miles of road would remain open to full-size vehicles. A reduction of 3.5 miles of road in the analysis area would have negligible effects on the District's road maintenance budget. Alternative 3 would increase the miles of motorized and non-motorized trails requiring maintenance by 25.7 miles and 27.8 miles, respectively. Open road densities proposed under this alternative are consistent with the Forest Plan (Table 4). No motorized trails are proposed within MA 2B, and motorized trail and local road densities would remain within limits established for this MA.

Under Alternative 3, First Fork Road (NFSR 622) would be converted from "open to highway-legal vehicles only" to "open to all vehicles." This change of designation is supported by an engineering report analyzing a mixed use designation for First Fork Road (USDA Forest Service 2011b), and no adverse effects with regard to road safety are anticipated.

3.2.2.4 Alternative 4

Under Alternative 4, 65.8 miles of road would remain open to full-size vehicles. A reduction of 3.5 miles of road in the analysis area would have negligible effects on the District's road maintenance budget. Alternative 4 would increase the miles of motorized and non-motorized trails requiring maintenance by 44.1 miles and 29.8 miles, respectively.

Open road densities proposed under this alternative are consistent with the Forest Plan (Table 4). No motorized trails are proposed within MA 2B, and motorized trail and local road densities would remain within limits established for this MA. Under Alternative 4, First Fork Road (NFSR 622) would be converted from "open to highway legal vehicles only" to "open to all vehicles." This change of designation is supported by an engineering report analyzing a mixed use designation for First Fork Road (USDA Forest Service 2011b), and no adverse effects with regard to road safety are anticipated.

3.3 Roadless

3.3.1 Affected Environment

Inventoried Roadless Area (IRA):
Approximately 14,600 acres of the analysis area are within the boundary of the Piedra IRA. There are approximately 12.3 miles of motorized system trails within the portion of this IRA that falls within the analysis area. The portion of the Piedra IRA that overlaps the analysis area was not recommended for inclusion into the Wilderness Preservation System under the Forest Plan, nor was it established as Wilderness or a Wilderness Study Area under the Colorado Wilderness Act of 1980.

Colorado Roadless Area (CRA):
The original RARE II has recently had an updated inventory completed as part of the 2001 Roadless Rule (USDA Forest Service 2001), and then again for ongoing rulemaking for the Proposed Colorado Roadless Rule (USDA Forest Service 2011d). Approximately 9,600 acres of the analysis area are classified as roadless under the Proposed Colorado Roadless Rule. There are approximately 5.3 miles of motorized system trails within the portion of the CRA that falls within the analysis area.

3.3.2 Environmental Consequences

At the time of this writing, future management, policy, and guidance regarding IRAs and CRAs is in question pending the resolution of ongoing court cases and rulemaking still in progress. Because of this uncertainty, impacts are analyzed for both versions of roadless inventory boundaries. Neither of these rules, as currently written, would prohibit motorized trails. Table 5 below shows how many acres of roads and trails are found within the IRA and the CRA under each alternative.

Table 5: Miles of Roads and Trails in Roadless Areas by Alternative

	IRA (Roadless 2001)				CRA (Roadless 2009)			
	No Action		Proposed Action		No Action		Proposed Action	
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 1	Alt 2	Alt 3	Alt 4
Existing Non-motorized trail system	25.0	25.0	12.7	2.7	13.7	13.7	6.8	1.9
Existing ATV trail	12.3	12.3	12.2	12.2	5.3	5.3	5.3	5.3

	IRA (Roadless 2001)				CRA (Roadless 2009)			
	No Action		Proposed Action		No Action		Proposed Action	
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 1	Alt 2	Alt 3	Alt 4
system								
Existing Single-track motorized trail system	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Existing Road system open to full-sized vehicles	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Existing ML1 (closed) road system	13.3 (5.8 dual designated as ATV trail)	13.2 (5.8 dual designated as ATV trail)	13.2 (8.2 dual designated as ATV trail)	13.2 (8.2 dual designated as ATV trail)	0.0	0.0	0.0	0.0
Non-system routes adopted as non-motorized trails	--	--	0.7	0.7	--	--	--	--
Non-system routes adopted as ATV trails	--	--	0.5	0.5	--	0.03	0.03	0.03
Non-system routes adopted as single-track mot. trails	--	--	0.9	1.8	--	--	0.2	0.2
Non-motorized trail converted to single-track mot. trail	--	--	9.0	17.8	--	--	5.8	10.7
ML1 road designated as new ATV trail	--	--	2.5	2.5	--	--	--	--
New construction non-motorized trail	--	--	0.0	0.0	--	--	--	--
New construction ATV trail	--	3.1	4.1	5.6	--	0.5	0.8	2.1
New construction single-track mot. trail	--	--	0.3	1.4	--	--	0.3	0.4
Decommission/remove from system non-motorized trail	--	--	3.3	4.5	--	--	1.2	1.2
Decommission/remove from system ATV trail	--	--	0.1	0.1	--	--	--	--
Decommission/remove from system system road	--	0.1	0.1	0.1	--	--	--	--

3.3.2.1 Alternative 1 – No Action

Under the No Action Alternative, existing road and trail designations would be retained and no changes would be proposed to the existing road and trail system in the analysis area. Under this alternative, there are 12.3 miles of motorized trails in the IRA (covering approximately 8.9 acres), and 5.3 miles of motorized trails in the CRA (covering approximately 3.9 acres). Use of the motorized system trails that currently exist in the IRA and CRA would continue. The presence of motorized trails under this

alternative does not substantially alter the undeveloped character of the roadless area, nor does it have a significant impact on any of the resources or features that characterize roadless areas.

3.3.2.2 Alternative 2

Under Alternative 2, some existing road and trail designations would be changed, and some new motorized trails would be constructed within the IRA and CRA. The result would be a total of 15.4 miles of motorized trails in the IRA (ATV trails), covering approximately 11.2 acres. There would be 5.8 miles of motorized trails in the CRA (ATV trails), covering approximately 4.3 acres. The presence of motorized trails under this alternative does not substantially alter the undeveloped character of the roadless areas, nor does it have a significant impact on any of the resources or features that characterize roadless areas.

3.3.2.3 Alternative 3 – Proposed Action

Under Alternative 3, some existing road and trail designations would change, and some new motorized trail would be constructed within the IRA and CRA. A short section of motorized trail (0.1 miles) would also be decommissioned. Under this alternative, there would be 29.5 miles of motorized trails in the IRA (19.3 miles of ATV trail and 10.2 miles of single track motorized trail), covering approximately 18.9 acres. There would be 12.4 miles of motorized trails in the CRA (6.1 miles of ATV trail and 6.3 miles of single track motorized trail), covering approximately 7.2 acres. Use of the motorized system trails that currently exist in the IRA and CRA would continue. The presence of motorized trails under this alternative does not substantially alter the undeveloped character of the roadless area, nor does it have a significant impact on any of the resources or features that characterize roadless areas.

3.3.2.4 Alternative 4

Under Alternative 4, some existing road and trail designations would change, and some new motorized trails would be constructed within the IRA and CRA. A short section of motorized trail (0.1 miles) would also be decommissioned under this alternative. Under this alternative, there would be 41.8 miles of motorized trails in the IRA (20.8 miles of ATV trail and 21.0 miles of single track motorized trail), covering approximately 25.3 acres. There would be 18.7 miles of motorized trails in the CRA (7.4 miles of ATV trail and 11.3 miles of single track trail) covering approximately 10.9 acres. Use of the motorized system trails that currently exist in the IRA and CRA would continue. The presence of motorized trails under this alternative does not substantially alter the undeveloped character of the roadless area, nor does it have a significant impact on any of the resources or features that characterize roadless areas.

3.4 Rangeland Management

3.4.1 Affected Environment

All or portions of four cattle grazing allotments are located within the analysis area. They are the Dudley Cattle and Horse (C&H) Allotment, Sheep Creek C&H Allotment, Mesa C&H Allotment, and Chris Mountain/Park Lake/Martinez C&H Allotment. All of these allotments are managed under some form of a rotational grazing system.

Only a portion of the Dudley Allotment is located within the analysis area. There are no active grazing permits issued for the Dudley Allotment, and the last year it was actively grazed by cattle was 2002. In

2006 a decision was made on the portion of Dudley Allotment located within the analysis area establishing it as a forage reserve. A forage reserve is an area where standing forage is specifically maintained for future or emergency use. A portion of the Sheep Creek Allotment is located within the analysis area. There is currently one active grazing permit issued for Sheep Creek. This permit authorizes 215 cow/calf pairs to graze the allotment between the dates of July 1 through October 15. All of the Mesa Allotment is located within the boundaries of the analysis area, and there is currently one active grazing permit issued. The permit on the Mesa Allotment authorizes 100 cow/calf pairs to graze from June 1 to October 15 annually. Most of the Chris Mountain/Park Lake/Martinez Allotment is located within the analysis area. There are currently two active grazing permits within this area, one being an on/off permit and the other a term permit. On/off permits are associated with unfenced private lands and there are no proposals under any of the alternatives that would affect this area. The term grazing permit on the Chris Mountain/Park Lake/Martinez Allotment authorizes 435 cow/calf pairs or 574 yearling plus six horses to graze the area from June 1 to October 15 annually.

3.4.2 Environmental Consequences

There are both positive and negative effects to range livestock operations associated with the network of system and non-system trails in the analysis area. Trails can be beneficial to livestock operations and range condition by providing for easier movement of livestock and better distribution to areas of underutilized forage. Recreation trail users may either cause livestock to scatter or move groups of them toward areas of concentration near fence lines or natural barriers. Recreation trail users can also be very disruptive during herding operations as they tend to scatter livestock when they are being gathered and/or moved. Recreation trail users may also be disruptive to operations by opening and not closing gates as they pass through fence lines. Table 6 provides the miles of trails by allotment for each alternative:

Table 6: Miles of Trails by Allotment

Proposed Trail Designation	Allotment Name	Status	Alternative 1 (miles)	Alternative 2 (miles)	Alternative 3 (miles)	Alternative 4 (miles)
Motorized ATV	Chris Mountain/Park Lake	Active	18.2	21.4	23.4	24.9
Motorized Single Track	Chris Mountain/Park Lake	Active	0	0	0	6.7
Non-motorized	Chris Mountain/Park Lake	Active	10.1	24.8	46.4	55.4
Remove System	Chris Mountain/Park Lake	Active	0	0	6.3	6.7
Motorized ATV	Dudley	Vacant	1.7	1.7	1.7	1.7
Motorized Single Track	Dudley	Vacant	0	0	4.6	9.8
Non-motorized	Dudley	Vacant	5.2	5.2	4.6	1.7
Motorized ATV	Mesa	Active	21.3	26.2	26.2	27.2
Motorized Single Track	Mesa	Active	0	0	8.5	12.5
Non-motorized	Mesa	Active	12.6	12.6	4.1	0.1
Motorized ATV	Sheep Creek	Active	3.9	5.8	5.8	5.8
Motorized Single Track	Sheep Creek	Active	0	0	0.5	0.5
Non-motorized	Sheep Creek	Active	1.9	1.9	2.4	2.4

3.4.2.1 Alternative 1 – No Action

Under the No Action Alternative, there are approximately 75 miles of trail found within the analysis area. Although there would be no changes to the existing road and trail system under Alternative 1, it is anticipated that there would be increased trail use in the analysis area. With this increased use, there would be an increase in the frequency of livestock being scattered, or groups moved toward areas of concentration. Disruptions in herding operations and instances of gates being left open would also likely increase. There are many more potential gate closure problems associated with non-system trails under Alternative 1. No ATV cattle guards, mountain bike cattle guards, self closing gates or similar structures would be installed under this alternative at non-system trail/fence intersections which would make it more difficult to control livestock movement and maintain the integrity of the fences. Along the current trail system, there are four locations identified where gate closures have been a problem. Overall, the No Action Alternative would have similar effects as Alternatives 3 and 4 with regard to improved distribution of livestock, but be the least desirable in terms of livestock control and fence integrity.

On the portion of the Dudley Allotment that is vacant, and the portion that is a forage reserve, effects to grazing would only occur if the area were stocked.

3.4.2.2 Alternative 2

Under Alternative 2, there would be approximately 100 miles of designated trail within the analysis area. An additional 17.9 miles of trail would be designated within the Chris Mountain/Park Lake/Martinez Allotment, 5 miles within the Mesa Allotment, 1.9 miles within the Sheep Creek Allotment, and no increase within the Dudley Allotment. Alternative 2 would provide more potential livestock distribution benefits than Alternative 1 because there would be more trails developed to a higher standard. This would aid in easier movement of livestock within pastures and provide better access to areas of underutilized forage. More trails of a higher standard would make it easier to move livestock from pasture to pasture. ATV cattle guards, mountain bike cattle guards, self closing gates or similar structures would be installed under this alternative at designated trail/fence intersections which would provide better control of livestock and maintain better integrity of the fences as compared to Aternative 1. The frequency of disruptions to livestock operations would likely be similar to those described in Alternative 1, but would occur in more places throughout the analysis area. Amount and frequency of disturbance incidence would be dependent on livestock rotation schedules, which would concentrate livestock into a particular pasture. Rotational schedules vary from year to year. These effects would be more acute on the Chris Mountain/Park Lake/ Martinez Allotment, as there is an increase in miles of trails on the allotment, and the allotment is in close proximity to private land. Effects to the Dudley Allotment under Alternative 2 would be the same as described under Alternative 1. In addition to the four locations with gate closures problems identified in Alternative 1, there would be at least five more associated with Alternative 2.

3.4.2.3 Alternative 3 – Proposed Action

Approximately 129 miles of designated trail would be found within the analysis area under Alternative 3. In relation to Alternative 1, this is an additional 41.5 miles of designated trail within the Chris Mountain/Park Lake/Martinez Allotment, 5 within the Mesa Allotment, 2.9 within the Sheep Creek Allotment, and 4 within the Dudley Allotment. Alternative 3 would provide more potential livestock distribution benefits than Alternative 2 because it provides more trails of higher standard, which would

assist in easier movement and better distribution of livestock. Structures would be installed at designated trail/fence intersections providing better livestock control and fence integrity. Frequency and amount of livestock operation disruptions would likely increase over those described under Alternatives 1 and 2 as it is expected that there would be a greater increase in trail use under this alternative, especially with regard to motorized single track on the Dudley, Sheep Creek and Mesa allotments. Amount and frequency of livestock operation disruptions and encounters between trail users would again be dependent on livestock rotation schedules. These effects would be even more acute on the Chris Mountain/Park Lake/Martinez Allotment under this alternative, as the total miles of trails within the allotment would be greater. Under Alternative 3 there would be approximately 17 locations identified where gate closures may be an issue.

3.4.2.4 Alternative 4

Under Alternative 4 there would be approximately 149 miles of designated trail within the analysis area. In relation to Alternative 1 there would be an additional 59.1 miles of designated trail within the Chris Mountain/Park Lake/Martinez Allotment, 6 within the Mesa Allotment, 2.9 within the Sheep Creek Allotment, and 6.3 within the Dudley Allotment. Alternative 4 would provide the greatest potential livestock distribution benefits of all the alternatives because it provides the most designated trails of higher standard. The more trails, the easier it would be to move and distribute livestock throughout a pasture and move them from pasture to pasture. However, frequency and amount of livestock operation disruptions would likely increase over those described under Alternatives 1, 2, and 3 as it is expected that there would be a greater increase in trail use under this alternative, especially with regard to motorized single track on the Dudley, Sheep Creek and Mesa Allotments. As in Alternatives 2 and 3, the amount and frequency of livestock operation disruptions and encounters between trail users would be dependent on livestock rotation schedules. As with Alternative 2 and 3, structures would be installed at designated trail/fence intersections providing better livestock control and fence integrity. The potential for livestock operation disruptions would be highest on the Chris Mountain/Park Lake/Martinez Allotment under this alternative as miles of trail within the allotment increases compared to Alternatives 1, 2, and 3. Under Alternative 4 there would be approximately 21 locations identified where gate closures may be an issue.

3.5 Vegetation

3.5.1 Affected Environment

The analysis area is comprised of a variety of terrain, from the relatively gentle terrain of Turkey Springs in the east, to the moderately steep slopes around Middle Mountain, Devil Mountain, Mule Mountain, and Horse Mountain in the central and western portions of the analysis area. The Piedra River drainage forms the western boundary of the analysis area. Elevations range from 6,500 feet to 9,950 feet.

Vegetation cover types within the 56,231-acre analysis area were analyzed through field reconnaissance and utilized GIS data from the SJNF vegetation database (R2Veg). A majority of the analysis area is in forested cover types, with ponderosa pine, mixed conifer, and aspen forests covering approximately 82 percent of the analysis area. There are also small amounts of spruce-fir (4 percent), shrublands (7 percent), grasslands (4 percent), and pinon-juniper (2 percent). Riparian areas and wetlands, rock, and water each make up less than 1 percent of the cover types in the analysis area.

A variety of noxious weeds are present in the analysis area. Noxious weeds are defined as non-native plants that disrupt native vegetation and ecosystems (Colorado Weed Management Association 2007). The State of Colorado categorizes noxious weeds into three lists: A, B, and C. List A plants are designated for elimination on all county, state, federal and private lands. List B includes plants whose continued spread should be stopped. List C plants are selected for recommended control methods (Colorado Department of Agriculture 2011).

There are currently no List A noxious weed species found within the analysis area. List B species within the analysis area or on National Forest System (NFS) lands in close proximity to the analysis area include bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), hoary cress (*Cardaria draba*), houndstongue (*Cynoglossum officinale*), jointed goatgrass (*Aegilops cylindrical*), Leafy spurge (*Euphorbia esula*), mayweed chamomile (*Anthemis cotula*), Musk thistle (*Carduus nutans*), oxeye daisy (*Chrysanthemum leucanthemum*), perennial pepperweed (*Lepidium latifolium*), spotted knapweed (*Centaurea maculosa*), and yellow toadflax (*Linaria vulgaris*). List C noxious weeds found within or close to the analysis area include chicory (*Cichorium intybus*), common burdock (*Arctium minus*), common Mullein (*Verbascum thapsus*), downy brome (*Bromus tectorum*), field bindweed (*Convolvulus arvensis*), and poison hemlock (*Conium maculatum*).

Objectives for list B weeds are to eradicate any new invaders, and to contain or control known infestations where feasible. For list C noxious weed infestations, the objective is to target those species while in the course of treating list A and B species. Most populations of List B and C noxious weeds are found along open/closed roadsides, along trails and at trailheads, and in frequently disturbed areas such as campsites or stockponds. Disturbance that creates bare ground and favorable seed beds, and is close to noxious weed infestations on adjacent lands are major contributing factors to the introduction and spread of noxious weeds. Noxious weeds are disseminated by numerous vectors such as people and their pets, vehicles, livestock, wildlife, wind, and water. Once established, noxious weeds are excellent competitors and infestations may rapidly increase. The Forest Service has and will continue to treat noxious weeds on NFS lands on a limited basis, in compliance with the Invasive Species Action Plan for the SJNF (2007). The SJNF currently treats about 3 percent of known noxious weed infestations annually. Funding for noxious weed treatment is declining while noxious weed infestations continue to increase.

Particular species of concern in this analysis area include leafy spurge, houndstongue, and spotted knapweed. The first populations of leafy spurge were found on the District in the late 1990s in the Martinez Canyon area. It has been slowly spreading since that time, but to date has been fairly well contained to the east side of the analysis area. Houndstounge is found mostly in the north and west portions of the analysis area where populations have been well established since the 1980s. It is uncommon in other parts of the District. Known infestations of spotted knapweed have been controlled, but new infestations are being identified annually. For other list B and C noxious weeds, success in treatment and control has been very limited. The only exceptions are bull thistle, mayweed chamomile, hoary cress, and perennial pepperweed. Current treatment efforts have been fairly successful at preventing the spread of these species.

3.5.2 Environmental Consequences

3.5.2.1 Alternative 1 – No Action

This alternative would retain existing road and trail designations and not propose any changes to the existing road and trail system in the analysis area. Motorized use of non-system routes would continue to be prohibited in accordance with existing policy. Non-motorized use of non-system trails would likely continue. These trails would be monitored for resource damage resulting from continued use and evaluated for decommissioning if necessary.

Potential direct impacts to vegetation from both non-motorized and motorized recreational use include trampling, uprooting, or killing of vegetation. Impacts to vegetation occur mostly during initial creation of the trails. After trails are established, there may still be impacts to vegetation adjacent to trail corridors due to normal trail maintenance, or where users periodically leave the trail. If more non-system routes are created, these impacts would occur over a larger area. If non-system routes are abandoned by users, or if they are decommissioned, there would be no further direct impacts to vegetation from recreational use and the vegetation would begin to recover.

Recreational use is also one of the many factors that can contribute to the establishment and spread of noxious weeds. This can occur when people, pets, recreation stock, or recreational vehicles spread weed seeds along trails, or cause disturbance that creates bare ground and seed beds favorable to the establishment of weeds. The use and creation of non-system trails, particularly in the eastern portion of the analysis area, has been one of the major contributing factors to the establishment and spread of leafy spurge. People, recreation stock, or recreational vehicles using these trails would continue to act as vectors for leafy spurge and other noxious weed species by bringing in and depositing new weeds and weed seeds from outside the area. The disturbance caused by use of these trails would also cause the establishment and spread of noxious weed species. The establishment of additional non-system trails would spread this effect over a larger area.

Noxious weed management would continue to occur in the analysis area as time and funding allow. However, it is likely that noxious weed introduction and spread would continue to increase over time due to a variety of factors, including recreational use of system and non-system trails in the area. These factors may also increase the likelihood that new species of noxious weeds may be brought into the area. Although there would be no new trail construction under this alternative, the establishment of non-system trails by the public is likely to continue. This makes it difficult to predict how much area may be impacted by recreational use in the future, and how this would impact the establishment and spread of noxious weeds. The disturbance caused by trail maintenance would create bare ground and favorable seed beds for noxious weeds.

3.5.2.2 Alternative 2

This alternative proposes a variety of changes to the existing trail system, including the adoption of non-system trails, changes in the managed use permitted on existing trails, and new construction of trails and trail segments.

In areas that are part of the existing road and trail system, and where non-system routes would be added to the system, impacts from this alternative to vegetation, including noxious weeds, would be similar to those described under Alternative 1.

Approximately 4.1 acres of area would be disturbed under this alternative due to the construction of 6.1 miles of new trails, including 1.1 miles of new non-motorized trails and 5.0 miles of new ATV trails. Construction of new trails would require the removal of tree, shrub, and grass-forb vegetation within the trail tread, and often immediately adjacent to the trail. Impacts to vegetation would occur on more acres under this alternative than under the No Action Alternative. The disturbance caused by construction of new trails would create bare ground and favorable seed beds for noxious weeds, thus increasing the potential for establishment and spread of noxious weeds as compared to Alternative 1. The disturbance caused by trail maintenance would also create bare ground and favorable seed beds for noxious weeds.

It is anticipated that some non-system routes may be abandoned by users since more system trails would be available for their use. Where this occurs, or in areas where roads or trails are decommissioned as part of this alternative, there would be no further impacts to vegetation from recreational use, and vegetation would begin to recover along the road or trail. Where routes are abandoned or decommissioned, there should also be no further introduction or spread of noxious weeds due to human vectors. Assuming no additional non-system trails are created, noxious weed infestations would be less likely to infest new areas.

Noxious weed management would continue to occur in the analysis area as time and funding allow. However, it is likely that noxious weed introduction and spread would continue to increase over time due to a variety of factors, including recreational use of new and existing trails in the area. These factors may also increase the likelihood that new species of noxious weeds may be brought into the area. Since there would be fewer miles of trail and fewer acres would be impacted by new trail construction under Alternative 2 than under Alternatives 3 or 4, this should occur at a slower rate and over fewer acres as compared to Alternatives 3 and 4.

3.5.2.3 Alternative 3 – Proposed Action

The effects under Alternative 3 are similar to Alternative 2, except there would be more vegetative area impacted by proposed motorized and non-motorized trails.

In areas that are part of the existing road and trail system, and where non-system routes would be added to the system, impacts from this alternative to vegetation, including noxious weeds, would be similar to those described under Alternative 1.

Approximately 8.7 acres of area would be disturbed under this alternative due to the construction of 15.4 miles of new trails, including 6.1 miles of new non-motorized trails, 6.0 miles of new ATV trails, and 3.3 miles of new single-track motorized trails, as well as parking areas. The impacts caused by this disturbance are similar to those described under Alternative 2, but would occur across 4.6 more acres than under Alternative 2.

Where non-system routes are abandoned, or in areas where roads or trails are decommissioned, impacts to vegetation, including noxious weeds, would be similar to those described under Alternative 2.

Noxious weed management would continue to occur in the analysis area as time and funding allow, however it is likely that noxious weed introduction and spread would continue to increase over time due

to a variety of other factors, including recreational use of new and existing trails in the area. These factors may also increase the likelihood that new species of noxious weed may be brought into the area. The establishment and spread of noxious weeds under Alternative 3 would likely occur at a faster rate and over more acres than under Alternative 2, but should occur at a slower rate and over fewer acres as compared to Alternative 4.

3.5.2.4 Alternative 4

The effects under Alternative 4 are similar to Alternative 2, except there would be more vegetative area impacted by proposed motorized and non-motorized trails.

In areas that are part of the existing road and trail system, and where non-system routes would be added to the system, impacts from this alternative to vegetation, including noxious weeds, would be similar to those described under Alternative 1.

Approximately 11.2 acres of area would be disturbed under this alternative due to the construction of 19.7 miles of new trails (6.3 miles of new non-motorized trails, 7.5 miles of new ATV trails, and 5.9 miles of new single-track motorized trails, as well as additional parking areas). The impacts caused by this disturbance are similar to those described under Alternatives 2 and 3, but would occur across 7.1 more acres than Alternative 2, and 2.5 more acres than under Alternative 3.

Where non-system routes are abandoned, or in areas where roads or trails are decommissioned, impacts to vegetation, including noxious weeds, would be similar to those described under Alternative 2.

Noxious weed management would continue to occur in the analysis area as time and funding allow. However, it is likely that noxious weed introduction and spread would continue to increase over time due to a variety of other factors, including recreational use of new and existing trails in the area. These factors may also increase the likelihood that new species of noxious weeds may be brought into the area. Construction of new trails in the northern portion of the analysis area, where houndstongue is a particular problem, would likely cause this species to spread and make it more difficult to control as compared to the other alternatives. The establishment and spread of noxious weeds under Alternative 4 would likely occur at a faster rate and over more acres than either Alternative 2 or 3 due to more acres being disturbed by trail construction.

3.6 Threatened, Endangered, and Sensitive Plant Species

3.6.1 Affected Environment

3.6.1.1 Threatened or Endangered Flora Species

A total of two federally listed plant species under the Endangered Species Act (ESA) of 1973, as amended, are evaluated for actions occurring on the SJNF. This includes Knowlton's cactus (*Pediocactus knowltonii*) and Pagosa skyrocket (*Ipomopsis polyantha*). Since there is no suitable habitat on the Pagosa District for Knowlton's cactus, this species is dismissed from further analysis. Field surveys have found potentially suitable habitat in the analysis area for Pagosa skyrocket, but the species itself has never been found in the analysis area. This habitat occurs in portions of the analysis area that may be impacted by road decommissioning activities and new, non-motorized trail construction.

3.6.1.2 Region 2 Sensitive Flora Species

There are two sensitive plant species with known populations in the analysis area: Pagosa bladderpod (*Lesquerella pruinosa*), which has several known populations in the analysis area, as well as giant helleborine orchid (*Epipactis gigantea*), which has one known population in the analysis area.

There are also three sensitive plant species that have suitable habitat in the analysis area, but have never been found in the analysis area. These are Missouri milkvetch (*Astragalus missouriensis* var. *humistratus*), Aztec milkvetch (*Astragalus proximus*) and yellow lady's slipper (*Cypripedium parviflorum*).

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1 – No Action

Threatened and Endangered Flora Species

There are currently some short segments of open roads and trails in areas with potentially suitable Pagosa skyrocket habitat, and continued use of these roads and trails could impact this habitat. Since effects to potentially suitable habitat are possible, this current use may effect, but is not likely to adversely affect Pagosa skyrocket.

Region 2 Sensitive Flora Species

For *Epipactis gigantea* (giant helleborine orchid), a determination of no impact was made since this species is found in an area that is not being impacted by current trail use in the analysis area. For *Astragalus missouriensis* var. *humistratus* (Missouri milkvetch), *Astragalus proximus* (Aztec milkvetch), *Cypripedium parviflorum* (yellow lady's slipper), and *Lesquerella pruinosa* (Pagosa bladderpod), a may adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide determination was made since direct effects by trampling or uprooting of individuals are possible along existing roads and trails, and in areas where non-system trails are currently being used.

3.6.2.2 Alternatives 2, 3, and 4

Threatened or Endangered Flora Species

A small amount of potentially suitable habitat for Pagosa skyrocket will be impacted by the decommissioning of two segments of non-system road under Alternatives 2, 3, and 4. Some non-motorized trail will also be constructed in potentially suitable habitat under Alternatives 3 and 4. Since potentially suitable habitat will be affected, a determination of **may affect, not likely to adversely affect** was made for Pagosa skyrocket. The USFWS concurred with this determination in a letter dated February 6, 2012. A more detailed discussion of the direct and indirect effects from the proposed action is provided in the Biological Evaluation.

Region 2 Sensitive Flora Species

For *Epipactis gigantea* (giant helleborine orchid), a determination of "no impact" was made since this species is found in an area that would not be impacted by proposed project activities. For *Astragalus missouriensis* var. *humistratus* (Missouri milkvetch), *Astragalus proximus* (Aztec milkvetch), *Cypripedium parviflorum* (yellow lady's slipper), and *Lesquerella pruinosa* (Pagosa bladderpod), a "may adversely impact

individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide" determination was made since some direct effects by trampling or uprooting of individuals of these species are possible along existing roads and trails, along newly constructed trails, and in areas where non-system trails may continue to be used. A more detailed discussion of the direct and indirect effects from the proposed action is provided in the Biological Evaluation.

3.7 Watershed, Soils, and Geology

3.7.1 Affected Environment

The analysis area is principally contained within three watersheds (5th level Hydrologic Unit Code): Devil Creek, Stollsteimer Creek, and Middle Piedra River. A small fraction of the analysis area (874 acres, 1.3 percent) is located in the Lower Piedra River 5th level watershed. Within each 5th level watershed, there are multiple 6th level watersheds and associated streams. These 6th level watersheds and associated perennial streams are shown in Table 7 All portions of the analysis area drain to the Piedra River. The analysis area is not part of a Municipal Supply Watershed.

Known perennial streams in the analysis area include: Piedra River, Horse Creek, Elk Creek, West Devil Creek, Devil Creek, Stollsteimer Creek, Martinez Creek, Dutton Creek, and Stevens Draw. In addition to these perennial streams, there is an extensive network of ephemeral and intermittent streams, as well as numerous springs, seeps, wetlands, and other water bodies. GIS analysis of the Forest Service lands in the analysis area shows 1,238 acres of riparian habitat. The distribution by 5th and 6th level Hydrologic Unit Code is shown in Table 7.

Table 7: HUC 5 and HUC 6 Watersheds, Riparian Habitat, and Streams in the Analysis Area (Forest Service lands only).

			Analysis Area Statistics			
HUC 5	HUC 6 Number	HUC 6 Name	Total Size (acres)	Riparian Habitat (acres)	Perennial Streams (miles)	Intermittent Ephemeral Streams (miles)
Devil Creek	140801020301	Headwaters Devil Creek	17,875	439	11.6	80.7
	140801020302	Outlet Devil Creek	13,853	148	2.5	64.5
			31,728	**587**	**14.0**	**145.2**
Lower Piedra River	140801020501	Yellowjacket Creek-Piedra River	874	16	0.1	4.3
			874	**16**	**0.1**	**4.3**
Middle Piedra River	140801020206	Indian Creek-Piedra River	9,561	269	5.3	45.6
	140801020205	Box Canyon-Piedra River	4,607	88	1.9	21.6
			14,168	**357**	**7.1**	**67.3**
Stollsteimer Creek	140801020402	Peterson Gulch-Stollsteimer Creek	10,949	142	1.2	37.5
	140801020404	Cabezon Canyon-Stollsteimer Creek	1,549	9	0.0	7.9
	140801020401	Dutton Creek-Martinez Creek	3,652	78	1.7	13.4
	140801020403	Dyke Valley-Stollsteimer Creek	4,648	49	0.0	18.0
			20,798	**277**	**2.9**	**76.8**
		Analysis Area	**67,569**	**1,238**	**24**	**294**

Notes: HUC = Hydrologic Unit Code

Stream segments that are not fully supporting their designated beneficial uses are defined as impaired and placed on the State of Colorado's 303(d) list. No streams within the analysis area are defined as impaired. However, Stollsteimer Creek above the Southern Ute boundary is listed on the Colorado Department of Public Health and Environment Monitoring and Evaluation List due to high sediment loading.

Soil characteristics such as texture, depth, and erosion hazard rating vary substantially across the analysis area, with differences in elevation, aspect, and vegetation often indicating changes in soil type. There are numerous soil units within the analysis area that have erosion hazard ratings of "severe" or "very severe," indicating that anthropogenic disturbance would likely result in accelerated erosion if not properly mitigated.

3.7.1.1 Background Information and Existing Watershed and Soil Impacts

Forested watersheds act to take precipitation inputs (snow and rain) and route them to stream channels. During the transition from water input to water outflow, land surfaces with plant litter, organic material, and growing plants capture or slow water, allowing the water to infiltrate the soil profile. Bare or compacted surfaces associated with forest roads and trails can effectively reduce infiltration rates, and increase overland flow of water and subsequent soil erosion (Neary et al. 2009).

The principal impacts of road and trail networks on watershed and soil resources within the analysis area are:

- Introducing sediment into the drainage network.
- Physically occupying the floodplain leading to a reduction of riparian area and straightening of stream channels.
- Erosion from trail and road surfaces during construction and use.

The introduction of sediment to the drainage network is heavily dependent on trail and road routing and the erosion potential of the soils that are impacted. If a road or trail network closely parallels, or frequently crosses stream channels, rates of sediment introduction to the drainage network will increase. Additional factors that can increase erosion include: steep trail gradients, soils with high erosion potential, soil wetness, and the slope of the land across which a trail is constructed. Increased introduction of sediment to the drainage network can negatively impact water quality, quantity, and aquatic habitat. For these reasons, erosion and subsequent sediment introduction to the drainage network are the primary concerns for watershed and soil resources.

Within the analysis area, NFST 601 has severely entrenched sections and erosion problems on the west end of the trail. Additionally, there are portions of the trail passing through wet areas where horses sink into mud at least one foot deep. The existing uses on the trail are non-motorized, and the trail sees heavy horse use, especially during big game hunting seasons. Additional erosion and sediment introduction can also come from landslides and slumps that are the result of poorly placed/constructed trails on unstable slopes. Within the analysis area, trail 6c (NFSR 730)/11d (Figure 5 – Figure 7) traverses several areas of steep (>50 percent) cross slopes and has several landslides and slumps that indicate unstable soil conditions.

Roads and trails have historically been located along and through valley bottoms. In some cases, routes have encroached on the floodplain leading to a physical diminishment of riparian vegetation and straightening/steepening the stream channel. Conversion of riparian areas to roads and trails leads to a decrease in the health of the riparian area. This, in turn, can lead to a reduced capacity of those areas' function as sponges, buffering intense rainstorms and filters of pollutants during precipitation events. This can lead to an alteration of the flow regime as well as a reduction in the water quality of a system. Within the analysis area, the Devil Creek Trail (NFST 603) has evidence of substantial erosion and subsequent sediment introduction to Devil Creek. Additionally, in its current alignment, the Devil Creek Trail closely parallels and crosses the channel at several points, passes through the riparian corridor, and traverses steep slopes and erodible soils. The existing non-motorized use of this trail has had minor negative impacts on floodplain function.

In addition to the specific problems discussed on NFST 601, NFST 603 and NFSR 730, all existing trails and roads in the analysis area undergo some minor erosion on a near continuous basis. This erosion does not have substantial impacts on watershed and soil resources in the analysis area. A multitude of physical factors (soils, gradient, etc.) influence erosion and sediment generation. One of the most important factors is the type of usage that will occur on the trail (Olive and Marion 2009). Typically, trails that allow only hiking will result in the lowest levels of erosion and sediment introduction to the drainage network, whereas trails open to ATV use may result in the highest levels. Mountain biking is generally expected to generate less erosion than horseback riding (especially during wet trail conditions), while motorized travel generally results in the largest amount of erosion (Olive and Marion 2009, Wilson and Seney 1994). These comparisons are general in nature and not true under all circumstances; however, they provide an indication of the relative impacts of various uses. In addition to the impacts associated with trail usage, the construction of new trails always results in short-term increases in sedimentation and erosion directly related to construction. These impacts generally subside quickly after construction activities are complete.

All trails will be constructed to meet the standards contained in EM 7720-103, FSH 2309.18, and the project design criteria described in Section 2.3.5 of this document. Collectively, these standards and guidelines will be referred to as "project design criteria" during the analysis of watershed and soil impacts.

3.7.2 Environmental Consequences

Alternatives 1 through 4 represent a progression from the existing trail and road network to the maximum proposed trail/road network. Each alternative will be discussed relative to the No Action Alternative (Alternative 1).

3.7.2.1 Alternative 1

Alternative 1 represents the continuation of the existing trail and road designations and does not propose any changes. Relative to Alternatives 2, 3, and 4, Alternative 1 has the fewest miles of non-motorized system trails (29.8 miles), ATV system trails (45.0 miles), single-track motorized system trails (zero miles), and ML1 (closed) system roads (81.6 miles). Alternative 1 has the largest number of miles of system roads open to full-sized vehicle traffic (69.3 miles). No trail or road decommissioning would occur under this alternative. Of the four alternatives, Alternative 1 would have the highest levels of use on non-system routes.

If Alternative 1 were selected, the existing impacts discussed under Section 3.7.1.1, Background Information and Existing Watershed and Soil Impacts, would continue to occur. Over time, these impacts on watershed and soil resources would potentially increase due to elevated levels of recreational use on the existing road and trail network. Erosion from usage of non-system trails, especially in the eastern portion of the analysis area, would likely increase since these trails do not receive periodic maintenance by the Forest Service. Additionally, the existing user-created trail network would likely continue to expand due to the lack of recreational opportunities. Use of these new trails would generate increased erosion.

3.7.2.2 Alternative 2

Non-motorized Impacts

Relative to Alternative 1, Alternative 2 represents an increase of 14.7 miles of non-motorized system trails; the majority (12.2 miles) of this increase comes from the adoption of existing non-system routes that are already being traveled by non-motorized users. The remaining 2.5 miles comes from the conversion of ATV system trails to non-motorized trails (1.4 miles), and new trail construction (1.1 miles). Under Alternative 2, 15.0 miles of non-system trails would be decommissioned, their use by non-motorized users would be discouraged, and traffic would be directed to the newly adopted system trails. The practice of routing traffic to system trails, combined with the decommissioning of some non-system trails, would likely reduce overall watershed and soil impacts by reducing erosion from non-motorized uses on non-system trails, especially in the eastern portion of the analysis area.

ATV Impacts

Alternative 2 proposes an additional 11.4 miles of system ATV trails, of which 5.0 miles are new construction, 4.1 miles are the designation of system ATV trails on system roads, and 2.3 miles are the adoption of non-system ATV trails. Proposed new construction trails 11a and 11c combine relatively moderate trail gradients, with short steep pitches and steep cross slopes. Trail 11d crosses a landslide path and has multiple short steep pitches. The potential impacts to watershed and soil resources from trails 11a, 11c, and 11d would be minor, as long as the design standards and guidelines of the project design criteria are adhered to. Construction of trail 11e would not have a substantial impact on soil and watershed resources due to low trail gradients and cross slopes.

The designation of ATV system trails on existing ML1 roads (NFSRs 730, 923.A, and 629.D) would have only minor impacts on water resources due to moderate trail gradients and topography, and the use of the existing road bed. For these same reasons, the designation of non-system routes as ATV system trails (7a, 7c, and 7d) would not substantially impact soil and watershed resources.

This alternative would also convert 1.4 miles of ATV trail to non-motorized trail, which would reduce watershed and soil impacts by eliminating the higher levels of erosion generated by motorized travel.

Road Impacts

Relative to Alternative 1, Alternative 2 would place 1.1 miles of system roads that are currently open to full-sized vehicles into ML1 status, as well as decommission a combined 0.6 miles of system and non-system roads. These actions would reduce existing impacts on watershed and soil resources by eliminating full-sized vehicle traffic and allowing revegetation of the road surface, thereby reducing erosion.

3.7.2.3 Alternative 3

Non-motorized Impacts

Compared to Alternative 1, Alternative 3 would add 41.0 miles of non-motorized system trails. The majority of this increase comes by adopting 28.3 miles of existing non-system routes, designating 8.3 miles of non-motorized system trail on existing roads, and constructing an additional 6.1 miles of new trail. Since the 28.3 miles of non-system trail that are proposed for adoption are already in use, re-designation and management as system trails would likely result in decreased impacts on watershed and soil resources due to periodic maintenance. The decommissioning of non-system routes would reduce erosion by eliminating traffic and allowing the trails to become revegetated. The designation of 2.8 miles of non-motorized trails on open system roads would decrease watershed and soil impacts by eliminating erosion associated with motorized traffic, while allowing revegetation of a portion of the road surface. The designation of 5.5 miles of ML1 roads as non-motorized trails would likely result in minor increases in erosion due to disturbance from non-motorized users.

The proposed construction of new non-motorized trails 13a, 13b, 13d, 13e, and 13h poses little threat to watershed and soil resources due to moderate cross slopes, low trail gradients, and non-motorized use. Trail segments 13i and 13j have relatively steep gradients and cross slopes; however, the short trail lengths combined with the project design criteria would effectively reduce erosion from these trails such that their construction and use would result in only minor impacts.

Single-track Motorized Impacts

Relative to Alternative 1, Alternative 3 proposes the addition of 13.6 miles of single-track motorized system trail, principally through the construction of new trails (3.3 miles) and the conversion of non-motorized system trails to motorized single-track system trails (9.2 miles). Proposed new construction trails 12a, 12d, 12e have both high cross slopes and gradients, combined with soils having erosion hazard ratings of moderate or severe. The application of the design standards and guidelines contained in the project design criteria would effectively reduce erosion from these trails such that their construction and use would result in only minor impacts to watershed and soil resources.

The conversion of non-motorized system trails to single-track motorized system trails (NFSTs 600 and 605) would generate minor levels of increased erosion relative to baseline conditions. NFST 600 traverses the divide between the Piedra and Devil Creek drainages, and contains short segments of high gradients, steep cross slopes, and soils with a moderate erosion hazard rating. Segment 3b of NFST 605 has moderate trail gradients, average cross slopes over 20 percent, and soils with erosion hazard ratings of severe. Segment 3f of NFST 605 has moderate trail gradients and cross slopes; however, two short sections combine severe cross slopes (55 percent) with steep trail gradients (25 percent). The increased erosion associated with NFSTs 600 and 605 would be mitigated using the project design criteria, and would result in minor impacts to watershed and soil resources.

ATV Impacts

Relative to Alternative 1, Alternative 3 would increase system ATV trail mileage by approximately 15.7 miles. A majority of the mileage increase comes from construction of new trails (6.0 miles) and the designation of ATV trails on system roads (6.8 miles). Additionally, 2.9 miles of non-system routes would be designated as ATV trails.

Alternative 3 proposes to construct trail 11b, in addition to trails 11a, 11c, 11d, and 11e (discussed in Alternative 2). Trail 11b has steep cross slopes, short steep pitches, and soils with erosion hazard ratings of moderate to severe. However, project design criteria coupled with the fact that the trail segment is well removed from the West Fork of Devil Creek, means that watershed and soil impacts would be minor.

Alternative 3 proposes to designate 2.7 miles of ATV trails on system roads (NFSR 630 and 630.J), in addition to the 4.1 miles discussed under Alternative 2. Trails on NFSR 630 and 630.J traverse moderate topography and would make use of the existing road features. Consequently, they would not have a substantial impact on watershed and soil resources.

Of the 2.9 miles of non-system routes converted to ATV trails as a part of Alternative 3, 2.4 miles are the same as discussed in Alternative 2 (7a, 7c, and 7d). The additional 0.5 miles comes from trail 7e, which would not have substantial impacts on water resources due to moderate topography, use of existing road features, and long distances from ephemeral and intermittent streams. The 1.2 miles of ATV trail that would be designated as non-motorized trail would result in a decrease in watershed and soil impacts by eliminating the higher levels of erosion generated by motorized travel.

Road Impacts

Relative to the No Action Alternative, Alternative 3 would reduce by 3.5 the miles of roads that are currently open to full-sized vehicles, and increase ML1 roads by 3.4 miles. These actions would reduce existing impacts on watershed and soil resources by eliminating full-sized vehicle traffic and allowing revegetation of the road surface, thereby reducing erosion.

3.7.2.4 Alternative 4

Non-motorized Impacts

Compared to Alternative 1, Alternative 4 would add 55.2 miles of non-motorized system trails. The majority of this increase comes by adopting 39.9 miles of existing non-system routes, designating 8.2 miles of non-motorized system trail on existing roads, and constructing an additional 6.3 miles of new trail. Since the 39.9 miles of non-system trail that are proposed for adoption are already in use, re-designation and management as system trails would likely result in decreased impacts on watershed and soil resources due to active management and the decommissioning of non-system routes. The designation of 2.8 miles of non-motorized trails on open system roads would decrease watershed and soil impacts by eliminating erosion associated with motorized traffic, while allowing revegetation of a portion of the road surface. The designation of 5.4 miles of ML1 roads as non-motorized trails would likely result in minor increases in erosion due to disturbance from non-motorized users.

In addition to the new non-motorized trails discussed in Alternatives 2 and 3 (13a, 13b, 13d, 13e, 13h, 13i, and 13j), Alternative 4 proposes to construct trail 13k. Trail 13k has moderate cross slopes and soils with an erosion hazard rating of slight; consequently, it would not impact soil or watershed resources.

Single-track Motorized Impacts

Compared to Alternative 1, Alternative 4 proposes the addition of 29.5 miles of single-track motorized system trail, which is accomplished through the conversion of non-motorized system trails to motorized

single-track system trails (20.2 miles), the construction of new trails (5.9 miles), and the adoption of 3 miles of non-system routes.

In addition to those non-motorized trails that are converted to motorized single-track in Alternative 3 (3a, 3b, and 3f [NFSTs 600 and 605]), Alternative 4 proposes trails 3c, 3d, and 3e (NFSTs 601, 603, and 604). For a majority of its length, NFST 601 traverses steep slopes with soils having an erosion hazard rating of severe. The existing uses on this trail have resulted in severe entrenchment, and have caused water to flow along the trail in several spots. Designation of the existing trail for single-track motorized use would substantially exacerbate erosion and entrenchment problems if corrective measures were not taken prior to re-designation. Consequently, several sections of NFST 601 would require minor re-routes, extensive armoring and drains, reclamation of entrenched sections, and hardened turnpikes to comply with direction found in EM 7720.103 and FSH 2309.18 and Forest Plan standards and guidelines pertaining to soil and hydrological resources. Even with these structural mitigations, it is anticipated that erosion issues would still pose a concern for trail managers and that intensive and regular maintenance would be required to maintain the effectiveness of the structural improvements.

NFST 604 has generally moderate trail gradients and cross slopes along a majority of its length. Short segments with steep pitches occur in multiple areas, but watershed and soil impacts would be minor as long as the project design criteria were employed.

As previously mentioned, the existing non-motorized uses of NFST 603 have resulted in substantial erosion, sediment introduction, and minor negative impacts on floodplain function. Due to the prolonged close alignment of the trail and stream, and multiple stream crossings, opening this trail to motorized use would substantially accelerate, and increase in severity, the existing impacts if corrective measures were not undertaken prior to re-designation. Consequently, multiple sections of NFST 603 would require relocation away from the drainage bottom and improved stream crossings to comply with direction found in EM 7720.103 and FSH 2309.18 and Forest Plan standards and guidelines pertaining to soil and hydrological resources. Even with these structural mitigations, it is anticipated that erosion issues would still pose a concern for trail managers and that intensive and regular maintenance would be required to maintain the effectiveness of the structural improvements.

Alternative 4 would adopt non-system routes 4b and 4c as motorized single-track in addition to trail 4a (discussed in Alternative 3). Trails 4b and 4c traverse moderate topography and make use of the existing road features. Consequently, they would not have a substantial impact on watershed and soil resources.

In addition to the trails proposed for construction under Alternative 3 (12a, 12d, and 12 e), Alternative 4 proposes trails 12b, 12c, and 12f. Trail 12f is a short steep section with soils having an erosion hazard rating of moderate; watershed and soil impacts from this trail segment would be minor. A majority of the proposed Trail 12b contours with the existing topography and poses little threat to watershed and soil resources. However, where the trail begins switchbacking down to Devil Creek, there are steep trail gradients (greater than 40 percent) combined with extremely steep cross slopes (greater than 70 percent). These factors, combined with motorized travel and severely erodible soils, indicate that substantial erosion would occur if substantial and extensive structural improvements are not incorporated into the trail design, including the use of retaining walls, armored switchbacks, and the careful redirection of surface runoff to armored drainage outlets that prevented discharge onto the trail below and that protect hillsides from gully erosion.

Trail 12c crosses a very steep intermittent drainage, which holds high soil moisture most of the year due to convergent topography, thick timber, and a northwest aspect. Even with an armored drainage crossing and travel timing restrictions, this trail segment would likely undergo substantial erosion and sedimentation into the drainage when subjected to motorized travel. Nearby non-motorized travel on NFST 601 has resulted in erosion problems on similar terrain and soils. Mitigating the impacts of trail 12c where it enters the steepest portion of the drainage and crosses the intermittent stream would require an elevated non-native trail surface.

ATV Impacts

With respect to ATV system trails, Alternative 4 is identical to Alternative 3, except that it adds trail 11f. Trail 11f crosses the West Fork of Devil Creek and climbs steeply out of the drainage on both sides. This trail has steep cross slopes and trail gradients (62 percent and 17 percent, respectively), and a stream crossing. These factors, combined with motorized ATV travel and soils with severe erosion hazard ratings, indicate that substantial erosion and sedimentation into the West Fork of Devil Creek would occur despite the implementation of project design criteria. To successfully mitigate these impacts would require the construction of retaining walls, armored switchbacks, and the careful redirection of surface runoff to armored drainage outlets that prevent discharge onto the trail below and that protect hillsides from gully erosion. Even with these structural mitigations, it is anticipated that erosion issues would still pose a concern for trail managers and that intensive and regular maintenance would be required to maintain the effectiveness of the structural improvements.

Road Impacts

The road impacts of Alternative 4 are the same as Alternative 3.

Summary and Comparison of the Alternatives

The alternative with the fewest watershed and soil resource impacts is Alternative 3. Relative to Alternative 4, Alternative 3 limits impacts associated with ATV and single-track motorized usage, while reducing the impacts, relative to Alternatives 1 and 2, associated with usage of non-system trails.

Overall, Alternatives 2 and 3 would likely have similar impacts to watershed and soil resources, with the impacts of Alternative 2 being slightly greater in spatial extent and magnitude due to continued use and proliferation of non-motorized trails (although this use/proliferation would be less than Alternative 1). While Alternative 3 allows for expanded ATV and motorized opportunities, the curtailment of non-system trails relative to Alternative 2 would result in reduced overall impacts to watershed and soil resources, though these reductions would be minor in nature.

The impacts to soil and watershed resources from Alternative 1 would be greater than Alternatives 2 and 3, but less than Alternative 4. These greater impacts are associated with the proliferation of non-system trails. Non-system trails, especially the non-motorized trails in the eastern portion of the analysis area, have an impact on watershed and soil resources. Since Alternative 1 does not actively seek to curtail their use, the associated impacts would increase over time as the non-system trail network expanded and experienced increased usage.

Relative to the other alternatives, Alternative 4 represents the greatest impacts on soil and watershed resources. While this alternative would curtail non-system trail usage, the impacts associated with

proposed trails 3d, 11f, 12b, and 12c are substantially greater than the impacts proposed under Alternatives 1, 2, or 3.

Alternatives 2 and 3 are likely to result in a reduction in overall impacts on watershed and soil resources relative to Alternative 1. The selection of Alternative 4 would likely result in increased watershed and soil impacts relative to Alternative 1.

3.8 Wildlife and Fish

The following section addresses wildlife and fish species, including Forest Plan Management Indicator Species (MIS), migratory birds, Region 2 Forest Service sensitive species, and federally listed species designated by the USFWS. An evaluation of the proposed action's effect on these species is consistent with law, regulation, and policy governing wildlife habitat management on NFS lands.

3.8.1 Management Indicator Species

The Forest Plan provides direction for the maintenance of habitat for viable populations of all existing vertebrate wildlife species. Due to the large number of species that occupy NFS lands, a subset of species is identified for analysis purposes that are intended to represent the full range of species. This subset is collectively referred to as MIS. Each action proposed by the agency is analyzed in a manner that discloses its effects to MIS and evaluates its consistency with the management direction contained in the Forest Plan. The analysis then determines effects from the project on Forest-level population and habitat trends for each MIS.

There are 23 species identified as MIS in the SJNF Forest Plan. As Table 8 shows, 12 species are carried forward for analysis due to species or habitat presence or likely presence in the analysis area, and direct and indirect effects associated with the proposed action. Species analyzed include rainbow trout, Abert's squirrel, American marten, black bear, elk, mule deer, green-tailed towhee, hairy woodpecker, Merriam's turkey, mountain bluebird, and northern goshawk. Mexican spotted owl is discussed in the federally listed threatened and endangered species section (Section 3.8.4). Rationale for species dismissed from analysis is provided in the Fish and Wildlife Specialist Report on file at the District Office.

Table 8: MIS Carried Forward for Analysis.

MIS Species	Preferred Habitat	Reason for Selection in Forest Plan	Habitat Present in Analysis Area	Species Present in Analysis Area, and Period of Use	Species Affected by Proposed Action
Rainbow trout (*Oncorhynchus mykiss*)	Aquatic	Economically important	Yes	Yes, year-round	Yes
Abert's squirrel (*Sciurus aberti*)	Ponderosa pine	Unique habitat, species easily monitors change, limited range Nationwide	Yes	Yes, year-round	Yes
American marten (*Martes americana*)	Spruce-fir and cool-moist mixed conifer	Unique habitat, species easily monitors change	Yes	Yes, year-round	Yes

MIS Species	Preferred Habitat	Reason for Selection in Forest Plan	Habitat Present in Analysis Area	Species Present in Analysis Area, and Period of Use	Species Affected by Proposed Action
Black bear (*Ursus americanus*)	All forested types, grassland, riparian, mountain shrub/Gambel oak, aspen, and pinyon-juniper	Economically important, represents large group of species	Yes	Yes, most active from spring through fall	Yes
Elk (*Cervus elaphus*)	All terrestrial habitats; pine, pinyon-juniper and mountain shrub/Gambel oak in winter	Economically important, public issue	Yes	Yes, year-round	Yes
Mule deer (*Odocoileus hemionus*)	All terrestrial habitats; pine, pinyon-juniper and mountain shrublands/Gambel oak in winter	Economically important, public issue	Yes	Yes, year-round	Yes
Green-tailed towhee (*Pipilo chlorurus*)	Mountain shrub/Gambel oak, pinyon-juniper, ponderosa pine/oak sagebrush, and riparian	Unique habitat, habitat that can be monitored	Yes	Yes, spring through summer	Yes
Hairy woodpecker (*Picoides villosus*)	All forested types, aspen, and pinyon-juniper	Unique habitat, habitat that can be monitored	Yes	Yes, year-round	Yes
Merriam's turkey (*Meleagris gallopavo merriami*)	Grasslands, riparian, mountain shrub/Gambel oak, aspen, pinyon-juniper, ponderosa pine, and mixed conifer	Limited habitat on the SJNF that would readily monitor change	Yes	Yes, year-round	Yes
Mexican spotted owl (*Strix occidentalis lucida*)	Mature ponderosa pine and mixed conifer in narrow rock-walled canyons	Federal threatened species	Yes, potential breeding and foraging	Unknown, possible breeder	Yes
Mountain bluebird (*Sialia currucoides*)	Cavity nester in alpine, aspen, mixed conifer, mountain shrub/Gambel oak, pinyon-juniper, ponderosa pine, and sagebrush	Unique habitat that would monitor management practices	Yes	Yes, spring through fall	Yes
Northern goshawk (*Accipiter gentilis*)	Generalists that uses mature forest habitats for nesting	Unique habitat and environmentally sensitive	Yes	Yes, year-round	Yes

3.8.1.1 Terrestrial MIS

Affected Environment

Three geographic areas are used to describe wildlife habitat and species distribution in the analysis area, and include the eastern, central, and western portions. The eastern portion extends from the PLPOA property boundary west to the Devil Creek drainage. This area is dominated by ponderosa pine vegetation on mostly gentle terrain, and generally receives the greatest amount of motorized and non-motorized use.

The central portion extends from the Devil Creek drainage west to Horse Mountain. Ponderosa pine and warm-dry mixed conifer are present in the lower elevations, while larger and more contiguous stands of warm-dry and cool-moist mixed conifer forests, and small blocks of spruce-fir forests are present in the higher elevations. The central portion contains moderately steep to very steep and remote terrain, and receives the least amount of use by motorized and non-motorized recreationists.

The western portion of the analysis area extends from Horse Mountain west to the Piedra River. The area is dominated by large stands of aspen, mountain shrublands, and mountain grasslands. Ponderosa pine and warm-dry mixed conifer forests are present in the lower elevations, with cool-moist mixed conifer present in the higher elevations. The western portion also contains moderately steep to very steep terrain and receives more motorized and non-motorized recreation use than the central portion, but less than the eastern portion. Each of these areas contains wildlife habitat characteristics and recreational use patterns that differ from one another.

The following section gives a brief overview of the status and distribution of each MIS in the analysis area and the SJNF. Effects of existing recreational activities are described below in the Habitat Capability and Effectiveness section and in the Environmental Consequences section.

Abert's squirrels are year-round residents of ponderosa pine forests on the SJNF (USDA Forest Service 2005b). This squirrel is unique in that its life necessities are almost entirely provided by a single plant species, ponderosa pine. Preferred habitats are stands of all-aged ponderosa pine with even-aged groups within the stands, open understories, and high canopy base levels (Keith 2003). Squirrel populations are limited when the availability of food and/or nesting sources are limited. Suitable squirrel nesting sites (large ponderosa pines in clumps with interlocking crowns) and evidence of squirrel feeding (clipped needle clusters, cone cores, and pealed twigs) have been observed in numerous locations across the analysis area. Additionally, squirrels have been observed during numerous field visits to the project area. Ponderosa pine forests in the lower elevations of all three geographic areas provide approximately 20,540 acres of Abert's squirrel habitat. Approximately 46 miles of motorized travel routes and 6 miles of non-motorized travel routes are present in squirrel habitat. Current Forest-wide monitoring shows a stable habitat and population trend for Abert's squirrel.

American martens are year-round residents of cool-moist mixed conifer and spruce-fir forests on the SJNF (USDA Forest Service 2005c). Optimal marten habitat contains large amounts of course woody debris on the forest floor, and closed canopy multi-storied stand conditions favored by prey species such as snowshoe hare and red squirrels (USDA Forest Service 2005b). In most studies of habitat use, marten were found to prefer late-successional stands of mesic coniferous forests, especially those with complex physical structure near the ground. Complex physical structure, especially near the ground, appears to address three important needs of marten. It provides protection from predators, provides access to subnivean space where most prey are captured during winter, and provides protective thermal microenvironments, especially in winter (Buskirk and Ruggiero 1994). Marten habitat is located primarily in the central and western portions, totaling approximately 9,927 acres. Martens (track sign) have been detected multiple times during marten monitoring in the analysis area. Approximately 13 miles of motorized travel routes and 9 miles of non-motorized travel routes are present in marten habitat. Current Forest-wide monitoring shows a stable habitat and population trend for marten.

Black bear habitat is present across the analysis area, totaling approximately 53,546 acres. Approximately 106 miles of motorized travel routes and 134 miles of non-motorized travel routes are present in bear habitat. The Forest-wide habitat trend for black bear is stable, with a stable population trend.

Elk and mule deer are forest generalists that occupy a variety of habitats across the SJNF and analysis area (USDA Forest Service 2005e and USDA Forest Service 2005k). The analysis area contains approximately 20,446 acres of forage and 35,789 acres of cover for both species. The current forage to cover ratio in the analysis area is 30:53, which is far from the optimal 60:40 described by Thomas et. al. (1979). Forage to cover ratios, along with other factors such as the amount of human disturbance and juxtaposition of forage to cover and available water, determine habitat quality for elk and mule deer.

Elk and mule deer inhabit the analysis area year-round. The lower elevations in all three geographic areas provide winter range where species forage on mountain shrublands associated with ponderosa pine and small blocks of pinyon-juniper woodlands. The mid and upper elevations provide transition range for individuals migrating to higher elevation summer range outside the analysis area. Individuals and small herds of both species will remain in transition range from spring through fall in areas with low levels of human disturbance, especially in the central portion. Animals that migrate through the area display north to south movement patterns, especially in the Horse Mountain, Devil Mountain, Mule Mountain, Middle Mountain, and Chris Mountain areas.

Calving and fawning activity occurs across the area with does and cow elk seeking areas with low levels of human disturbance and close to security habitat and water. Calving activity (observations of individuals and tracks of cows with calves) has been observed in the central and western portions. These areas provide quality calving habitat due to their proximity to water and general lack of human presence and disturbance. Fawning activity appears to be less concentrated in certain locations, as does with fawns have been observed across the analysis area.

The western and central portions provide abundant security habitat for both species due to the unroaded character of the landscape, lack of motorized and non-motorized trails, and lack of public use as compared to the eastern.

There have been numerous studies conducted assessing disturbance impacts to elk from motorized use of roads, and to a lesser extent, motorized trails (USDA Forest Service 2005e, Rowland et al. 2003, Preisler et al 2006). Many elk biologists suggest that disturbance response from the use of motorized trails is similar to use of roads. Declines in elk use of habitat adjacent to forest roads have been documented in several studies. The area of avoidance, or reduced habitat effectiveness has ranged from 0.25 miles to over 1 mile from the road, depending on the amount of traffic, road quality, terrain, and cover availability near roads (Lyon 1979). Within this zone, available habitat is only partially used, and is less effective than it would have been in the absence of the road.

Animals disturbed by motorized activity generally seek areas that provide security from disturbance. Security habitat should contain forage, cover, and water nearby to be effective. A GIS analysis was conducted to assess current presence and distribution of elk security habitat in the analysis area. The analysis model uses a 0.5-mile buffer distance from currently designated open motorized roads and trails combined with areas of 250 acres or larger to illustrate elk security areas (Leege 1984). A 0.5-mile buffer was used based on terrain features and dense forest cover across most of the analysis area. Water is

present across the area in the form of perennial streams, intermittent streams and associated seasonally flooded zones, small stock ponds, and springs, and therefore is not a limiting factor. Forage availability is less than the optimal and likely limits extensive use by large numbers of animals. The model shows approximately 8,510 acres of elk security habitat in the area, with the largest blocks occurring in the central and western portions. The model shows approximately 600 acres of elk security habitat in the southeastern portion of the analysis area (east of Brockover Mesa and north of Peterson Gulch). This area contains numerous non-system, non-motorized routes that receive extensive use from spring through summer, therefore providing poor elk security. Consequently, the total available elk security habitat is approximately 7,910 acres across the analysis area.

Approximately 50 miles of motorized travel routes and 9 miles of non-motorized travel routes are present in elk foraging habitat in the analysis area. Approximately 64 miles of motorized travel routes and 24 miles of non-motorized travel routes are present in areas providing cover.

Elk and mule deer are economically important species and are hunted during the regulated big game hunting seasons from late August to mid-November. Most big game hunting during the onset of the season (archery, muzzleloader, and first rifle elk season) occurs primarily in the central and western portions. During this time, hunters pursue small resident herds in more remote and less disturbed areas. Hunter use and activity increases across the entire analysis area during the second and third hunting seasons due to over-the-counter bull license sales and extended hunting seasons (generally nine days each). All elk and deer license sales are limited during the fourth season. The limited number of licenses available generally limits hunter use of the area during the fourth season. The chance of snow and cooler weather is generally greater during the later seasons, triggering the onset of migration and forcing animals to lower elevations.

The Forest-wide habitat trend for elk and mule deer is slightly downward. The elk population trend is slightly downward while the deer population trend is stable.

Green-tailed towhees are well distributed and are a common breeding species on the SJNF (USDA Forest Service 2005g). Towhees are present on the SJNF from spring through late summer. Towhees forage predominantly on the ground and low in shrubby vegetation, mostly amid dense overhead or surrounding bushes, or at the edge of bushes or thickets. They eat seeds, small insects, and some fruit, such as serviceberry, elderberry, and raspberry (Andrews and Righter 1992, Dobbs et al. 1998, Righter 1998). Towhees prefer low tree canopy cover and medium to dense shrub cover, commonly on dry, shrubby hillsides and in post-disturbance shrubby growth (Dobbs et al. 1998). It is assumed that the primary limiting factor of green-tailed towhee breeding populations on the SJNF is the amount and distribution of breeding habitat (USDA Forest Service 2005g). Towhees have been observed on numerous occasions in the analysis area. The analysis area contains approximately 19,634 acres of towhee habitat, predominately in the lower elevations. Approximately 44 miles of motorized travel routes and 4 miles of non-motorized travel routes are present in towhee habitat. The Forest-wide habitat trend for green-tailed towhee is slightly upward and the population trend is stable.

Hairy woodpeckers are year-round residents of all coniferous and aspen forests on the SJNF (USDA Forest Service 2005j). Habitat for hairy woodpecker on the SJNF includes ponderosa pine, Douglas-fir, lodgepole pine, spruce-fir, aspen, lowland and foothill riparian forests, pinyon-juniper woodlands, and urban areas with tall trees. Hairy woodpeckers are primary cavity constructors that utilize snags (dead

trees) and suitable live trees (trees with decay caused by insects and disease) for cavity nesting. The species constructs cavities that are later used by other cavity nesting species (birds and small mammals). There are many snags present across the analysis area with high densities present in spruce-fir and mixed conifer forests, and ponderosa pine forests in areas furthest from roads. Hairy woodpeckers consume a diet that is about 80% insect larvae (wood boring beetles removed from dead and diseased trees).

The species has been observed on numerous occasions in all three geographic areas. The analysis area contains approximately 45,877 acres of hairy woodpecker habitat. Approximately 89 miles of motorized travel routes and 24 miles of non-motorized travel routes are present in woodpecker habitat. The Forest-wide habitat trend for hairy woodpecker is slightly upward, and population trend is stable.

Merriam's turkeys are year-round residents on the SJNF. Primary habitat for Merriam's turkey is found in mountain grasslands, riparian, mountain shrub/Gambel oak, aspen, pinyon-juniper, ponderosa pine, and mixed conifer vegetation types (USDA Forest Service 2005f). Although turkeys utilize the higher elevation spruce-fir forests, their presence is generally irregular and unpredictable. Small openings dominated by grasses and forbs that are interspersed throughout forested areas provide foraging habitat, especially for poults in spring. Large trees with large horizontal branches and open crowns, and generally within groups of mature trees, provide optimal roosting habitat. Turkeys are hunted during the spring and fall, with harvest regulated by CDOW. During these periods, most hunting occurs in the lower to mid elevations in the Devil Creek, Devil Mountain, Mule Mountain, Middle Mountain and Piedra River/First Fork areas. Merriam's turkeys have been observed on numerous occasions in the analysis area.

The analysis area contains approximately 37,090 acres of turkey habitat scattered across the lower and mid elevations coniferous and deciduous forests, mountain shrublands, and mountain grasslands of all three geographic areas. Approximately 79 miles of motorized travel routes and 16 miles of non-motorized travel routes are present in turkey habitat. The Forest-wide habitat trend for Merriam's turkey is stable, with an upward trend in the population. The turkey population is secure and self-sustaining.

Mountain bluebirds inhabit the analysis area from spring through late summer. Bluebirds are obligate secondary cavity nesters associated with forested edge habitats and/or grasslands and other open habitats on the SJNF (USDA Forest Service 2005g). There are two primary components of mountain bluebird habitat: tree cavities for nesting, and open habitats for capturing prey on or near the ground (USDA Forest Service 2005g). They nest relatively early in the season, have high site fidelity and are relatively tolerant of human disturbance. Bluebirds forage primarily on the ground on large insects (USDA Forest Service 2005g). Bluebirds have been observed nesting in tree cavities created by woodpecker's near forest edges.

The analysis area contains approximately 3,238 acres of foraging habitat and 14,151 acres of nesting habitat for bluebirds. Approximately 8 miles of motorized travel routes and 1 mile of non-motorized travel routes are present in bluebird foraging habitat. Approximately 34 miles of motorized travel routes and 5 miles of non-motorized travel routes are present in bluebird nesting habitat. The Forest-wide habitat and population trend for bluebird is stable.

Northern goshawks occupy the analysis area from spring through fall, and are a relatively uncommon and irregular breeding species on the SJNF (USDA Forest Service 2005h). The species nests in mature and late successional ponderosa pine, mixed conifer, and spruce-fir forests, often with an aspen

component in the overstory. Goshawks prey on small to medium size mammals and birds. Forest openings and the edges of mature forest stands provide preferred hunting habitats, especially where standing snags provide hunting perches. Reynolds et al. (1992) suggest that nesting habitat and food availability are the primary factors that influence goshawk populations. Goshawks are sensitive to human presence and disturbance in nest areas, and typically display aggressive behavior towards intruders. More recent information suggests that prey abundance and availability are important habitat attributes and potential limiting factors for goshawk populations, particularly if prey species have cyclic populations (Kennedy 2003). There are no known active nest territories in the analysis area, however habitat occupancy and breeding potential is high based on observations in the area.

The analysis area contains approximately 32,951 acres of goshawk habitat scattered across all three geographic areas. Approximately 58 miles of motorized travel routes and 20 miles of non-motorized travel routes are present in goshawk habitat. The Forest-wide habitat and population trends for goshawk are both stable.

Habitat Capability and Habitat Effectiveness. Habitat capability and habitat effectiveness are two primary considerations in assessing human disturbance impacts to wildlife. Habitat capability refers to the combination of ecological factors (existing vegetation, climate, and landforms) that influence the inherent ability of a landscape to provide habitat and sustain species in the absence of human disturbance. Habitat effectiveness refers to the spatial use of potential habitats in the context of human disturbance. Reduced habitat effectiveness generally results from the displacement of individuals from preferred habitats, forcing them to leave (temporarily or permanently) otherwise suitable habitats to avoid disturbance along, and especially on heavily used routes. When this occurs, animal distribution, productivity, and survival can be affected (Preisler et al. 2006, Rowland et al. 2003, Cole et al. 1997). Disturbance that occurs in blocks of core habitat that provide secure sites for resting, breeding, and feeding are most impacting to wildlife. Disturbance can be especially disruptive during some seasons of the year such as in late winter on crucial winter range, or during the early breeding season when entire annual reproductive outputs can be lost due to relatively small disturbances.

Recreational use (both motorized and non-motorized) and vegetation management (mechanical vegetation treatments, livestock grazing, and prescribed fire activity) are the primary human uses/disturbances that have influenced wildlife habitat capability and effectiveness in the analysis area. The following paragraphs describe existing habitat capability and habitat effectiveness for MIS in the analysis area.

Habitat capability and effectiveness for MIS and other wildlife have been influenced most in the eastern portion of the analysis area. Forest management actions have emphasized forest restoration of ponderosa pine and warm-dry mixed conifer forests through mechanical vegetation treatments and prescribed burns. These activities have benefitted Abert's squirrel, mule deer, hairy woodpecker, Merriam's turkey, mountain bluebird, and northern goshawk by improving habitat capability in some areas. The area also receives the highest level of motorized and non-motorized use from spring through early fall. Moderate to high levels of recreational use in the area have likely reduced habitat effectiveness for species. Black bear, elk, Merriam's turkey, mule deer, and northern goshawk have likely been most affected by disturbance as these species are generally less tolerant of human activities. Abert's squirrel, green-tailed towhee, hairy woodpecker, and mountain bluebird have likely been affected to a lesser extent as these species (adults and juveniles) are often observed in close association with human activity.

The central portion of the analysis area receives less motorized and non-motorized use than the western and eastern portions due to the more unroaded character, limited number of motorized and non-motorized routes, and generally more remote and rugged terrain. Effects to MIS from forest management actions are similar to those occurring in the eastern portion, but at a smaller scale due to limited access across most of the area. Habitat capability and effectiveness have been influenced less than the eastern portion, and are considered greatest in the central portion due to the lower levels of human use and disturbance. The area provides quality habitat for all MIS associated with the vegetation types present, especially those MIS described earlier that are less tolerant of humans. Consequently, overall use by all MIS is likely higher than in the eastern portion.

The western portion of the analysis area contains large sections of unroaded terrain with several designated motorized travel routes. The effects from forest management actions are similar to those occurring in the eastern and central portions, but at a smaller scale due to limited access across most of the area. Motorized and non-motorized recreational use combined with forest management actions have affected wildlife habitat in the western portion less than the eastern portion, and slightly more than the central portion, thus maintaining relatively high levels of habitat capability for all MIS. Habitat effectiveness is greater than the eastern portion due to the lower levels of human use and disturbance, and slightly less than the central portion due to more human use and activity. Consequently, overall use by species is likely higher than the eastern portion, but slightly less than the central portion.

Environmental Consequences

Motorized and non-motorized recreational activities can have direct and indirect effects on wildlife habitat and species. Direct effects to habitat include habitat loss via removal of vegetation and habitat components (such as snags and downed woody debris). Indirect effects to habitat include habitat modification (modification of vegetation, soil, or water) and pollution (habitats contaminated with discarded human food or foreign objects) (Knight and Cole 1995). Direct effects to species include exploitation (hunting, trapping, or collection), and disturbance which is intentional (harassment) or unintentional (hiking through an animal's territory or bird watching) (Knight and Cole 1995). Other potential direct effects to species include collisions with motor vehicles and subsequent injury or mortality. The most important indirect effect of motorized and non-motorized use is the ability of these activities to reduce habitat effectiveness resulting from human disturbance.

The following analysis focuses on activities proposed to facilitate motorized and non-motorized recreation in the area (decommissioning and closing of roads, and construction, reconstruction, and maintenance of trails), the type of use proposed (motorized, non-motorized, or both in some locations), and the timing and intensity of the activities. Factors considered include effects to wildlife habitat and key habitat components, risk of injury or mortality due to collisions with motorized and non-motorized travel, and disturbance to species. Direct and indirect effects to aquatic MIS (rainbow trout) are discussed in Section 3.7.1.2.

Alternative 1 – No Action

This alternative would retain existing road and trail designations and not propose any changes to the existing road and trail system in the analysis area. Currently, there are 29.8 miles of non-motorized system trails, 45 miles of ATV trails, 69.3 miles of open system roads, and 81.6 miles of closed system roads.

There are currently no single-track motorized trails in the analysis area. Use of these existing system roads and trails is expected to continue. Motorized use of non-system routes would continue to be prohibited, in accordance with existing policy. Non-motorized use of non-system trails would likely continue. Currently there are approximately 42.4 miles of non-system trails, mostly in the eastern portion of the analysis area. These trails would be monitored for resource damage resulting from continued use and evaluated for decommissioning if necessary.

The direct effects to terrestrial habitat (removal of tree, shrub, and grass-forb vegetation), key habitat components (removal of snags and course woody debris on the forest floor used by prey species), and overall effect to habitat capability are expected to be minor in scope, scale, and duration. Potential impacts are confined to areas where trail maintenance is occurring, and are expected to be minimal. As discussed in the recreation section, the current motorized trail system is viewed by many motorized recreationists as insufficient to meet their recreation preferences. In taking no action to address this matter, the No Action Alternative would likely result in increased unauthorized, off-route travel as compared to any of the action alternatives, thereby affecting habitat. Terrain and dense forest vegetation across most of the analysis area would help alleviate some illegal motorized travel and impacts to habitat. Indirect effects to habitat associated with discarding of foreign objects or other pollutants (mostly litter, garbage, etc.) are expected to be minimal based on current observations and no appreciable increase in use expected in the foreseeable future.

The current road and trail systems provide access for hunting and trapping activities. These activities are regulated by the CDOW, and have a direct effect on local populations. MIS that are regularly hunted in the area include black bear, Merriam's turkey, mule deer, and elk. MIS hunted or trapped less frequently include Abert's squirrel and American marten. These activities are expected to continue in the foreseeable future, and would continue affecting populations. CDOW establishes management goals and objectives for big game, small game, and furbearer species to maintaining viable, self-sustaining populations.

In most areas, the short sight distances, terrain, and physical characteristics (narrow widths, curves and turns, surface conditions) of roads and motorized trails require operators to maintain relatively slow speeds. MIS observed on, near, or crossing roads in the analysis area include Abert's squirrel, black bear, elk, mule deer, green-tailed towhee, hairy woodpecker, Merriam's turkey, and mountain bluebird. Direct effects associated with potential injury or mortality from vehicle collisions are expected to be low, given the ability of these species to move away from roads and generally flee from the area before encounters occur. Non-motorized travel is unlikely to result in collisions with wildlife, given the very low speeds associated, and the high likelihood that species would flee from the area of disturbance well before encounters occur. Potential effects from injury or mortality from recreational use of roads or trails on American marten and northern goshawk are expected to be very low, if any, as both species are largely associated with "interior" forests, and generally avoid foraging or breeding in areas close to roads and heavily used trails.

The most important indirect effects to species from motorized and non-motorized use is the ability of these activities to reduce habitat effectiveness. The level of recreational use, type of use, timing, and location play an important role in determining how human disturbances affect wildlife. These effects can either be negative, neutral, or positive, depending on the time of year the disturbance takes place, level of disturbance, the species in question, and habitat available for dispersal when disturbances exceed the

species' tolerance. Although there have been numerous studies of recreational impacts on wildlife, the knowledge gained is disparate and seldom definitive (Knight and Gutzwiller 1995). For this reason, it is difficult to accurately quantify the affect disturbance may have for a specific species. In addition, some species are inherently more sensitive to disturbance (black bear, elk, Merriam's turkey, mule deer, and northern goshawk) than other species, and within a species, some individuals are inherently more sensitive to disturbance than other individuals. Abert's squirrel, green-tailed towhee, hairy woodpecker, and mountain bluebird are likely more tolerant of disturbance as they are often observed in close association with human activity.

Table 9 provides miles of motorized and non-motorized travel routes in MIS habitat. This information is used as an indicator to evaluate indirect effects associated with disturbance, and relative degree of habitat effectiveness. The analysis uses route miles in habitat instead of buffer distances and acreage calculations, as there are no "commonly agreed" distance disturbance buffers that illustrate disturbance response. As mentioned previously, response to disturbance differs among species; however, it is reasonable to conclude that indirect effects to species from disturbance are likely to be greater when larger amounts of habitat are affected.

As shown for most MIS, total miles of motorized and non-motorized trails in habitats utilized are less Under Alternative 1, compared to Alternatives 2, 3, and 4. As mentioned in the affected environment section, habitat capability and effectiveness have been influenced from past and existing forest management activities and recreational use. These activities have likely resulted in the short-term displacement of some MIS in areas receiving minimal use (central and western portions of the analysis area) to short and long-term displacement in areas receiving moderate to high levels of use (eastern portion).

Under Alternative 1, indirect effects to species would likely increase from the potential increase in motorized and non-motorized activities. Alternative 1 would likely result in increased unauthorized, off-route travel as the current motorized trail system is viewed by many motorized recreationists as insufficient to meet their recreation preferences. Additionally, non-motorized use, particularly in the eastern portion of the analysis area, may increase in the future as public awareness of the trails expands and overall forest use increases. These activities would reduce habitat effectiveness for MIS slightly more than that described in the affected environment section, with effects being greater for species more sensitive to human disturbance.

Although there is the potential for increased illegal motorized use and non-motorized use of non-system trails, habitat capability and effectiveness are expected to be influenced less under Alternative 1 than under Alternatives 2, 3, and 4. The terrain present across most of the analysis area is moderately steep to very steep, contains relatively dense forest vegetation, and is to a large extent unroaded. The physical characteristics of the area limit illegal and authorized travel to a large extent. Direct and indirect effects to habitat and species are expected to increase slightly above existing conditions, resulting in the potential minor increase in habitat impacted and short-term disturbance and temporary displacement of species across the central and western portions. Continued moderate to high public use levels in the eastern portion will continue to displace species more sensitive to human disturbance over the long-term. This displacement will occur at a relatively small scale, and therefore is unlikely to impact local populations given the large amount of suitable habitat within and outside the analysis area.

The amount and presence of security habitat is an important consideration for species sensitive to human disturbances. Under Alternative 1, approximately 7,910 acres of big game security habitat would be available for elk, mule deer, black bear, and other species sensitive to disturbance. The largest block of security habitat is available in the central portion. This area provides optimal calving and fawning habitat for big game due to the relatively low levels of human disturbance. Given the limited use in this area, Alternative 1 would have a negligible influence to elk and mule deer production. This alternative would provide more security habitat for big game and other species as compared to the other alternatives.

Direct and indirect effects associated with Alternative 1 are expected to have negligible effects to habitat capability, and Forest-wide habitat and population trends for Abert's squirrel, American marten, black bear, elk, mule deer, green-tailed towhee, hairy woodpecker, Merriam's turkey, mountain bluebird, and northern goshawk as key habitat components needed for foraging and breeding will be minimally affected, and abundant and relatively undisturbed habitat will remain across the area for species dispersal when disturbances exceed the species' tolerance.

Table 9: Miles of Motorized and Non-motorized Travel Routes in Terrestrial MIS Habitats

	Alternative 1 – No Action		Alternative 2		Alternative 3 – Proposed Action		Alternative 4	
	M	NM	M	NM	M	NM	M	NM
Abert's squirrel	46	6	50	16	49	32	55	37
American marten	13	9	23	9	19	5	23	1
Black bear	106	134	116	40	156	50	196	51
Elk forage	50	9	52	15	56	24	62	28
Elk cover	64	24	71	34	80	38	95	34
Mule deer forage	50	9	52	15	56	24	62	28
Mule deer cover	64	24	71	34	80	38	95	34
Green-tailed towhee	44	4	52	8	52	13	54	18
Hairy woodpecker	89	24	99	34	109	42	124	43
Merriam's turkey	79	16	85	31	90	50	101	55
Mountain bluebird forage	8	1	9	4	8	8	9	9
Mountain bluebird nesting	34	5	37	9	40	14	43	17
Northern goshawk	58	20	65	28	73	32	85	29

Notes: M = motorized; NM = non-motorized

Alternative 2

Under Alternative 2, the overall trail system within the analysis area would be expanded by approximately 25 miles, with 15 miles of additional non-motorized trails and 10 miles of additional ATV trails.

The direct and indirect effects to wildlife habitat from motorized and non-motorized recreational activities under Alternative 2 are similar to those discussed under Alternative 1, but would occur across slightly more area due to the added maintenance and construction of trails, such as non-system routes adopted as non-motorized or motorized trails and new non-motorized and motorized trail construction, and minor increase in public use.

Direct effects to habitat from the removal of vegetation, standing dead trees, and course woody debris from maintenance and construction of new trails, are expected to be minimal since they would occur on approximately 11.6 acres. Indirect effects to habitat associated with pollutants are expected to increase

slightly above Alternative 1 given the minor increase in use. Overall, the impacts to habitat capability are expected to be minor under this alternative since direct and indirect effects to habitat are expected to be minor in scope, scale, and duration.

The direct and indirect effects to wildlife species (injury and mortality from motorized and non-motorized use and hunting and trapping) under Alternative 2 are the same as those discussed under Alternative 1, but would occur across slightly more area due to the construction of new trails (Table 9). Habitat effectiveness for all MIS would be reduced more than Alternative 1 since more trails would be constructed, resulting in a slight increase in use and disturbance. Habitat effectiveness would be reduced along new motorized routes, and along routes where the designation would change from non-motorized to motorized, such as south of Brockover Mesa (Trail Sections 11e, 7c, 6e, and 1d), west of Snow Springs (Trail Sections 7a and 11a), and the upper Elk Creek Drainage (11c and 11d).

Under this alternative, approximately 7,466 acres of big game security habitat would be available for elk, mule deer, black bear, and other species sensitive to disturbance. This alternative would have approximately 444 acres less security habitat than Alternative 1, but 2,729 acres more than Alternative 3, and 4,833 acres more than Alternative 4. Effects to big game calving and fawning in the central portion would be the same as Alternative 1.

Habitat capability and effectiveness are expected to be influenced slightly more than Alternative 1, but less than Alternatives 3 and 4 for all MIS. These influences are unlikely to have measureable affects to Forest-wide habitat and population trends for Abert's squirrel, American marten, black bear, elk, mule deer, green-tailed towhee, hairy woodpecker, Merriam's turkey, mountain bluebird, and northern goshawk as key habitat components needed for foraging and breeding will be minimally affected, and abundant and relatively undisturbed habitat will remain across the area for species dispersal when disturbances exceed the species' tolerance.

Alternative 3 – Proposed Action

Under Alternative 3, approximately 54 miles of additional trails would be added to the system, with 28 miles of additional mountain biking trails, 12 miles of new ATV trails, and 14 miles of single-track motorized trails.

The direct and indirect effects to wildlife habitat from motorized and non-motorized recreational activities under Alternative 3 are similar to those discussed under Alternative 2, but would occur across a larger area due to the added maintenance and construction of trails such as non-system routes adopted as non-motorized or motorized trails, and new non-motorized and motorized construction (Table 9).

Direct effects to habitat from the removal of vegetation, standing dead trees, and course woody debris, are still expected to be minimal since they would occur on approximately 25.5 acres, 13.9 acres more than under Alternative 2. Indirect effects to habitat from pollutants are expected to more than Alternative 2 given the additional increase in use across the area. Overall, the impacts to habitat capability are expected to be more than Alternative 2 given the increase in activities and use.

The direct and indirect effects to wildlife species from motorized and non-motorized recreational activities under Alternative 3 are the same as those discussed under Alternatives 1 and 2, but would occur across more area due to the maintenance and construction of additional trails. The potential for direct effects (injury or mortality) from motorized travel under Alternative 3 are greater than Alternatives 1 and

2 due to increasing traffic volumes. Direct effects from non-motorized travel are expected to be similar to Alternatives 1 and 2 given the species ability to disperse from affected areas. Direct effects associated with hunting and trapping are expected to be similar to Alternatives 1 and 2 despite the additional motorized and non-motorized access available for hunters.

Habitat effectiveness for all MIS would be affected more than Alternatives 1 and 2 given the increase in motorized and non-motorized opportunities and corresponding increase in use across the analysis area (Table 9). In addition to areas described under Alternative 2, habitat effectiveness would be reduced and likely impact species to a greater extent from single-track motorized activity in the Middle Mountain (NFSTs 630 and 630J), Devil Mountain (NFST 605), and Horse Mountain (NFST 600) areas (areas that currently provide relatively undisturbed, high quality habitat for MIS). The application of seasonal closures from September 1 through June 14 would minimize disturbance to all MIS prior to peak birthing seasons. However, disturbance impacts would still occur during the post-birthing periods for all MIS, the time when young are developing behavioral skills used later during subadult and adult life stages. MIS most impacted by the activities would include American marten, black bear, elk, mule deer, Merriam's turkey and northern goshawk, given their sensitive nature to disturbance. The degree of impact would depend on the amount of motorized use occurring in the area, resulting in either temporary or more long-term displacement. Displacement has the potential to reduce productivity and survival through increased competition for available resources (food, cover, and water).

Surveys for northern goshawk will be conducted prior to new trail construction in suitable habitat under Alternatives 3 and 4. Surveys for northern goshawk will also be conducted under Alternatives 3 and 4 on trails where use designations change from non-motorized to motorized. If active territories are detected, measures will be taken to minimize impacts from construction activities and changes in use designations.

Under this alternative, approximately 4,737 acres of big game security habitat would be available for elk, mule deer, and black bear. This alternative would have approximately 3,173 acres less security habitat than Alternative 1, and 2,729 acres less security habitat than Alternative 2. This alternative would have approximately 2,104 more acres of security habitat than Alternative 4. Alternative 3 would be more impacting to big game than Alternatives 1 and 2, as single-track motorized use in the central portion (NFSTs 600 and 605) would affect big game use, distribution, calving/fawning, and rearing of young in the Horse Mountain, Monument Park, and north of Devil Mountain areas, causing displacement outside the analysis area or further east in areas less disturbed by humans.

Habitat capability and effectiveness for MIS are expected to be affected more than Alternatives 1 and 2, but less than Alternative 4. Direct and indirect effects to Abert's squirrel, American marten, black bear, elk, mule deer, green-tailed towhee, hairy woodpecker, Merriam's turkey, mountain bluebird, and northern goshawk are expected to be more than Alternatives 1 and 2, based on additional habitat impacted, short-term displacement of species, and potential for short and long-term displacement in areas currently providing relatively undisturbed, high quality habitat for MIS. Consequently, Alternative 3 is expected to have more influence to existing Forest-level habitat and population trends for all MIS than Alternative 1, and slightly more than Alternative 2. These negative influences are not expected to appreciably impact local populations, nor will they affect the viability of any species Forest-wide.

Alternative 4

Under Alternative 4, approximately 74 miles of additional trails would be added to the system, with 29 miles of non-motorized trails, 15 miles of ATV trails, and 30 miles of single-track motorized trails.

The direct and indirect effects to wildlife habitat from motorized and non-motorized recreational activities under Alternative 4 are similar to those discussed under Alternatives 2 and 3, but would occur across more area due to the added maintenance and construction of trails such as non-system routes adopted as non-motorized or motorized trails, and new non-motorized and motorized construction (Table 9).

Direct effects to habitat from the removal of vegetation, standing dead trees, and course woody debris, are still expected to be minimal since they would occur on approximately 35.9 acres, 10.4 acres more than under Alternative 3. Indirect effects associated with pollutants are expected to more than Alternatives 2 and 3 given the additional increase in use across the area. Overall, the impacts to habitat capability are expected to be more than Alternatives 2 and 3 given the increase in activities and use.

The direct and indirect effects to wildlife species from motorized and non-motorized recreational activities under Alternative 4 are the same as those discussed under Alternatives 1, 2, and 3 but would occur across more area due to the maintenance and construction of additional trails (Table 9). The potential for direct effects (injury or mortality) from motorized travel under Alternative 4 are greater than Alternatives 1, 2, and 3 due to increasing traffic volumes. Direct effects from non-motorized travel are expected to be similar to Alternatives 1, 2, and 3 given the species ability to disperse from affected areas. Direct effects associated with hunting and trapping are expected to be similar to Alternatives 1, 2, and 3 despite the additional motorized and non-motorized access available for hunters.

Habitat effectiveness for all MIS would be affected more than Alternatives 1, 2, and 3 given the increase in motorized and non-motorized opportunities and corresponding increase in use across the analysis area (Table 9). In addition to areas described under Alternatives 2 and 3, habitat effectiveness would be reduced and likely impact species to a greater extent in the Devil Creek Drainage (NFST 603 and 12b connection), the West Devil Creek Drainage (NFST 604 and 11f), Monument Park area (NFST 601), areas that currently provide relatively undisturbed, high quality habitat for MIS. The application of seasonal closures from September 1 through June 14 would minimize disturbance to all MIS prior to peak birthing seasons. However, disturbance impacts would occur during the post-birthing periods for all MIS, the time when young are developing behavioral skills used later during subadult and adult life stages. MIS most impacted by the activities would include American marten, black bear, elk, mule deer, Merriam's turkey and northern goshawk, given their sensitivity to disturbance. The degree of impact would depend on the amount of motorized use occurring in the area, resulting in either short or long-term displacement. Displacement has the potential to reduce productivity and survival through increased competition for available resources (food, cover, and water). Surveys for northern goshawk will be conducted prior to new trail construction in suitable habitat under Alternatives 3 and 4. Surveys for northern goshawk will also be conducted under Alternatives 3 and 4 on trails where use designations change from non-motorized to motorized. If active territories are detected, measures will be taken to minimize impacts from construction activities and changes in use designations.

Under this alternative, approximately 2,633 acres of big game security habitat would be available for elk, mule deer, and black bear. This alternative would have approximately 5,277 acres less security habitat than

Alternative 1, 4,833 acres less than Alternative 2, and 2,104 acres less than Alternative 3. Alternative 4 would be more impacting to big game than Alternatives 1, 2, and 3 as single-track motorized use in the central portion (NFSTs 600, 604, and 605) would affect big game production in the Horse Mountain, Monument Park, north of Devil Mountain, and near the West Fork Devil Creek drainage, causing displacement outside the analysis area, or further east in areas less disturbed by humans. Proposed new trail construction and motorized use (ATV) of Trail 11f is located in quality calving and fawning habitat for big game. The construction and motorized use of Trail 11f will occur outside the months of May, June, and July in order to minimize adverse impacts to big game calving and fawning habitat in MA 4B.

Habitat capability and effectiveness would be affected more than Alternatives 1, 2, and 3. Direct and indirect effects to Abert's squirrel, American marten, black bear, elk, mule deer, green-tailed towhee, hairy woodpecker, Merriam's turkey, mountain bluebird, and northern goshawk are expected to be more than than Alternatives 1, 2, and 3 based on additional habitat impacted, short-term displacement of species, and potential for short and long-term displacement in areas currently providing relatively undisturbed, high quality habitat for MIS. Alternative 4 is expected to have more influence to existing Forest-level habitat and population trends for all MIS than any other Alternative, particularly black bear, elk, and mule deer. Alternative 4 will affect occupancy and alter distribution patterns in the analysis area for black bear, elk, and mule deer more than any other Alternative. These negative influences will impact local populations (displacement to areas with fewer disturbances) of black bear, elk, and mule deer more than Alternative 3, but are not expected to affect the viability of any species Forest-wide.

3.8.1.2 Aquatic MIS

Affected Environment

Perennial streams in the analysis area include Devil Creek, Dutton Creek, Elk Creek, Horse Creek, Martinez Creek, Piedra River, Stevens Draw, Stollsteimer Creek, and West Fork Devil Creek. Fish are present in Devil Creek, Piedra River, Stollsteimer Creek, and West Fork Devil Creek. Fish habitat and populations influenced by existing and proposed recreational activities in the analysis area include Devil Creek and West Fork Devil Creek. Rainbow trout are present in Devil Creek and West Fork Devil Creek.

Rainbow trout are non-native species that were introduced widely on the SJNF in the early 1900s. Habitat for rainbows is present in approximately 6 miles of Devil Creek, and approximately 4 miles of West Fork Devil Creek. Fish habitat improvement work was conducted in the early 1990s in the upper reaches of Devil Creek, providing benefits to the fishery. The work focused on protecting streamside riparian vegetation, improving bank stability, and increasing summer feeding and resting habitat by constructing pools and increasing depth of existing pools. Rainbows were observed using many of the created and natural pools during the 2010 field season. Existing impacts to the Devil Creek fishery include livestock grazing in localized areas, and sedimentation from motorized traffic on the East Monument Road (NFSR 630) and erosion from landslides and slumps present primarily in the lower and mid-sections of the drainage. Incidental non-motorized use on the Devil Creek Trail (NFST 603), particularly in areas paralleling and immediately adjacent to the creek, has likely had minimal impact on fish present in Devil Creek. Low flows present from summer through winter are the primary limiting factor for fish in Devil Creek.

West Fork Devil Creek is located in a relatively remote area, in a narrow, and moderately steep to very steep drainage. As such, there are no roads in or near the stream. NFST 654 parallels the stream in the lower reaches above its confluence with Devil Creek and Snow Angel Ranch. NFST 654 is a non-motorized trail that receives very minimal use. There has been no habitat improvement work in the stream. Low flows present from summer through winter are the primary limiting factor for fish in the West Fork Devil Creek.

Fish are economically important as they provide public fishing opportunities. Daily bag and possession limits are regulated by CDOW. Devil Creek and West Devil Creek provide fishing opportunities for the public. Both streams receive minimal fishing pressure due to small fish populations and difficult access to some locations.

Approximately 286 streams across the Forest have been inventoried to determine the status of trout populations. Statistical analysis of fish population and aquatic habitat data suggests declining population trends correlated with factors such as reduced flows and increased water temperatures. These results agree with the results of numerous scientific peer-reviewed studies that have evaluated the cause-and-effect relationships between stream flows, aquatic habitats, and fish population response (Gerhardt, pers. com). Reduced stream flows result in reductions in aquatic habitats, which typically lead to reductions in aquatic organisms that rely on those habitats. Given this, it is reasonable to conclude that self-sustaining fish populations have declined from historic levels across the Forest because of incremental water developments occurring over the last 100 years. More recently, it is likely that fish populations have been further reduced by the severe drought conditions experienced between 2000 and 2003. Many non-native trout populations across the Forest have been maintained by controlled stocking by CDOW.

Environmental Consequences

Recreational activities such as the construction, reconstruction, and maintenance of motorized and non-motorized travel routes and corresponding use, have potential to effect fish habitat and populations. Potential direct and indirect effects from these actions include reduced shading thereby increasing water temperatures, reduced spawning habitat or spawning success due to increased sediment load, reduced aquatic macro-invertebrate species and diversity resulting in reduced food availability, and loss of overhead cover and undercut banks resulting in fewer resting and hiding places thereby increasing predation rates or energetic costs associated with inhabiting the stream. Potential effects from these activities to rainbow trout are addressed below for each alternative.

Alternative 1 – No Action

Under Alternative 1, potential effects to rainbow trout in Devil Creek and West Fork Devil Creek would be similar to those described in the affected environment section. There are no motorized trails proposed adjacent to or near either creek. Continued incidental use on non-motorized NFST 603 and NFST 654 would have minimal impact on rainbow trout as no appreciable increase in sedimentation or loss of streamside vegetative cover are expected. The primary limiting factor for fish populations would be low flows from summer through winter. Consequently, Alternative 1 is expected to have no measurable influence to the declining Forest-level rainbow trout habitat or population trends.

Alternative 2
Potential effects to rainbow trout under Alternative 2 are the same as Alternative 1. Alternative 2 is expected to have no measurable influence to the declining Forest-level rainbow trout habitat or population trends.

Alternative 3 – Proposed Action
Potential effects to rainbow trout under Alternative 3 are expected to be similar to Alternatives 1 and 2. There are no motorized trails proposed adjacent to or near the Devil Creek or West Fork Devil Creek fisheries. With application of watershed design criteria, the addition of trail section 9g on NFST 979 (new non-motorized designation) is not expected to contribute any appreciable amount of sedimentation into Devil Creek. Consequently, Alternative 3 is expected to have no measurable influence to the declining Forest-level rainbow trout habitat or population trends.

Alternative 4
Potential effects to rainbow trout under Alternative 4 would be much greater than Alternatives 1, 2, and 3. Changing the designation of NFST 603 from non-motorized to motorized would increase sedimentation into Devil Creek due to the very close proximity of the trail and creek, and multiple creek crossings. New construction of Trail 12b to accommodate single-track motorized use from Chris Mountain into the Devil Creek drainage also increases the risk of additional sedimentation into Devil Creek. The combined effects of these actions have potential to reduce spawning habitat and decrease forage habitat quality by decreasing macro-invertebrate population densities and diversity.

New construction of Trail 11f to accommodate single-track motorized use from Middle Mountain into and beyond the West Fork Devil Creek drainage, would increase the risk of additional sedimentation into the creek, and likely reduce streamside shading from vegetation removal at the creek crossing.

The application and effectiveness monitoring of watershed design criteria for trail construction and maintenance would help minimize adverse impacts to rainbow trout in Devil Creek and West Fork Devil Creek.

In summary, trail management activities proposed under Alternative 4 would have direct and indirect effects to rainbow trout at a level much greater than Alternatives 1, 2, and 3. However, with application of watershed design criteria for trail construction and maintenance, Alternative 4 is expected to have a minor negative influence to the declining Forest-level rainbow trout habitat and population trends.

3.8.2 Migratory Birds

3.8.2.1 Affected Environment

Executive Order EO 13186 was enacted in 2001 to protect migratory birds. This Executive Order highlights the important role of cooperation and communication among federal agencies in implementing bird conservation activities. The order requires federal agencies to consider the effect of land management planning and project implementation on migratory birds, particularly those species for which there may be conservation concern. This analysis focuses on migratory bird species on the USFWS Birds of Conservation Concern list for the Southern Rockies/Colorado Plateau Bird Conservation Region, BCR 16, (USFWS 2008), and birds listed in the Colorado Partners in Flight Bird Conservation Plan for the Southern Rocky Mountains Physiographic Area, PA 62, (Beidleman 2000).

There are 19 migratory bird species on the USFWS Birds of Conservation Concern list for BCR 16. Seven species are either known to occur or have a high probability of occurring in the analysis area including American bald eagle, American peregrine falcon, Cassin's finch, flammulated owl, golden eagle, Grace's warbler, and Lewis' woodpecker. Additionally, there are 32 species on the Colorado Partners in Flight list for PA 62. Twenty-one species are either known to occur or have potential to occur in the analysis area including American peregrine falcon, American dipper, band-tailed pigeon, boreal owl, broad-tailed hummingbird, Cordilleran flycatcher, dusky grouse, flammulated owl, Grace's warbler, green-tailed towhee, Hammond's flycatcher, Lazuli bunting, Lewis' woodpecker, MacGillivray's warbler, Mexican spotted owl, olive-sided flycatcher, red-naped sapsucker, violet-green swallow, Virginia's warbler, Wilson's warbler, and Williamson's sapsucker.

Species are grouped into analysis groups based on life history requirements or habitats they either occupy or presume to occupy in the analysis area. The eight analysis groups are mountain shrublands (green-tailed towhee and Virginia's warbler), ponderosa pine (Grace's warbler, flammulated owl and band-tailed pigeon), cliffs (golden eagle), cavity dependant (violet-green swallow), cavity constructor (Lewis' woodpecker, red-naped sapsucker and Williamson's sapsucker), mixed-conifer (broad-tailed hummingbird, Cassin's finch, dusky grouse, and Mexican spotted owl), riparian/wetlands or shrublands (American dipper, Cordilleran flycatcher, Lazuli bunting, MacGillivray's warbler, and Wilson's warbler), and spruce-fir (boreal owl, Hammond's flycatcher, and olive-sided flycatcher). American dipper, boreal owl, dusky grouse, and golden eagle are present in the area year-round. The remaining species are present or likely present in the area during the breeding season (spring through summer).

Species that are addressed in other sections of the wildlife analysis will not be addressed in this section. Green-tailed towhee is addressed in the MIS section. American bald eagle, American peregrine falcon, Flammulated owl, Lewis' woodpecker, olive-sided flycatcher, and boreal owl are addressed in the sensitive species section (Section 3.8.3). Mexican spotted owl is addressed in the federally listed threatened and endangered species section (Section 3.8.4).

Many migratory birds occupy the same habitats as MIS; therefore, existing influences from recreational activities in mountain shrublands, ponderosa pine, mixed conifer, and spruce fir are similar to those for MIS. Rock-cliff habitat is limited in the analysis area for cliff nesting species such as golden eagle. Cliff habitats have not been affected by recreation activities in this analysis area. Cavity dependent and cavity constructor species use similar habitat components as mountain bluebirds and hairy woodpeckers; therefore, existing influences to habitat are similar. Riparian/wetland habitats have been minimally affected by recreational use in the analysis area for riparian species (American dipper, Cordilleran flycatcher, Lazuli bunting, MacGillivray's warbler, and Wilson's warbler).

3.8.2.2 Environmental Consequences

Alternative 1

Short and long-term effects to migratory bird species would be similar to those described under Alternative 1 in the consequences section for MIS.

Alternatives 2, 3, and 4

The direct and indirect effects of motorized and non-motorized recreation on migratory birds vary greatly from species to species depending on their key habitat components, and can vary greatly across the Landscape depending on the intensity of use across the analysis area.

Direct effects of motorized and non-motorized recreation on migratory bird analysis groups (except cliff habitats) and individual bird species include loss of key habitat components to tire trampling, new trail construction and trail reroutes, removal of standing dead trees that may pose safety hazards to trail users, creation and extension of user created trails, and a risk, albeit relatively low, of mortality due to collisions with motor vehicles. Indirect effects are primarily related to human disturbance to otherwise secure resting, feeding and breeding individuals, potentially displacing individual birds to lower quality or less preferred habitats. Disturbance can be especially disruptive during some seasons of the year, such as during the early breeding season when entire annual reproductive outputs can be lost due to relatively small disturbances.

Birds in the mountain shrub analysis group nest on or near the ground in dense shrub thickets. Loss of shrubs to trail clearing and maintenance activities results in the permanent loss of small amounts of breeding and foraging habitat. The well developed stature of shrubs preferred for nesting and foraging is closely associated with forest openings and in more open forested stands. As mentioned in the MIS section, a very minor amount of habitat would be affected under all action Alternatives, thereby having only minor impacts on mountain shrubland associated bird species.

Birds in the ponderosa pine analysis group mostly nest high in the overstory canopy and in the foliage of live pine trees, or on the ground in pine-dominated landscapes. Ponderosa pine is the most common migratory bird habitat type in the eastern and western portions of the analysis area. Few green trees are generally lost to trail construction or maintenance activities, compared to the large number of trees available in the analysis area. For this reason, the primary impact of recreational use on this analysis group is potential disturbance during the breeding season.

There are no motorized or non-motorized activities occurring in nesting habitat for golden eagle or other cliff nesting species. Direct and indirect effects to the species are limited to human disturbance impacts in eagle foraging habitat. Because of the large foraging areas utilized by eagles, disturbance impacts area expected to be minor.

Birds in the cavity-dependent group require a cavity to nest in but cannot construct the nest cavity themselves, thereby depending on the cavity constructor group for their nesting sites. Because abandoned cavities in standing dead trees are relatively rare, there is often intense competition among members of the cavity-dependent group for the use of existing cavities. For this reason, it is not uncommon for several bird species to occupy adjacent cavities in the same standing dead tree simultaneously. These "hotel" trees are both relatively rare on the landscape and very important to migratory birds. Because of the relative large diameter and tall stature of most "hotel" trees, they are often removed as hazard trees or lost to personal use firewood harvesting when in close proximity to motorized routes. As mentioned in the MIS section, a very minor amount of habitat would be affected under all action Alternatives thereby having only minor impacts on cavity dependent associated bird species.

Birds in the cavity constructor group (woodpeckers) depend on standing dead trees or green trees with heartwood decay in which to construct their nesting cavities. Cavities are constructed each spring, used for that breeding season only, then abandoned. For this reason, standing dead and diseased trees are their most critical habitat component. Standing dead and diseased trees are often considered hazards to human safety and therefore removed from close proximity to motorized and sometime non-motorized routes. As mentioned previously, a very minor amount of habitat would be affected under all action Alternatives, thereby having only minor impacts on cavity constructor associated bird species.

Public lands in the analysis area, particularly in the eastern portions, have had a long history of active resource utilization and management including timber harvests, more recent fuels reduction projects, livestock grazing and prescribed fire. Annual harvesting of standing snags for personal use firewood in the area has resulted in low snag densities, reducing habitat capability for birds in the cavity constructor and cavity-dependant groups. Beginning in 2003, it was prohibited to harvest standing dead ponderosa pine trees greater than 15 inches in diameter at breast height (DBH). These changes in firewood harvesting policy have provided many benefits to cavity dependent and cavity constructor bird species.

Riparian and wetlands habitats are the least common habitats in the analysis area, encompassing less than 1 percent of the analysis area. There are more species in this group than any other group. The loss or degradation of even small amounts of riparian or wetland habitats can therefore have disproportionate impacts on birds in this analysis group. Motorized travel, and to a lesser extent non-motorized travel in riparian and wetland habitats, can cause permanent loss of habitat for these species, as well as disturbance to preferred breeding and foraging areas. Watershed design criteria would minimize potential impacts to riparian and wetland habitats under all action Alternatives. Potential impacts are limited mostly to disturbance impacts, and given the minimal use associated with riparian corridors, disturbance impacts are expected to be minimal for all species.

Birds in the mixed-conifer and spruce-fir analysis groups mostly nest in the foliage of live conifer trees or on the ground in conifer dominated forests. Few green trees are generally lost to trail construction or maintenance activities, compared to the large number of trees available in the analysis area. For this reason, the primary impact of motorized and non-motorized use on this analysis group is disturbance during the breeding season.

As mentioned in the MIS section, the amount of habitat directly impacted under all action Alternatives would be very minor. Alternative 4 would impact the most habitat for all bird analysis groups (except cliffs), followed by Alternatives 3, 2, and 1. Reduced habitat effectiveness would also be greatest under Alternative 4, followed by Alternatives 3, 2, and 1. Under Alternatives 3 and 4, all new motorcycle trails would have seasonal closure dates of September 1 through June 14. This closure overlaps most of the early nesting periods of bird species in the analysis area, thereby providing protection from disturbance early in the breeding cycle. In addition to reduced habitat effectiveness, potential impacts to species with reproductive failure early in the season may occur, should they make second attempts at nesting. As mentioned for MIS, based on the increase in recreational use in the area, activities associated with the action Alternatives, particularly 3 and 4, may have a minor negative influence to migratory bird populations in the analysis area.

3.8.3 Forest Service Sensitive Species

3.8.3.1 Affected Environment

Sensitive species reviewed for this analysis were designated by the Regional Forester due to concerns over their population status, trend, and habitat conditions (USDA Forest Service 2009a). A total of 36 species contain habitat on the SJNF. Twelve species have habitat in the analysis area including American bald eagle, American marten, American peregrine falcon, American three-toed woodpecker, boreal owl, boreal toad, flammulated owl, fringed myotis, Lewis' woodpecker, northern goshawk, northern leopard frog, and olive-sided flycatcher.

Existing habitat for American marten and northern goshawk was described in the MIS section. The bald eagle is a fall/winter migrant to the area. Eagles are commonly observed in big game winter range along U.S. Highway 160, and sometimes observed foraging on carrion along the highway. The American peregrine falcon is present in the area from spring through summer. Falcons nest on ledges near the top of cliff faces that have commanding views over the surrounding terrain. The species is not known to nest in the analysis area, but there is a known nest site adjacent to the area. Foraging habitat (open habitats, often near water) is present across the area for this wide ranging species.

The fringed myotis is a small bat that utilizes ponderosa pine forests from spring through summer in areas providing suitable roosting habitat (buildings, cliffs, and snags). American three-toed woodpecker and boreal owl occupy spruce-fir forests year-round. The flammulated owl and olive-sided flycatcher are neotropical migrants, wintering in southern latitudes, and spending their summers breeding locally. Flammulated owls and olive-sided flycatchers are present in ponderosa pine and mixed conifer forests. Both species feed on insects they capture in flight in mature ponderosa pine and mixed conifer stands with relatively open stand conditions. Flammulated owl and olive-sided flycatcher use snags for nesting (flammulated owl) or perching (olive-sided flycatcher). Olive-sided flycatchers also breed in spruce-fir forests, preferring open areas with tall snags. The Lewis' woodpecker occupies the area from spring through summer. The species is found foraging along the edges of mountain grasslands and shrublands, and nesting in snags or live trees with suitable cavities, in adjacent mature ponderosa pine or aspen forests.

Boreal toad and northern leopard frog are associated with riparian/wetland habitats from spring through summer. They occupy suitable breeding habitat where fish species are absent. Habitat for both amphibians is very limited in the analysis area. Northern leopard frogs have been detected in wetland habitats in the area. Known boreal toad populations in the San Juan Mountains are located in subalpine spruce-fir forests, and near treeline. Boreal toads have not been detected in the area, and their probability of occurrence is low due to the lack of suitable wetland breeding habitat, and the areas low elevation.

Many sensitive species occupy the same habitats as MIS; therefore, existing influences from recreational activities are also similar. More information on habitat requirements, distribution, and other relevant information for all sensitive species addressed in the analysis is located in the Biological Evaluation.

3.8.3.2 Environmental Consequences

Alternative 1

Short and long-term effects to sensitive species would be similar to those described under Alternative 1 in the consequences section for MIS.

Alternatives 2, 3, and 4

The proposed action would have no impact on boreal toad due to their unlikely occurrence in the area and very limited potential breeding habitat present. The proposed action will have no impact on bald eagle as the species is unlikely to occur in the area during the summer when motorized and non-motorized activities occur.

The proposed action will have no impact on peregrine falcon as there are no nest sites in the area, and potential foraging habitat is not expected to be affected by motorized or non-motorized travel to the level that would affect abundance of primary avian prey species, or affect peregrine survivorship or productivity. Additionally, human presence in the area is not expected to disturb foraging activity for this wide ranging species.

The proposed action may adversely impact individual American martens, American three-toed woodpeckers, boreal owls, flammulated owls, fringed myotis', Lewis' woodpeckers, northern goshawks, northern leopard frogs, and olive-sided flycatchers, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide. Direct and indirect effects to all species are associated with minor impacts to habitat, and reduced habitat effectiveness from human presence and disturbance.

New ATV trails would have seasonal closure dates of December 1 through May 14. All new single-track motorcycle trails would have seasonal closure dates of September 1 through June 14. The closure periods would minimize some disturbance to all sensitive species early in the breeding seasons. Disturbance impacts would occur during the breeding seasons for all species with habitat present in and along motorized and non-motorized travel routes. The degree of impact would depend on the amount of motorized use occurring in the area, and generally result in either short or long-term displacement from suitable habitat. Displacement has the potential to reduce productivity and survival through increased competition for available resources (food, cover, and water).

Surveys for northern goshawk will be conducted prior to new trail construction in suitable habitat under Alternatives 3 and 4. Surveys for northern goshawk will also be conducted under Alternatives 3 and 4 on trails where use designations change from non-motorized to motorized. If active territories are detected, measures will be taken to minimize impacts from construction activities and changes in use designations.

Surveys for northern leopard frog will be conducted prior to new trail construction under Alternatives 3 and 4 in order to minimize impacts to habitat. If the species is detected, measures will be taken to minimize impacts to habitat.

Habitat effectiveness for sensitive species would be less under Alternative 4, followed by Alternatives 3 and 2 based on the total number of miles receiving motorized and non-motorized use and associated disturbance. A more detailed discussion of the direct and indirect effects from each alternative is provided in the Biological Evaluation.

3.8.4 Federally Listed Threatened and Endangered Species

3.8.4.1 Affected Environment

Federally listed species reviewed for this analysis are based on the most recent species list from the USFWS (USFWS 2011). A total of nine federally listed species and two candidates for federal listing under the ESA of 1973, as amended, are designated for the SJNF. Federally listed species include: Mexican spotted owl, southwestern willow flycatcher, bonytail, Colorado pikeminnow, humpback chub, razorback sucker, greenback cutthroat trout, Uncompahgre fritillary butterfly, and Canada lynx. The yellow-billed cuckoo, New Mexico meadow jumping mouse, and North American wolverine are candidates for federal listing.

There is no suitable habitat in the analysis area for southwestern willow flycatcher, bonytail, Colorado pikeminnow, humpback chub, razorback sucker, Uncompahgre fritillary butterfly, yellow-billed cuckoo, New Mexico meadow jumping mouse, or North American wolverine. These species are dismissed from further analysis. Greenback cutthroat trout habitat is present, although no populations exist in the analysis area and there are no recovery actions planned. The species is dismissed from further analysis.

Canada lynx habitat consists of cool-moist mixed conifer, aspen mixed with cool-moist mixed conifer, spruce-fir, and high elevation willow riparian adjacent to these habitats (Ruediger et al. 2000). Stands of cool-moist mixed conifer, aspen mixed with cool-moist mixed conifer, and spruce-fir occur in the northern tip of the central portion of the analysis area. These areas occur as "island habitats" that are surrounded by non-lynx habitat. Although they provide habitat for snowshoe hare and other prey species, these island habitats were determined to be non-essential for lynx conservation and were excluded from the recently updated lynx habitat mapping effort conducted by the SJNF based on habitat delineation direction and guidance from the USFWS. These island habitats occur outside designated Lynx Analysis Units and outside key linkage areas because of their juxtaposition to larger blocks of contiguous lynx habitat. Therefore, Canada lynx is dismissed from further analysis.

Throughout its range Mexican spotted owl (MSO) uses a variety of habitat types but tends to do so on a regional basis, which is one of the primary reasons for dividing the range of the subspecies into eleven separate Recovery Units (RUs) (six in the United States and five in Mexico) as described in the MSO Recovery Plan (USFWS 1995). The SJNF lies within the Southern Rocky Mountains Colorado Recovery Unit (SRMCRU). The SRMCRU lies at the northeastern periphery of the MSO's range.

In the SRMCRU, MSO is found breeding and foraging primarily in canyons in which they appear to occupy two disparate canyon habitat types (USFWS 1995). The first is sheer slick-rock canyons containing widely scattered patches (up to 1 ha [2.2 acres] in size) of mature Douglas-fir in or near the canyon bottoms or high on the canyon walls, in short, hanging canyons. The second consists of steep canyons containing exposed bedrock cliffs either close to the canyon floor or more typically, several tiers of exposed rock at various heights on the canyon walls. Mature Douglas-fir, white fir, and ponderosa pine (often in association with Gambel oak) dominate the canyon bottoms on north and east-facing slopes, while ponderosa pine grows on the more xeric south and west-facing slopes with piñon-juniper growing on the mesa tops (USFWS 1995). Spotted owls are relatively intolerant of high temperatures. They nest and roost primarily in closed canopy forests or habitat structures (caves and crevices in cliffs) that provide cool, micro-climatic conditions.

Near the San Juan Public Lands (SJPL), spotted owls have been found in mixed conifer forests of extreme southwest Colorado in rock-walled canyons at Mesa Verde National Park, the mountains of northern New Mexico, and the central Front Range of Colorado. Only four MSOs have been confirmed on the SJPL since surveys began in 1989. A single MSO detection occurred on a steep mixed conifer slope on BLM land near the southern end of the District in 1991 (Elwood pers. com.). The remaining detections occurred on the District in steep canyons containing mixed conifer approximately five air miles from the analysis area.

The analysis area contains approximately 600 acres of potential MSO habitat. Approximately 320 acres are present in the lower section of the West Devil Creek drainage. Habitat consists of closed canopy, mature and late successional mixed conifer on steep slopes and in the drainage bottom. Although the area lacks rock structure, the physical characteristics of the area provide cool, micro-climatic conditions potentially suitable for breeding. Approximately 280 acres are present in the lower section of the Devil Creek drainage. Similar to West Devil Creek, the area lacks rock structure, but contains closed canopy, mature and late successional mixed conifer on steep slopes thus providing cool-microclimatic conditions potentially suitable for breeding. There have been no MSO surveys conducted in either location, therefore it is unknown if either area is occupied by the species.

3.8.4.2 Environmental Consequences

Alternative 1

There is no motorized use in the Devil Creek and West Devil Creek drainages. Additionally, very minimal non-motorized use occurs in the Devil Creek and West Devil Creek drainages. Alternative 1 would have no effect to Mexican spotted owl.

Alternative 2

Effects to Mexican spotted owl are the same as Alternative 1.

Alternative 3 – Proposed Action

There would be no motorized use or associated disturbance (noise from off-highway vehicles) in potential habitat located in the Devil Creek drainage. NFST 603 will continue to provide only non-motorized use (foot, horse, and potential mountain bike travel). The incidental, non-motorized use on NFST 603 is unlikely to affect MSO should the species be present in the drainage as the area currently receives minimal use, and use is not expected to appreciably increase in the foreseeable future. Additionally, use that occurs is generally concentrated on or along the trail given the areas steep topography. For these reasons, no protocol surveys were initiated nor are there any protocol surveys planned in the Devil Creek drainage.

The proposed action includes approximately 0.75 miles of newly constructed motorized trail (trail 11b) adjacent to the West Fork Devil Creek drainage. This section of proposed motorized trail provides suitable foraging habitat, and is located directly above suitable breeding and foraging habitat present on steep mixed conifer slopes in the drainage. Trail construction will affect a minor amount of foraging habitat for MSO, and has potential to disturb MSO should the species occur in the drainage, or roosting/perching along the rim of the drainage in the areas warm-dry mixed conifer forest (ponderosa pine, Douglas-fir, and white fir). Foraging habitat quality declines further away from the rim as the forest becomes more open, with an increasing presence of ponderosa pine in the overstory and understory.

Overall, habitat quality is greatest in mixed conifer forests located on steep slopes in the drainage and near the drainage bottom.

The USFWS has designed a survey protocol to obtain information on MSO occupancy within and adjacent to proposed project areas. The protocol helps the public and agency personnel determine whether proposed activities will have an impact on owls and/or owl habitat, and identification of potential Protected Activity Centers (PACs). A properly conducted survey will help agencies determine whether or not further consultation with USFWS is necessary before proceeding with a project. A complete inventory for MSO requires that at least four properly scheduled complete surveys are accomplished annually for two years to determine habitat occupancy where agency actions affect the species.

MSO protocol surveys have not been completed for the proposed action. Protocol surveys were initiated spring of 2011. No MSOs were detected during the 2011 surveys. Protocol surveys will continue in 2012, thereby completing project-level habitat occupancy surveys. The likelihood of detecting MSOs in the West Fork Devil Creek area is low based on the lack of detections in similar habitat across the Pagosa Ranger District and San Juan National Forest.

The MSO Recovery Plan recommends actions to reduce impacts to MSO from land management activities such as the identification of PACs and applying recommended guidelines for PACs and restricted areas. A PAC is an area established around an owl nest (or sometimes roost) site, for the purpose of protecting that area (USDI Fish and Wildlife Service 1995). The completion of surveys in 2012 will determine MSO habitat occupancy in the area, and need to identify a PAC as described in the MSO Recovery Plan (USDI Fish and Wildlife Service, 1995). As mentioned in the MSO Recovery Plan, "road or trail building in PACs should generally be avoided but may be allowed on a case-specific basis if pressing management reasons can demonstrate." There will be no trails constructed in a PAC should one be identified in the West Fork Devil Creek area. Re-initiation of Section 7 consultation with USFWS will occur if MSOs are detected and expected to be influenced by activities associated with the proposed action.

If there are no owls detected upon the completion of protocol surveys, no PAC will be identified, no design criteria applied, and no re-initiation of Section 7 consultation as the proposed action will have no direct, indirect, or cumulative effects to MSO.

Non-motorized use of NFST 604 is not expected to cause any adverse disturbance impacts to MSO should the species be detected in West Fork Devil Creek drainage. Portions of the trail are within ¼ to ½ mile from the canyon rim and/or steep slopes. Dense forests and small ridges between the trail and the canyon rim provide screening from potential disturbance. It is very likely that this trail will be located outside a PAC (should one be identified in the area) based on proximity to suitable habitat in the West Fork Devil Creek area. The probability of MSO occupancy is greatest in the drainage, away from the non-motorized trail.

Motorized use on the southern most section of NFST 605 is not expected to cause any adverse disturbance impacts to MSO should the species be detected in West Fork Devil Creek drainage. The motorized trail lies mostly away from the drainage (approximately ¼ to ½ mile) and there are small ridges between the trail and the drainage that help screen potential motorized disturbances. Similar to NFST 604, it is very likely that this trail will be located outside a PAC (should one be identified) based on

proximity to suitable habitat in the West Fork Devil Creek area. The probability of MSO occupancy is greatest in the drainage, away from the motorized trail.

The proposed action (Alternative 3) may affect but is not likely to adversely affect Mexican spotted owl or owl habitat. The USFWS concurred with this determination in a letter dated February 7, 2012. USFWS protocol surveys for MSO will be completed in 2012. The completion of surveys in 2012 will determine MSO habitat occupancy in the area. No project actions will occur within or adjacent to suitable MSO habitat until protocol surveys determine habitat occupancy. If MSO occupation is detected, Section 7 consultation will be reinitiated. At that time, a PAC may be designated if criteria as described in the MSO Recovery Plan are met. There will be no trails constructed in a PAC should one be identified in the West Fork Devil Creek area. Re-initiation of Section 7 consultation with USFWS will occur if MSOs are detected and expected to be influenced by activities associated with the proposed action. Additional conservation measures may be identified to protect MSO as a result of the consultation.

Cross-country, non-motorized travel (foot and horse travel) in the West Fork Devil Creek drainage are expected to have negligible disturbance effects to MSO (should the species be detected) given the very minimal use expected. Non-motorized use of NFST 604 and motorized use on NFST 605 are expected to have negligible disturbance effects to MSO given the proximity of activities to habitat.

The proposed construction of 0.75 miles of motorized trail (trail 11b) is expected to have negligible effects to MSO. The trail and adjacent area outside the drainage do not provide suitable nesting habitat based on known nesting sites and occupancy in the Southern Rocky Mountains Colorado Recovery Unit (crevices and/or overhangs of steep, rock-walled canyons). The trail occurs in suitable foraging habitat adjacent to the drainage. There is an extensive amount of suitable foraging habitat in the West Fork Devil Creek drainage that will be unaffected by the proposed action. A more detailed discussion of the direct and indirect effects from the proposed action is provided in the Biological Evaluation.

Alternative 4

Alternative 4 includes approximately 1 mile of new trail construction and motorized use in potential habitat located in the Devil Creek drainage (trail 12b). Ground disturbance and associated use have potential to impact MSO (impacts to habitat and disturbance to individuals) should the species be present in the area. USFWS protocol surveys will be conducted in the Devil Creek drainage during the 2012 and 2013 breeding seasons to determine occupancy. There will be no ground disturbance or motorized use of trail 12b prior to completion of surveys. If MSO is detected, construction of trail 12b and motorized use on the trail will occur outside the breeding season (March 1 through August 31). Additional consultation with USFWS may be required prior to trail construction and use.

Alternative 4 also includes approximately 1.5 miles of new trail construction in potential habitat located in the West Devil Creek drainage (trail 11f). Ground disturbance and associated use have potential to impact MSO (impacts to habitat and disturbance to individuals) should the species be present in the area. Additionally, motorized use on proposed trail 11b has potential to disturb MSO should the species be present in the area. As mentioned for Alternative 3, MSO surveys will be conducted during the 2011 and 2012 breeding season to determine occupancy in West Devil Creek. There will be no ground disturbance or motorized use of trail 11f or 11b prior to completion of surveys. If MSO is detected, construction of

trail 11f and motorized use on trail 11f and 11b will occur outside the breeding season (March 1 through August 31). Additional consultation with USFWS may be required prior to trail construction and use.

3.9 Socioeconomic

3.9.1 Affected Environment

The analysis area is located in Archuleta County, Colorado. In 2010 the population of Archuleta County was 12,084, and was ranked 5th of 63 Colorado counties (14th nationwide) for rate of growth. According to the Colorado State Demography Office (CDOLA 2000), Archuleta County is projected to grow to 17,805 by 2020 (projected from a base year 2000 population of 10,286). The County population peaks at about 17,000 individuals during the summer months, due to the high concentration of seasonal vacation homes and a large influx of recreational visitors during the summer months (Archuleta County 2007). There are numerous vacation rentals and other lodging, as well as both commercial and National Forest campgrounds that are utilized by visitors.

The majority of the county's population is concentrated within the town of Pagosa Springs and its surrounding subdivisions, which are located along the east and southeast boundaries of the analysis area. It is anticipated that future growth in the county will be concentrated in subdivisions outside of Pagosa Springs. Population growth in the area reflects a desire for quality of life based in part on the natural environment, including the SJNF, and the amenities it provides.

Tourism serves as a primary economic base for Pagosa Springs and Archuleta County. The economic viability of the local economy depends in part upon recreational opportunities and access to the SJNF. The tourist economy consists of clusters of businesses primarily in the services sector that market various tourist-related services to local and non-local customers. Service occupations accounted for 1,136 workers, or nearly 30 percent, of the civilian labor force in the county in 2009 (US Census 2011). According to the 1992 Forest Plan, about 28 percent of total area employment is directly or indirectly associated with the activities and outputs of the SJNF. Local businesses that are part of the tourism economic base include outfitters and guides, lodging and vacation rentals, restaurants, ATV rentals, and other service industries that depend on non-local visitors as well as residents. Economic impact to tourism related businesses from activities on the SJNF occurs from users who purchase supplies and services on their way to (or returning from) an activity on the SJNF.

Commercial outfitters and guides that operate in the analysis area provide guided activities in the analysis area that require access via roads and motorized or non-motorized trails. There are currently 13 outfitter permits operating in the analysis area, with a total of 3,541 authorized days. Services provided by outfitters include hunting drop camps, horseback trail rides, environmental education pack trips, mountain biking, jeep and road tours, day hikes, turkey hunts, fishing, and rafting. These services attract non-local visitors, in addition to regional and local recreationists, that bring an influx of money into local economies, which can be substantial between Memorial Day and Labor Day and during hunting season.

The upper Piedra River in the analysis area provides fishing opportunities, including fly fishing, which supports local fishing guides and equipment purchases. Hunting opportunities in the analysis area provide employment for local outfitters and guides, as well as support for equipment purchases. Hunting and fishing are important contributors to Archuleta County's tourist economy. Direct expenditures made by

Colorado residents and non-resident hunters and fishers include purchases of hunting and fishing licenses, which benefit the state. Expenditures that benefit Archuleta County include trip expenses, sporting equipment purchases, and CDOW expenditures that support hunting and fishing.

Both motorized and non-motorized recreational users contribute to the local economy as they access the Forest for day and overnight trips. The U.S. Department of Agriculture Forest Service National Visitor Use Monitoring survey indicates the average expenditures for supplies and services within 50 miles of the SJNF is approximately $572 per party, per trip. Trip spending is more greatly influenced by the type of trip (e.g., day trip vs. overnight) than by the recreational activity that the visitor participates in. There are also spending differences among overnight visitors between those staying on and off the forest, and spending differences between local and non-local visitors. Spending (per party, per trip) on day trips to the SJNF averaged $29 for local visitors, compared to $90 for non-locals. Spending (per party, per trip) on overnight trips averaged $185 and $348 for local visitors staying on or off the forest, respectively. Spending for non-local visitors averaged $364 per party for overnight trips on the forest, and $795 per party for overnight trips off the forest (USDA Forest Service 2011c).

3.9.2 Environmental Consequences

The proposed project has the potential to affect social and economic resources in communities near the analysis area. The local economy is highly dependent on recreation and tourism, and could be affected by changes in recreational opportunities. Changes to motorized and non-motorized opportunities could affect businesses that provide services and supplies to visitors.

Based on an increasing trend of annual resident ATV and dirt bike registrations in Colorado (145 percent increase in the number of OHV registrations between the 2000-01 and 2007-08 seasons) (COHVCO 2009), as well as an increasing local population with an interest in recreational opportunities, demands for all types of recreational opportunities in the analysis area will likely continue.

Each alternative provides options for a variety of motorized and non-motorized opportunities by designating routes to appeal to different user groups and providing new loop opportunities. Some alternatives may result in displacement of non-motorized user groups on some trails; however, there would be an increase in non-motorized trails in other parts of the analysis area so that the overall trail miles in the non-motorized trail system increases under all action alternatives over the No Action Alternative. It is unlikely that changes in the mix of motorized and non-motorized trails, or the minor changes in the road system under any action alternative would cause noticeable changes in the larger economy of the region, as local businesses provide services and supplies to users for a large area of public lands in the surrounding region. The overall impact on communities surrounding the analysis area is expected to remain stable or to increase under all alternatives.

While increasing motorized and non-motorized trail-related opportunities for hikers, bicyclists, and OHV users would benefit the local economy, there are also potential costs related to the loss of other recreational opportunities. Outfitters and guides that are permitted for hunting activities in the analysis area could be adversely affected by the overall increase in motorized uses under the action alternatives. However, seasonal closure of motorized ATV trails (December 1through May 15) and seasonal closure of single-track motorized trails (September 1 through June 14) would reduce those impacts. Similarly, equestrian uses could be displaced from non-motorized trails that are proposed to be opened for

motorized uses. If equestrian uses are displaced, they would likely be displaced to the adjacent Piedra Area, or nearby National Forest or wilderness areas elsewhere on the SJNF. It is not anticipated that there would be significant adverse impacts to local outfitters that provide fish guiding services on the Piedra River, or to the sale of related equipment. Further discussion of impacts to recreation is provided in Section 3.1, Recreation and Wilderness.

3.9.2.1 Implementation and Maintenance Costs

Direct effects of the proposal include the cost of implementing the project. Estimated costs for constructing each of the action alternatives are summarized in Table 10. Estimated costs include costs for design of new trails; contractor labor for operation of heavy equipment during new motorized trail construction; and other direct costs for signs, width restrictors, post and cable, gates, and other materials. It is assumed that Forest Service personnel and volunteers would make minor improvements to existing trails, construct new non-motorized trails, and supplement contractor labor during construction of new motorized trails. Construction of new ATV or motorcycle trail segments on very steep and rocky slopes, as proposed actions in Alternative 4, would come at a very high cost. These costs are provided as separate line items in Table 10. System and non-system trails that would be decommissioned under each alternative would require closure signs, access barriers, soil stabilization features, and/or vegetation restoration work. Cost estimates for Alternatives 2, 3, and 4 are $114K, $183K, and $338K, respectively, given these assumptions (Table 10).

Table 10: Estimated Costs to Implement Turkey Springs Trail Management Plan Alternatives

Proposed Action	Alternative 2	Alternative 3	Alternative 4
ATV trail Construction and Reconstruction	$74,050	$88,850	$87,750
ATV trail construction over extreme terrain	N/A	N/A	$68,600
Motorcycle trail construction and reconstruction	N/A	$35,030	$43,970
Motorcycle trail construction over extreme terrain	N/A	N/A	$70,200
Non-motorized trail construction/reconstruction	$10,100	$31,480	$44,575
Road reclassification, closure, and decommissioning	$7,825	$10,825	$8,425
Decommission system and non-system trails	$22,500	$16,800	$14,100
Total Cost	**$114,475**	**$182,985**	**$337,620**

The addition of system trails under all action alternatives would also increase the miles of trail requiring annual maintenance. Annual maintenance costs for motorized ATV trails and non-motorized trails on the District (outside of Wilderness areas) are approximately $205/mile and $165/mile, respectively. There are presently no single-track motorized trails on the District. Annual maintenance costs for single-track motorized trails are estimated at $185/mile, based on costs incurred for maintenance of non-motorized and ATV trails.

As noted in the Recreation Affected Environment discussion (Section 3.1.1), a variety of factors have contributed to the accumulation of deferred maintenance on certain trails, including inadequate maintenance appropriations, historic neglect, and poor original trail layout. Recent appropriations have been sufficient to perform annual maintenance on roughly half of the District's trails each year, with all trails receiving maintenance at least once every two years. This funding scenario has enabled the District to largely halt the accumulation of additional trail deferred maintenance, but it has not been adequate to

mitigate some of the larger, pre-existing trail deficiencies. That being said, considerable strides have been made in recent years to address deferred maintenance, especially on motorized trails, through external funding sources such as the Colorado State Trails OHV grant program. The District competed for and received grants for heavy trail maintenance and reconstruction in 2008, 2009, and 2010 and will continue to utilize this beneficial program to address deferred maintenance needs, as well as other sources of funding and labor not directly tied to standard appropriations, such as Forest Service Legacy Road and Trail funds, partnering trail maintenance organizations (e.g., Wolf Creek Trailblazers and Pagosa Nordic Club), and volunteer groups and individuals. Implementation of all action alternatives would depend on these sources of funding and labor not directly tied to standard appropriations.

3.9.2.2 Alternative 1 – No Action

Under Alternative 1 there would be no changes to the motorized or non-motorized trail system in the analysis area. There would be no expenditure for proposed new facility construction, new trails, or realigned trails. Most of the existing system trails in the analysis area have evolved through historic, repetitive use by the public or permittees seeking access to the Forest, and were not constructed with the aid of engineering design, making them susceptible to erosion. Therefore, trail maintenance costs per mile could be expected to increase over time, as poorly located trails or trail segments further deteriorate.

Alternative 1 would maintain trail-based recreational opportunities at current levels. Recreational use of the analysis area would be expected to remain stable or increase proportionally to population growth over time. Implementation of Alternative 1 would likely not affect expenditures made in the local or regional tourist economy.

3.9.2.3 Alternative 2

Alternative 2 would result in a net increase of 10 miles of motorized ATV trails and 15 miles of non-motorized trails; 12 miles of new non-motorized system trails would be gained by adopting existing non-system routes. New non-motorized trails would be constructed between Newt Jack Road and Brockover Road to create a non-motorized loop connection. New ATV trail construction would add key connections between existing motorized trails for the purpose of improving connectivity and loop opportunities. Use levels along existing system trails would increase as a result of the new connectivity, but overall use levels of the motorized trail system would still remain in the low to moderate range relative to the rest of the District, with some potential for high use days during summer holidays. No measurable negative impacts to outfitter/guide activities are expected under this alternative, as the majority of changes that could potentially adversely affect outfitter/guide operations are not proposed in locations utilized by permittees. Proposed changes under Alternative 2 would be expected to have only minor effects on overall recreational use of the area, and negligible local or regional economic effects.

Costs for construction, reconstruction, and minor improvement of trails under Alternative 2 are estimated at $114,475. Alternative 2 would increase the miles of motorized ATV trail and non-motorized trail requiring maintenance by 10 miles and 15 miles, respectively.

As noted elsewhere in this document, this increase in trail miles (approximately 5 percent over the District's current system) is not expected to have measurable effects on the District's trail maintenance

capabilities for a variety of reasons, most notably the availability and commitment of external resources to address many maintenance needs (see Section 3.1, Recreation and Wilderness).

3.9.2.4 Alternative 3 – Proposed Action

Alternative 3 focuses on the provision of trail-based recreational opportunities for a variety of user groups' current and projected demands. This alternative would result in a net increase of 12 miles of motorized ATV trails, 28 miles of non-motorized trails, and 14 miles of single-track motorized trails. Recreational opportunities would increase for motorized ATV and single-track users, mountain bikers, and other non-motorized users.

For some, these improvements are of great importance and would influence their choice of recreation destinations. The development of the motorized trail system could be a draw to non-local users, who make greater expenditures on lodging, gasoline, food, and other trip related expenditures than local users. Improved mountain biking opportunities would be expected to draw primarily local recreational users. Increased motorized and non-motorized recreational opportunities within the analysis area would result in minor benefits to local businesses, including camping concessions, local stores, and other associated entities. However, these effects are anticipated to be very small relative to the overall tourism based economy of the county, which provides numerous outdoor recreational opportunities on public lands.

Impacts to hunting outfitters/guides, especially Backcountry Outfitters, increases in potential with this alternative, as well as to Backcountry Outfitters' trail rides that have been historically conducted along NFST 600 and 605. However, no loss in revenue is predicted to occur in light of the proposed seasonal restrictions on motorized use, the locations of outfitter/guide hunting camps and areas, and the additional hunting and trail-riding opportunities available to the permittee in compartments not subject to effects from this alternative.

Costs for construction, reconstruction, and minor improvement of trails under Alternative 3 are estimated at $182,985. Similar to Alternative 2, any major new construction or reconstruction of trails would be subject to the availability of external funding sources for the majority of costs. Alternative 3 would increase the miles of motorized ATV trail, motorized single-track trail, and non-motorized trail requiring maintenance by 12 miles, 14 miles, and 28 miles, respectively. While trail maintenance needs would increase as compared to Alternative 2 under the Proposed Action (approximately 9 percent over the present system), similar to Alternative 2 the availability of external resources should offset much of the additional maintenance responsibilities incurred under this alternative.

3.9.2.5 Alternative 4

Alternative 4 would provide the greatest net increase in the miles of motorized and non-motorized system trails of the action alternatives. This alternative would result in a net increase of 15 miles of motorized ATV trails and 29 miles of non-motorized trails, and 30 miles of single-track motorized trails,. Recreational opportunities would increase for motorized ATV and single-track users, mountain bikers, and other non-motorized users.

This alternative would have the greatest appeal to motorized user groups. The addition of 30 miles of motorized single-track trail would likely draw non-local motorized users, who make greater expenditures on lodging, gasoline, food, and other trip related expenditures than local users. This alternative provides

the best scenario for economic gain for businesses that provide supplies and services to motorized user groups.

Big game hunting outfitter/guides in the analysis area would see an increase in potential negative effects to their business operations in this alternative by virtue of the introduction of motorized use into areas that have not had such use in many years. Backcountry Outfitters and Fawn Gulch Outfitters both maintain heavily used camps along trails affected by this alternative, with Backcountry Outfitters having camps located on multiple trails. Consequently, a loss in revenue during the archery and muzzle-loading seasons is possible under this alternative, especially for Backcountry Outfitters. The opening of these trails to motorized use would also further affect Backcountry Outfitters' trail riding operations. Relocating the camps, hunting areas, and trail ride locations is not a viable option due to the nature of the permits in question and terrain limitations.

There are considerable outdoor recreational opportunities available outside of the analysis area that contribute to the local economy, and economic effects of Alternative 4 to local businesses, including outfitters/guides, are anticipated to be very small relative to the overall tourism based economy of the county.

Costs for construction, reconstruction, and minor improvement of trails under Alternative 4 are estimated at $337,620. Alternative 4 would increase the miles of motorized ATV trail, motorized single-track trail, and non-motorized trail requiring maintenance by 15 miles, 30 miles, and 29 miles, respectively. While this alternative would also benefit from the availability of external resources to address many maintenance needs, the addition of the two motorized trails located in steep and erosive terrain proposed in this alternative would present unique and intensive maintenance needs. The use of armoring, surfacing, retaining walls, and other complex design strategies necessary to meet Forest Service design specifications and address soil and hydrological design criteria—would require a considerably different level and type of maintenance to avoid structural deterioration and its resultant resource and user safety concerns. Consequently, Alternative 4 would likely impact the District's maintenance capabilities to a more notable extent than either of the other action alternatives.

3.9.3 Environmental Justice

A specific consideration of equity and fairness in resource decision-making is encompassed in the issue of environmental justice. As required by law and Title VI, all federal actions will consider potentially disproportionate negative impacts on minority or low-income communities.

In Hinsdale and Mineral counties, there are no significant minority populations. In Archuleta, Conejos and Rio Grande counties, there is a significant minority population of Hispanic origin. No disproportionate negative effect on or changes to low-income or minority communities associated with the analysis area due to the Proposed Action were identified.

3.10 Cultural Resources

3.10.1 Affected Environment

Cultural resources are fragile and nonrenewable remains of prehistoric and historic human activity, occupation, or endeavor. Cultural resources are the physical remains (e.g., sites and isolated finds) that are

evidence of these past human activities and occupations. Forest Plan direction requires that we protect and foster public use and enjoyment of cultural resources, complete cultural resource inventories prior to ground disturbing activities, avoid disturbing cultural resources until we evaluate the significance of said resources, collect and record information from historic properties if they can't be avoided, and protect properties of socio-cultural significance. This direction is accomplished through compliance with the National Historic Preservation Act and consultation with Native American Tribes.

Existing Conditions

Turkey Springs Trails (SJNF# 10-047), prepared by Archaeologists with the Pagosa District of the SJNF, documents previous fieldwork within the project area as well as the results of 3,518 acres of new Class III Cultural Resource Inventory conducted in support of the Turkey Springs Trail Management Plan Project between May and September of 2010. During the 2010 fieldwork, 12 new sites/site segments and 24 new isolated finds were recorded; 30 previously recorded sites and two previously recorded isolated finds were either re-recorded or re-visited/re-evaluated in order to assess the impacts of the proposed actions. In addition to the new inventory, 84 previous inventories have been conducted within the project area. At this time, the entire Area of Potential Effect (APE) for all alternatives analyzed within this document has been inventoried at the Class III level and potential impacts to all resources located within the APE evaluated. Not all of the (proliferating) user-created (non-system) trails where no actions were proposed were inventoried, as many were only recognized during or after the field season.

Cultural resources located within the project area (defined as located within the analysis area and within 300 feet of any route analyzed) include 107 sites or segments of linear sites and 166 isolated finds. Some portions of the project area lie outside of the APE due to topography or use patterns. These resources reflect that the area was used both prehistorically and historically. There is evidence of prehistoric resource procurement and camping within the area; some travel corridors appear to have been used prehistorically and historically. Historic uses of the area include indigenous resource procurement, logging, ranching, mining, Forest Service administrative activities, and recreation.

3.10.2 Environmental Consequences

Cultural resources are considered nonrenewable resources. In compliance with Section 106 of the NHPA, effects to cultural resources are only considered significant if a resource is considered eligible for or listed on the National Register of Historic Places (sites considered historic properties). Disturbances which alter an historic property's integrity are considered adverse effects. Thirty-three historic properties were identified within the APE. Further analysis through site visits indicated that many of these sites were unlikely to be impacted by trail use. Potential direct and indirect impacts to the historic properties located within the APE of the current project are discussed in Table 11.

Trail and road use, construction, maintenance, and decommissioning can create ground disturbance and directly affect historic properties. Vegetation removal associated with trail maintenance can also directly affect certain historic properties (particularly culturally modified trees). Increased recreational use and access, while not incompatible with cultural resource protection, can also impact sites as users may inadvertently (or intentionally) cause impacts to sites. These impacts range from inadvertently camping on sites (potentially causing soil erosion or introducing intrusive new features, e.g., campfires) to defacing or looting sites.

Twenty-two sites have been identified where trail management related impacts are occurring or might be anticipated as a result of a proposed alternative. However, ten of these represent segments of trails which are non-contributing to a larger eligible resource or contribute in location only; impacts to these sites are not considered significant, as they would not compromise site integrity further (5AA528.6, 5AA528.12, 5AA525.13, 5AA528.14, 5AA1247.2, 5AA1247.3, 5AA1247.4, 5AA1247.7, 5AA3414.1, and 5AA3414.2). Two sites 5AA1152 (Prehistoric Campsite) and 5AA1859 (Historic Devil Mountain Fire Lookout Tower) have limited integrity; no damage to site integrity from ongoing recreational use is anticipated even though there would be continued use of portions of the sites which lack integrity.

Six eligible or potentially eligible isolated finds also require consideration; all are culturally modified trees (CMTs). CMTs belong to the Protohistoric or Historic period (meaning they have been recorded as either prehistoric or historic resources depending on the researcher). CMTs within the project area are generally less than 500 years old, with peeling usually occurring sometime after a tree reached 75 years of age. Within the Pagosa area, they are generally interpreted as resource procurement locations where either food or raw materials (e.g., for cradle boards) was collected; given inferred ages of scars they are most commonly attributed to Ute occupations. Previous research indicates that trees were still being peeled into the late 1800s and possibly 1900s. Some recorded Culturally-Modified Trees (CMTs) are located along trails; another is located near a dispersed recreational site (within site 5AA1152). At present, no CMTs along trails show any evidence that they are being impacted by trail use. It is conceivable that erosion along a trail, trail construction, or trail clearing activities could impact trees. As culturally modified trees are sacred to some Native Americans and data can be gained from dating peels, these resources warrant special consideration. Design criteria have been developed that will help minimize impacts to CRT's.

Trail crews will be instructed to avoid felling CMTs and to pay attention to degraded soils near the base of these trees, rerouting trails away from trees should be considered, with further consultation, in the event degraded trail conditions began to impact root balls. In the event a CMT dies (and becomes a hazard tree) or falls across the trail, the District Archaeologist will be notified and efforts will be made to collect dateable samples (pending approval through tribal consultation). No comments from tribes regarding tree treatment has been received specific to this project; however, previous consultation has indicated that the tribes would prefer that trees be avoided and protected during other projects.

By applying design criteria, as outlined in both Table 11 and the Design Criteria section (Section 2.3.5), and agreed to in consultation with SHPO, any proposed alternative would result in *no adverse effect* (NHPA) to cultural resources. Colorado SHPO concurred with these findings in a letter dated July 25, 2011.

Table 11: Historic Properties within APE

Site/IF Number	Description	Eligibility	Impacts Anticipated?	Discussion of Impacts	Design Criteria
5AA524	Historic RR Nolan's Spur	E (SHPO)	No Additional Impacts Anticipated (NAE)	Site is braided with NFSR 681 (ML2), continued use of NFSR 681 all Alts	Road maintenance limited to existing disturbance as per general road maintenance policy.
5AA526	Historic Railhead	E (SHPO)	No Additional Impacts Anticipated (NAE)	This historic railhead is found along NFSR 681 (ML2)	Road maintenance limited to existing disturbance as per general road maintenance policy.

Site/IF Number	Description	Eligibility	Impacts Anticipated?	Discussion of Impacts	Design Criteria
5AA528 .5	Historic Pine-Piedra Stock Driveway	Resource is considered E (SHPO); however, all segments are non-contributing or contribute in location only (No Adverse Effect)	No Impacts Anticipated (NAE)	This portion of the historic stock driveway is a side portion of the trail not incorporated into system.	None
5AA528.6			Impacts Anticipated Under All Alternatives (NAE)	This portion of the historic stock driveway is part of multiple trails/routes. Portions of this segment would become an ATV route under Alt 4 (Piedra Stock Dr. Trail [NFST 583])	
5AA528.12			Impacts Anticipated Under All Alternatives (NAE)	This portion of the historic stock driveway is currently a non-system route which is used. Would remain a non-system non-motorized route (route 9ff).	
5AA528.13			Impacts Anticipated Under All Alternatives (NAE)	This portion of the historic stock driveway would remain a motorized ATV route, All Alts. (Piedra Stock Dr. Trail 583)	
5AA528.14			Impacts Anticipated Under Alternative 4 (NAE)	This portion of the historic stock driveway not incorporated into current system. Alt 4 would consider a non-system non-motorized trail (route 9gg).	
5AA760	Multicomponent Historic Logging Camp & Prehistoric Open Lithic	E (SHPO)	Impacts Anticipated Under All Alternatives (NAE)	Alt 1 retains non-system trails (9cc, 9e & 9w) through this site; Alt 2 decommissions non system trails; Alt 3 incorporates 9e & 9w into system; Alt 4 incorporates trails into system.	If use of the trail continues, no formal trail construction work will occur within the site boundaries. Additionally, monitoring shall be conducted on an approximately 10 year basis. In the event the route is decommissioned, no ground disturbing work will be conducted within the site boundaries.
5AA877 and 5AA878	Multicomponent Prehistoric Campsite & Historic Trail Marker	E (SHPO)	Impacts Anticipated Under All Alternatives (NAE)	Dudley non-motorized trail (NFST 601) runs through this site; Alt 3-4 would make the trail a single track motorized trail	Monitor on approximately 10 year cycle; site is already monitored as part of Weminuche-Devil Allotment Monitoring
5AA962	Prehistoric Lithic Scatter	E (SHPO)	Impacts Anticipated Under Alternative 4 (NAE)	Alt 4 would open Piedra Stock Drive (5AA528.14) as non-motorized non-system trail through this site (9gg)	Monitoring on 10 year basis

Site/IF Number	Description	Eligibility	Impacts Anticipated?	Discussion of Impacts	Design Criteria
5AA1152	Prehistoric Open Lithic	E (SHPO)	No Significant Impacts Anticipated (NAE)	This site is within a camping area (all alternatives); archaeological deposits do not have integrity. Only element contributing to eligibility is a CMT which has not been impacted by camping. No significant impacts anticipated.	See discussion of CMT design criteria
5AA1247.1	Multicomponent Trail – Devil Mountain Trail	Entire resource is Eligible (SHPO); however segments are non-contributing or contribute in location only. Therefore, impacts result in no adverse effect.	No Impacts Anticipated	This portion of the Devil Mt. Trail is a segment that is not incorporated into any trail system	None
5AA1247.2			Impacts Anticipated Under All Alternatives (NAE)	This portion of the Devil Mt. Trail would remain a non-motorized trail under Alt 1 & 2. Would become a single-track motorized trail in Alt 3 & 4. (Snow Springs NFST 605)	
5AA1247.3			Impacts Anticipated Under All Alternatives (NAE)	Alt 1 & 2 retain this portion of the route as a non motorized trail; Alt 3 & 4 would convert it to single-track motorized use. (NFST 600 & NFST 605)	
5AA1247.4			Impacts Anticipated Under All Alternatives (NAE)	This portion of the Devil Mt. Trail would be designated as a motorized ATV trail within all alternatives (NFST 600)	
5AA1247.5			No Impacts Anticipated	This segment of the Devil Mt. Trail is not part of current or proposed trail system. Use of segment is minimal.	
5AA1247.6			No Impacts Anticipated	This segment of the Devil Mt. Trail is not part of current or proposed trail system. Use of segment is minimal.	
5AA1247.7			Impacts Anticipated Under All Alternatives (NAE)	Alt 1 & 2 retain this route as a non motorized trail; Alt 3 & 4 would convert it to single-track motorized use (NFST 600).	
5AA1408	Prehistoric Open Architectural	E (SHPO)	No Impacts Anticipated	NFSR 628 (ML3) runs south of this site. Dispersed camping off south side of road. Some evidence of recreational shooting on site. Minimal use should not adversely affect site integrity.	None

Site/IF Number	Description	Eligibility	Impacts Anticipated?	Discussion of Impacts	Design Criteria
5AA1479	Prehistoric Open Camp	E (SHPO)	Impacts Anticipated Under All Alternatives (NAE)	NFSR 630 (ML3) runs through this site. A developed recreational site (parking area) which will be closed to dispersed camping (Alt 2-4) is located just off the site. The camping closure should reduce impacts to the site.	Closure of developed recreational site to dispersed camping (Alt 2-4) will reduce impacts. Design criteria for Alternative 1 would require closure of developed recreation site for camping. Monitor site at 10 year intervals.
5AA1593	Prehistoric Open Lithic	E (SHPO)	Impacts Anticipated Under Alternative 4 (NAE)	Faint user-created trails (routes 9hh & 9ii) within site (Alt1-3); this is not considered an appreciable impact. Alt4 would incorporate routes into system as non-motorized trails.	Trail should be re-routed around site if a formal trail is developed. At current use no design criteria recommended.
5AA1755	Historic Turkey Springs Guard Station	E (SHPO)	Impacts Anticipated Under All Alternatives (NAE)	Site is located at terminus of NFSR 629.B. Turkey Guard Station is a Developed Recreation Site.	Ongoing monitoring as per previous management strategy (currently in place at 5 year interval). Also, see discussion of CMT design criteria.
5AA1859	Historic Devil Mountain Fire Lookout Tower	E (SHPO) Largely Destroyed	No Additional Impacts Anticipated (NAE)	Site is located at terminus of NFSR 626 and beginning of Devil Mountain NFST 600 (non-motorized); limited staging activities in hardened parking area will continue. These activities will not compromise site integrity.	None No Adverse Effect
5AA2465	Prehistoric Open Lithic	E (SHPO)	No Additional Impacts Anticipated (NAE)	NFSR 629 crosses site (ML3); 90' from NFSR 631 (ML2), all alternatives. The portion of the site within the road disturbance is already compromised. No evidence of recreational activities on site. No impacts likely.	All road maintenance within current grade.
5AA2474	Prehistoric Lithic Scatter	E (SHPO)	No Impacts Anticipated	150' from new non-motorized trail (route 9ff), Alt4	None
5AA2596*	Protohistoric/ Historic CMTs	NE (Field, not revisited)	No Impacts Anticipated	Isolated find located within 50' of NFSR 629 (ML2)	See discussion of CMT design criteria

Site/IF Number	Description	Eligibility	Impacts Anticipated?	Discussion of Impacts	Design Criteria
5AA2598	Prehistoric Open Lithic	E (SHPO)	Impacts Anticipated Under All Alternatives (NAE)	Alt1 would continue to allow a non-system trail (9w) to cross the site; Alt2 would decommission the non-system trail; Alt3 & Alt4 would incorporate trail into system as a non non-motorized route.	Alt1: Re-route trail around site or decommission trail segment without ground disturbing activities within site boundary. Alt2: no ground disturbing activities within site boundaries. Alt3 & 4: reroute trail around site and decommission route (without ground disturbance) through site.
5AA2623	Prehistoric Lithic Scatter	E (SHPO)	No Impacts Anticipated	Isolated find is located 180 feet through trees from user created trail (route 9v). Significant distance from trail limits potential for recreational impacts.	None
5AA2625*	Protohistoric/ Historic CMTs	NE (Field, not revisited)	No Impacts Anticipated	Isolated find is located within 50' of non-motorized non-system trail (9x). Alt 2-4 would incorporate route into formal trail system as a non-motorized trail.	See discussion of CMT design criteria
5AA2630*	Protohistoric/ Historic CMT	NE (Field, not revisited)	No Impacts Anticipated	Isolated find is located immediately along non-motorized non-system trail (9v). Alt 2-4 would incorporate route into formal trail system as a non-motorized trail.	See discussion of CMT design criteria
5AA2646*	Protohistoric/ Historic CMTs	E (SHPO)	No Impacts Anticipated	Isolated find is located within 50' of non-motorized non-system trail (Piedra Hot Springs Trail, route 9a); route would be incorporated into system as a non-motorized route Alt 3-4.	See discussion of CMT design criteria
5AA2679	Historic Sheep Creek Bridge	E (SHPO) Destroyed	No Impacts Anticipated	Site is destroyed; it was the Sheep Creek Footbridge which collapsed into the river.	None – Site Destroyed No Adverse Effect from Current Project
5AA2998.1	Historic Lumber Road	E (Field)	Impacts Anticipated Under All Alternatives (NAE)	Site is a non-system trail which is braided with another non-system trail (9w). Alt 2-decommission; Alt 3-4 decommission one of the two trails within this area would allow continued use of the other as a non-motorized non-system trail.	Use of historic trails can help maintain routes. This site should not be subjected to ground disturbance. Recommend continuing use of historic route and decommissioning other braided trail.

Site/IF Number	Description	Eligibility	Impacts Anticipated?	Discussion of Impacts	Design Criteria
5AA3414.1	Multicomponent Trail – Beaver Lakes	Resource is Eligible (SHPO) – contributes in location only	Impacts Anticipated Under All Alternatives (NAE)	Site is located along Beaver Lakes NFST 604 and is a current and proposed non-motorized trail. This segment is considered eligible in location only. Impacts will result in no adverse effect.	None
5AA3414.2	Multicomponent Trail – Beaver Lakes (Dudley Segment)		Impacts Anticipated Under All Alternatives (NAE)	Site is located along Dudley NFST 601, which is a current and proposed non-motorized trail. This segment is considered eligible in location only. Impacts will result in no adverse effect.	None
5AA3489*	Protohistoric/ Historic CMT	E (SHPO)	No Impact Anticipated	Isolated find is located within 50' of non-motorized non-system trail (Piedra Hot Springs Trail, 9a); route would be incorporated into system as a non-motorized route Alt 3-4.	See discussion of CMT design criteria
5AA3782*	Protohistoric/ Historic CMT	E (2010)	No Impact Anticipated	Isolated find is located along Elk Creek NFST 689, an existing motorized trail retained in all alternatives	See discussion of CMT design criteria

* indicates potentially eligible isolated find, culturally modified tree/trees
E = Eligible,
NAE = No Adverse Effect

3.10.2.1 Alternative 1

Current management practices are resulting or could result in impacts to contributing portions of some historic properties. These properties include: 5AA1152, 5AA1479, 5AA1755, 5AA2598, 5AA2998.1, and all six CMT isolated finds. Design criteria can address these impacts. Provided design criteria are applied, adopting this alternative would result in *no adverse effect* to historic properties.

3.10.2.2 Alternative 2

This alternative proposes a variety of changes to the existing trail system, including the adoption of non-system trails, changes in the managed use permitted on existing trails, and new construction of trails and trail segments. Road and trail use and maintenance have the potential to impact cultural resources. The impacts of these activities to Historic Properties within the APE are described in Table 11, along with any design criteria proposed. Alternative 2 would also decommission multiple non-system trails. During trail decommissioning, no ground disturbing activities would be permitted within the boundaries of eligible sites. Design criteria have been identified for five sites and all six CMT isolated finds. Sites with design criteria under Alternative 2 are: 5AA1152, 5AA1479, 5AA1755, 5AA2598, and 5AA2998.1. Provided design criteria are applied, adopting this alternative would result in *no adverse effect* to historic properties.

3.10.2.3 Alternative 3

The effects under Alternative 3 are similar to Alternative 2, except Alternative 3 would impact a greater area due to additional proposed motorized and non-motorized trails. The design criteria for this alternative are the same as for Alternative 1. Provided design criteria are applied, adopting this alternative would result in *no adverse effect* to historic properties.

3.10.2.4 Alternative 4

The effects under Alternative 4 are similar to Alternative 3, except Alternative 4 adds additional trails to the system and requires additional design criteria. Resources with additional design criteria under Alternative 4 are: 5AA962, 5AA1479, 5AA1755, 5AA2598, 5AA2998.1, all six CMT isolated finds and the CMT at 5AA1152. Provided design criteria are applied, adopting this alternative would result in *no adverse effect* to historic properties.

3.11 Air Quality

3.11.1 Affected Environment

3.11.1.1 Regulatory Environment and Regional Attainment Status

The Clean Air Act (42 USC 7401 et seq. as amended in 1977 and 1990) is the principal federal statute governing air pollution. The Clean Air Act empowered the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These pollutants are called "criteria" air pollutants and include carbon monoxide (CO), ozone, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, particulate matter equal to or less than 10 microns in diameter (PM_{10}), and fine particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$). The NAAQS include primary standards designed to protect human health and secondary standards to protect public welfare, including visibility and damage to crops and vegetation.

Regions of the country that meet the NAAQS are considered "attainment" areas, and regions that do not meet the NAAQS are designated as "nonattainment" areas. Certain rural parts of the country do not have extensive air quality monitoring networks; these areas are considered "unclassifiable" and are presumed to be in attainment with the NAAQS. The analysis area is located within Archuleta County, which along with the southwestern Colorado counties of Dolores, La Plata, Montezuma, and San Juan, comprises Colorado Air Quality Control Region (AQCR) 9. With the exception of the Pagosa Springs PM_{10} Attainment/Maintenance Area, air quality in AQCR 9 falls into the categories of either "better than national standards" or "unclassifiable/attainment" for all criteria air pollutants (EPA 2011). Based on this general classification of the AQCR, air quality within the analysis area would generally be considered good.

3.11.1.2 Local Air Quality Conditions

The central portion of Pagosa Springs was designated as a moderate nonattainment area for the PM_{10} NAAQS in 1990, and the analysis area is located approximately 2 miles west of the portion of Pagosa Springs that was designated nonattainment. As a result of this nonattainment designation, the State Implementation Plan for the Pagosa Springs area was amended and included several mandatory control measures including paving 6.5 miles of unpaved roads, adoption of street sanding controls and other

street sweeping requirements, control of emissions from stationary sources, federal motor vehicle emission controls, and a series of voluntary and state-only control measures. According to the Final Revised PM_{10} Maintenance Plan (APCD 2009), these control measures resulted in the area's attainment of the PM_{10} NAAQS, and EPA approved the re-designation request and maintenance plan for the Pagosa Springs area, which became effective on August 14, 2001. Even with the expected growth in PM_{10} emissions from categories including unpaved road dust, the adopted maintenance plan expects that the current control measures should ensure continued maintenance of the PM_{10} NAAQS through the year 2021, which is the duration of the maintenance period.

Between 1998 and 2008, the Pagosa Springs air quality monitor recorded only a single exceedance of the 24-hour PM_{10} NAAQS. However, in 2009, a total of four exceedances were recorded and in 2010, a total of five exceedances were recorded. The Colorado Air Pollution Control Division believes that all of these exceedances can be considered "exceptional events" as these were caused by regional high wind and blowing dust events. However, due to a data reporting error, only three of the four exceedances in 2009 are officially classified as exceptional events (pers. comm. McGraw, 2011).

For the purposes of the Turkey Springs Trail Management Plan, it is important to note that with the exception of one event, all of the recorded exceedances in 2009 and 2010 occurred between March 1 and May 15, which corresponds with the time period when proposed seasonal trail closures for motorized vehicles would be in effect. For this reason, and given the distance between the new proposed motorized trails and the Pagosa Springs attainment/maintenance area (more than 5 miles), it is unlikely that trail construction or motor vehicle use on those trails would have any effect on the Pagosa Springs PM_{10} attainment/maintenance area.

3.11.2 Environmental Consequences

3.11.2.1 Methodology

Air quality impacts from the proposed trail management plan could occur during both the trail construction phase and from motorized vehicles using the trails once they have been opened to motorized recreational use. Air quality impacts from the construction and use of non-motorized trails are expected to be negligible and are not discussed further in this impact assessment.

Two types of new motorized trails are planned under the Turkey Springs Trail Management Plan: single-track trails designed for motorcycle use, and motorized ATV trails that are designed primarily for ATV use, but not for street-legal vehicles. Due to the width of single-track trails (up to 24 inches), these trails would primarily be constructed by crews using hand tools, which could include picks, shovels, and chain saws. Emissions generated during the construction of single-track trails are anticipated to be negligible.

In contrast, motorized ATV trails may be constructed using a combination of hand tools and small diesel construction equipment such as trail dozers, skid steer loaders, and backhoes. During motorized ATV trail construction activities, emissions would be generated from both equipment exhaust as well as fugitive dust from earthmoving.

Based on the design tread width of the motorized ATV trails (up to 60 inches) and the size of compatible diesel construction equipment expected to be used for trail construction, the equipment used would likely

be in the range of 50 to 100 horsepower (hp). EPA's emission standards for selected small diesel construction equipment and hand-held gasoline powered equipment are presented in Table 12.

Table 12: EPA Emission Standards for Small Construction Equipment

Engine Size and Type	NMHC & NOx	CO	PM/PM_{10}	Source
50 to 100 hp – Diesel equip. 2004 model year Tier II standard (trail dozers)	5.6 g/hp-hr	3.7 g/hp-hr	0.3 g/hp-hr	EPA 1998b, Table 1-1
20 to <50 cc displacement hand-held (chain saws)	50 g/kW-hr	50 g/kW-hr	--	Sicking and Zavala 2002, Table 1

Notes: cc = cubic centimeter; g/hp-hr = gram per horsepower-hour; g/kW-hr = gram per kilowatt-hour; NMHC = non-methane hydrocarbons; NOx = oxides of nitrogen

Using the emission standards (emission factors) presented in Table 12, hourly emission estimates for potential construction equipment were calculated. A sampling of construction equipment and hourly emission estimates that could potentially be used during the construction of motorized ATV trails is presented in Table 13.

Table 13: Potential Motorized ATV Trail Construction Equipment and Emission Estimates

Equipment	Estimated Engine Size	NMHC & NOx(lbs/hour)	CO(lbs/hour)	PM/PM_{10}(lbs/hour)
Trail Dozer	80 hp	1.0	0.7	0.05
Skid Steer Loader	89 hp	1.1	0.7	0.06
Backhoe	98 hp	1.2	0.8	0.06
Chain Saw	1.68 kW	0.2	0.2	--

Notes: lbs = pounds

As can be seen from Table 13, exhaust emissions from small construction equipment would be quite small and range from 0.05 pounds per hour for particulate matter (PM_{10}) to 1.2 pounds per hour for non-methane hydrocarbons (NMHC) and oxides of nitrogen (NOx) for the 98 hp backhoe. These levels of emissions are not expected to result in high concentrations of any air pollutants even in the immediate vicinity of construction activities.

Fugitive dust emissions from the construction of ATV trails would be generated primarily during earthmoving activities. Emission estimates were developed using standard emission factors for bulldozing obtained from the EPA publication AP-42 (EPA 1998a). Using the recommended emission factor equation for bulldozing overburden (EPA 1998a, Table 11.9-1), emissions of PM_{10} were calculated to be approximately 0.75 pounds per hour. It is estimated that the construction of 1 mile of ATV trail using a trail dozer and hand crew would require approximately 40 hours of construction activity depending on topography and vegetation (pers. comm. Dollus, 2011). As with any earthmoving activities, the heaviest particles would quickly settle out of the air near the dust source and the finer particles could become entrained in the air and travel some distance from the source.

The total emissions from equipment exhaust and fugitive dust would be dependent upon the length of the trail constructed as well as the duration of construction activities.

Emissions to be generated by new ATV trail construction were estimated for each alternative based on the above assumptions, and are presented in Table 14 below.

Table 14: Estimated Emissions for ATV Trail Construction by Alternative

Alternative	New ATV Trail (miles)	Equipment Operation (hours)	NMHC & NOx pounds (tons)	CO pounds (tons)	PM/PM_{10} pounds (tons)
1	0.0	0	0	0	0
2	5.0	200	240 (0.12)	170 (0.09)	160 (0.08)
3	6.0	240	288 (0.14)	204 (0.1)	192 (0.1)
4	7.5	300	360 (0.18)	255 (0.13)	240 (0.12)

3.11.2.2 Alternative 1 – No Action

The No Action Alternative would have no additional effect on air quality. There would be no trail construction associated with this alternative. Trail usage would be comparable to current usage and both motorized and non-motorized trail usage would be expected to increase slightly over time in proportion to the expected growth in population and visitation.

3.11.2.3 Alternative 2

Air quality impacts associated with Alternative 2 would result primarily from the addition of 10.0 miles of ATV trail to the transportation system, including 5.0 miles of new construction. The addition of 14.7 miles of non-motorized trail and construction of 1.1 miles of new non-motorized trail would have negligible air quality impacts. The decommissioning of 0.1 miles of system road, 0.5 miles of non-system road, and 15.0 miles of non-system trail would have minor air quality benefits within the MA.

Construction of 5.0 miles of new ATV trail would have negligible to minor short-term air quality impacts. These impacts would result from exhaust emissions from the use of diesel-powered trail dozers, gasoline-powered chain saws, and fugitive dust emissions from earthmoving activities. Based on an estimated 40 hours of construction per mile of trail, construction equipment could be operated as much as 200 hours.

As shown in Table 14, emissions of criteria pollutants from trail construction under Alternative 2 would be very small and would range from 0.08 tons of PM_{10} to 0.12 tons of NMHC and NOx. These emissions are well below any regulatory standard and would be spread out along the 5 miles of trail, which would limit pollutant concentrations in any one area. Pollutant and dust concentrations would be elevated for short periods in the immediate vicinity of construction, but these concentrations would disperse rapidly and are not expected to result in an exceedance of any air quality standard. The overall air quality impact from ATV trail construction would be negligible to minor.

Minor localized air quality impacts would result from the expansion of the motorized trail network due to increased use by motorcycles and ATVs. Emissions would result from exhaust emissions from the recreational vehicles and fugitive dust would be generated by the use of these vehicles on unpaved trails. Due to the limited expansion of the motorized trail network under Alternative 2, the air quality impacts from this alternative would be the least of the three action alternatives. Impacts would generally be localized in the immediate vicinity of the trail when recreational vehicles would pass a given point. Since

vehicles would pass any given point quickly and the total emissions would be spread out along the entire length of the trail, perceptible concentrations of pollutants would not remain at any point along the trail for more than a few minutes following vehicle passage. In addition, concentrations of pollutants would drop off rapidly with increasing distance from the motorized trails. Impacts to air quality in the analysis area from Alternative 2 would be negligible to minor.

3.11.2.4 Alternative 3 – Proposed Action

Air quality impacts associated with Alternative 3 would result primarily from the addition of 12.1 miles of ATV trail to the transportation system, including 6.0 miles of new construction, and the addition of 13.6 miles of single-track motorized trail, with 3.3 miles of new construction. The addition of 41.0 miles of non-motorized trail and construction of 6.3 miles of new non-motorized trail would have negligible air quality impacts. The closure, removal from the transportation system, and decommissioning of roads and trails would have minor air quality benefits within the MA.

Similar to Alternative 2, the construction of 6.0 miles of new ATV trail would have negligible to minor short-term air quality impacts. Trail construction equipment would be the same as described in Alternative 2. Based on an estimated 40 hours of construction per mile of trail, construction equipment could be operated as much as 240 hours.

As shown in Table 14, emissions of all criteria pollutants from trail construction under Alternative 3 would be very small and would range from 0.1 tons of PM_{10} to 0.14 tons of NMHC and NOx. These emissions are well below any regulatory standard and would be spread out along the 6.0 miles of trail, which would limit pollutant concentrations in any one area. Pollutant and dust concentrations would be elevated for short periods in the immediate vicinity of construction, but these concentrations would disperse rapidly and are not expected to result in an exceedance of any air quality standard. The overall air quality impact from ATV trail construction would be negligible to minor.

Minor localized air quality impacts would result from the expansion of the motorized trail network due to increased use by motorcycles and ATVs. Use of the First Fork/Devil Mountain ATV trails is expected to increase due to the enhanced connectivity and loop opportunities. The Forest Service anticipates that overall use of the ATV trail system would be moderate compared with recreational use in other portions of the District. The use of single-track motorized trails is anticipated to remain low on weekdays and be moderate on weekends during the trail open season.

During trail use, the most noticeable air quality impacts would be in the immediate vicinity of either ATV or single-track trails when recreational vehicles pass a given point. However, since vehicles would pass any given point quickly and the emissions from each vehicle would be spread out along the entire length of the trail, perceptible concentrations of pollutants would not remain at any point along the trail for more than a few minutes following vehicle passage. In addition, concentrations of pollutants would drop off rapidly with increasing distance from the motorized trails. Even with increased usage by motorcycles and ATVs on the expanded trail network, impacts on air quality within the analysis area from Alternative 3 would be minor.

3.11.2.5 Alternative 4

Similar to Alternative 3, air quality impacts associated with Alternative 4 would result primarily from the addition of 14.6 miles of ATV trail to the transportation system, including 7.5 miles of new construction, and the addition of 29.5 miles of single-track motorized trail, with 5.9 miles of new construction. The addition of 55.2 miles of non-motorized trail and construction of 6.3 miles of new non-motorized trail would have negligible air quality impacts. The closure, removal from the transportation system, and decommissioning of roads and trails would have minor air quality benefits within the analysis area.

Similar to Alternatives 2 and 3, the construction of 7.5 miles of new ATV trail would have negligible to minor short-term air quality impacts. Trail construction equipment would be the same as described in Alternative 2. Based on an estimated 40 hours of construction per mile of trail, construction equipment could be operated as much as 300 hours.

As shown in Table 14, emissions from trail construction under Alternative 4 would also be very small and would range from 0.12 tons of PM_{10} to 0.18 tons of NMHC and NOx. These emissions are well below any regulatory standard and would be spread out along the 7.5 miles of trail, which would limit pollutant concentrations in any one area. Pollutant concentrations would be elevated for short periods in the immediate vicinity of construction, but these concentrations would disperse rapidly and are not expected to result in an exceedance of any air quality standard. The overall air quality impact from ATV trail construction would be negligible to minor.

Air quality impacts from Alternative 4 would be similar to the impacts described above for Alternative 3. Minor localized air quality impacts would result from the expansion of the motorized trail network due to increased use by motorcycles and ATVs. Use of the First Fork/Devil Mountain ATV trails is expected to increase due to the enhanced connectivity and loop opportunities. The use of single-track motorized trails is anticipated to remain low on weekdays and be moderate on weekends during the trail open season.

During trail use, the most noticeable air quality impacts would be in the immediate vicinity of either ATV or single-track trails when recreational vehicles pass a given point. However, since the emissions from each vehicle would be spread out along the entire length of the trail, perceptible concentrations of pollutants would not remain at any point along the trail or within the MA for more than a few minutes following vehicle passage. In addition, concentrations of pollutants would drop off rapidly with increasing distance from the motorized trails. Even with increased usage by motorcycles and ATVs on the expanded trail network, impacts on air quality within the analysis area from Alternative 4 would be minor.

3.12 Scenic Resources

3.12.1 Affected Environment

The scenic resources of the analysis area play an important role in the attraction, enjoyment, and economic value of recreational uses by visitors to the area, and enhance the quality of life for local residents. The existing landscape character of the analysis area is a predominantly natural landscape that provides a mountain setting for a variety of outdoor recreational opportunities. The eastern portion of the analysis area is characterized by gently sloping terrain vegetated with ponderosa pine and interspersed with grassy meadows. The western portion of the analysis area is characterized by higher elevations, increasingly rugged terrain, and mixed conifer forest interspersed with aspen, mountain shrubland, and

grassland vegetation types. The steep slopes that rise from the Piedra River at the west boundary of the analysis area are dissected by canyons that extend to the east. The rugged, rocky San Juan Mountains to the north, east, and west include peaks that rise to heights that exceed 13,000 feet, and provide a scenic backdrop to views of the analysis area.

Existing visual modifications to the natural setting includes grazing, roads and trails, developed recreation facilities (i.e., trailheads, parking areas, and one campground), and adjacent residential development. The eastern portion of the analysis area shows disturbance from non-system trails in close proximity to residential areas. Visible management actions are generally subtle, so that the landscape retains a predominantly natural appearing character.

The analysis area is viewed from interior and exterior locations that include system roads and trails, recreation facilities, nearby residential subdivisions, and part of Pagosa Springs. Views from the Piedra River, which provides water-based recreation, are enclosed by the river valley along the west boundary of the analysis area. Views from most of the analysis area are limited in viewing distance (immediate foreground up to 300 feet and foreground up to 0.5 miles from viewer) due to tree stands or the surrounding terrain.

The Piedra River is a potential addition to the Wild and Scenic Rivers System, and the analysis area includes portions of a recommended scenic segment. Most of the scenic segment is within the Piedra Area along the west boundary of the analysis area. The adjacent Piedra Area roadless area is characterized by landscapes that have a high scenic quality, and little evidences of human modification. No other scenic designations were identified in the analysis area or at locations with views of the analysis area.

3.12.1.1 Scenery Management Direction

The SJNF is currently updating the Forest Plan, and has inventoried SJNF lands with the Scenery Management System (SMS), which supersedes the Visual Resource Management (VRM) System used under the existing Forest Plan[1]. The SMS incorporates viewing distance zones, concern levels (public importance), scenic attractiveness (indicator of intrinsic scenic beauty of a landscape), scenic class (determined by combining the scenic attractiveness with distance zone and concern levels), and existing scenic integrity (state of naturalness). The draft SJNF inventory in the analysis area currently consists of scenic attractiveness classes and scenic integrity levels. The scenic attractiveness classes and the scenic integrity levels provide a description of the existing condition of the scenic resource in the analysis area. The final Forest Plan will establish Scenic Integrity Objectives, or acceptable limits of change for scenic resources and the desired future condition for MAs.

Scenic Integrity (SI), as defined by the Forest Service, is the state of naturalness or, conversely, the state of disturbance created by human activities or alteration. The six SI levels range from Very High, in which the valued landscape character is intact, to Unacceptably Low, which refers to landscapes where the valued landscape character appears extremely altered. The analysis area includes landscapes with SI levels of Very High (VH) (unaltered), High (H) (appears unaltered), Moderate (M) (slightly altered), and Low (L)

[1] According to the Handbook for Scenery Management (USDA Forest Service 1995), Visual Quality Objectives can be converted to Scenic Integrity Objectives (SIOs) as follows: VQO Retention converts to High SIO; VQO Partial Retention converts to Moderate SIO; VQO Modification converts to Low SIO.

(moderately altered). Most of the analysis area contains lands inventoried with a High SI. The Piedra River along the boundary of the Piedra Area is a Very High SI landscape.

The Forest Plan also depicts inventoried scenic attractiveness. Scenic attractiveness is defined as the scenic importance of a landscape based on human perceptions of the intrinsic beauty of landform, rockform, waterform, and vegetation pattern. The scenic attractiveness levels determine the relative scenic value of lands within a particular landscape character. Scenic attractiveness levels applied to landscapes in the analysis area include A-distinctive, B-typical or common, and C-undistinguished. Class A landscapes are defined in the Devil Mountain/Horse Mountain area and within the Devil Creek and Piedra River corridors. Most Class A landscapes in the analysis area are also rated with a Moderate to High SI because they have experienced little visible modification from human activities. Class C areas are identified in the East Monument and Middle Mountain areas where there are numerous closed system roads previously used for timber harvesting, along the Turkey Springs Road, and in the vicinity of Elk Creek and West Monument Road.

The analysis area is currently managed under the Forest Plan, which contains Visual Quality Objectives (VQOs) by MA. See Figure 2 for MA boundaries.

3.12.2 Environmental Consequences

Impacts were determined by comparing action alternatives to the inventoried SI and scenic attractiveness classifications, and to the Existing Forest Plan VQOs with consideration for the following: 1) the degree of change (adverse or beneficial) to inventoried scenic attractiveness, 2) changes to areas of Very High and High existing Scenic Integrity, 3) consistency with the existing Forest Plan visual resource management guidelines and VQOs.

3.12.2.1 Alternative 1 – No Action

Under the No Action Alternative there would be no changes to system roads or trails within the analysis area; therefore, there would be no direct effects on scenic attractiveness or scenic integrity. Motorized use of non-system routes would continue to be prohibited, consistent with current policy; however, decommissioning of non-system routes is not proposed. Non-motorized recreational use of non-system routes east of Turkey Springs Road would likely continue at current or increased levels of use, and visual impacts due to lack of management would be probable on many routes over time. Route deterioration resulting from unmanaged use of non-system routes would have negligible to minor indirect effects on scenic resources.

3.12.2.2 Alternative 2

Alternative 2 would add 10.0 miles of motorized ATV trail and 14.7 miles of non-motorized trail to the system. Five miles of the proposed ATV trail and 1.1 miles of proposed non-motorized trail would be new construction. New trails are proposed in the vicinity of Devil Mountain, Brockover Road, and Newt Jack Road (Figure 5). Proposed alignments for trails in the vicinity of Devil Mountain are in areas designated as having Moderate to High SI and are predominantly in scenic attractiveness Class B. Proposed new trail construction in the vicinity of Brockover Road and Newt Jack Road is proposed in areas designated as having Moderate to High SI and scenic attractiveness Class C.

Direct and indirect effects on scenic resources from trail construction activities would be primarily short-term and construction-related, and would consist of the sight of construction equipment, construction activities, and temporary disruptions of road and trail access. The addition of new trails would cause a negligible degree of change in the overall scenic integrity. The curvilinear lines of new and modified trails would follow the contours of the terrain, and would not alter landforms. Minimal cut and fill slopes and adjacent undisturbed vegetation would result in a natural-appearing edge effect, and would minimize the visual impact of new trails. There would be no significant long-term effects to the inventoried scenic integrity and scenic attractiveness levels from changes to system trails and roads. No areas with Very High SI would be affected.

Redesignation of uses permitted on existing system routes, and the adoption of non-system routes, would have negligible effects to scenic resources as these routes already exist on the ground. Under Alternative 2, 0.6 miles of system and non-system roads and 15.0 miles of non-system trails would be decommissioned. Decommissioned routes would be rehabilitated to a natural condition, with minor beneficial effects for scenic resources.

The general Forest Plan direction for visual resources is to enhance and/or preserve scenic values along heavily traveled roads, use areas, and trails through management activities. None of the proposed activities would alter scenic values along existing and new or modified system roads and trails. Proposed road and trail management activities would be in compliance with management direction for visual resources in MAs 02B, 03A, 04B, 05B, and 06B, as once construction activities are completed, the proposed project would be visually subordinate to existing natural landscape elements and would harmonize and blend with natural settings.

Most new motorized and non-motorized trail construction, as well as changes in existing trail designations would be in MA 07E, which is managed to meet the VQO of Partial Retention within the foreground of primary trails, and Modification on other areas. New motorized and non-motorized trails would provide linkages in the existing trail system; and would repeat the form, line, color, and texture of existing trails. The proposed action would meet the Partial Retention objective, which requires activities to remain visually subordinate to the characteristic landscape; and the Modification objective, which provides for management activities that may visually dominate the original characteristic landscape.

First Fork Road (NFSR 622) is in MA 10D. There would be no change to the characteristic landscape from the designation of the road to open to all vehicles, or any effects to the scenic qualities of the Wild and Scenic River segment of the Piedra River. The proposed activity would meet the VQO Retention objective, which provides for management activities which are not visually evident, and with the Partial Retention objective.

3.12.2.3 Alternative 3 – Proposed Action

Alternative 3 would add 12.1 miles of motorized ATV trail, 13.6 miles of single-track motorized trail, and 27.8 miles of non-motorized trail to the system. Six miles of the proposed ATV trail, 3.3 miles of proposed single-track motorized trail, and 6.1 miles of proposed non-motorized trail would be new construction. Alignments for new trails considered under Alternative 2 are also considered in Alternative 3. In addition, new single-track trail is proposed in the vicinity of West Monument in an area classified as having Moderate to High SI and scenic attractiveness Class B (Figure 6). Additional ATV trail

construction is proposed in the Middle Mountain area (High SI and scenic attractiveness Class B), and new non-motorized trail is proposed in the vicinity of Newt Jack and Piedra roads (Moderate to High SI and scenic attractiveness Class B and C). Direct and indirect effects to scenic resources from trail construction activities would be the same as described for Alternative 2.

Under Alternative 3, new motorized and non-motorized trails would be added across the analysis area; however, this is not anticipated to impact landscape character since there would be no significant long-term effects to the inventoried scenic integrity and scenic attractiveness levels. No areas with Very High SI would be affected.

An existing non-system road in MAs 1.12 and 1.13 would be converted to a non-motorized system trail. The proposed Piedra Hot Springs Trail would be similar in appearance to the existing non-system trail, and would not create new contrasts in the natural appearing landscape. Management direction for both MAs provides for the establishment of trails. The conversion to a system trail would meet the Preservation objective, which provides for very low visual-impact recreation facilities such as trails.

Re-designation of uses permitted on existing system routes, and the adoption of non-system routes, would have negligible effects to scenic resources as these routes already exist on the ground. Under Alternative 3, 0.6 miles of system and non-system roads and 4.4 miles of non-system trails would be decommissioned. Decommissioned routes would be rehabilitated to a natural condition, with minor beneficial effects for scenic resources.

Compliance with visual quality management objectives described for Alternative 2 also applies to Alternative 3.

3.12.2.4 Alternative 4

Alternative 4 would add 14.6 miles of motorized ATV trail, 29.5 miles of single-track motorized trail, and 29.8 miles of non-motorized trail to the system; 7.5 miles of the proposed ATV trail, 5.9 miles of proposed single-track motorized trail, and 6.3 miles of proposed non-motorized trail would be new construction. Alignments for new trails considered under Alternative 3 are also considered in Alternative 4. However, Alternative 4 would add additional ATV and single-track trail in the Devil Creek area (High SI and scenic attractiveness Class A and B).

Direct and indirect effects to scenic resources from new trail construction, conversion of system routes, and adoption of non-system routes would be the same as described for Alternative 3. There would be no significant long-term effects to the inventoried scenic integrity and scenic attractiveness levels, and no areas with Very High SI would be affected. Compliance with visual quality management objectives described for Alternative 2 also applies to Alternative 4.

An existing non-system road in MAs 1.12 and 1.13 would be converted to a non-motorized system trail. The proposed Piedra Hot Springs Trail would be similar in appearance to the existing non-system trail, and would not create new contrasts in the natural appearing landscape. Management direction for both MAs provides for the establishment of trails. The conversion to a system trail would meet the Preservation objective, which provides for very low visual impact recreation facilities such as trails.

Under Alternative 4, 0.6 miles of system and non-system roads and 2.3 miles of non-system trails would be decommissioned. Decommissioned routes would be rehabilitated to a natural condition, with minor beneficial effects for scenic resources.

3.13 Cumulative Effects

3.13.1 Past, Present and Reasonably Foreseeable Future Actions Considered

This section considers the effects on the environment resulting from the incremental impact of the alternatives analyzed in detail, when added to other past, present, and reasonably foreseeable actions and trends. Where no cumulative effects have been identified, such is noted.

For the cumulative effects analysis, unless otherwise stated, the spatial scale is the analysis area and the temporal scale is 20 years into the future.

3.13.1.1 Past and Present Actions

Past and present actions considered include those actions that have had an impact on recreational opportunities and uses, as well as actions that have had an impact on both physical resources (such as soils) and biological resources (such as wildlife). Below are the past and present actions considered in the cumulative effects analysis:

- Weminuche Wilderness designation (1975), South San Juan Wilderness designation (1983), Piedra Area designation (1993)

  Collectively, these Congressional actions have reduced the amount of acreage and trails that were historically available for motorized uses District-wide. Such actions have increased the public pressure for remaining areas on the District to meet increasing demand for motorized recreation.

- 1998 Hut and Trail System Decision

  This decision reduced the amount of D area within the Devil Mt. area and associated cross-country travel by approximately 5,700 acres. This decision also closed 6.8 miles of system trails to motorized use (Trails # 603 and 654). This action further reduced historically used motorized trails and motorized area on the District. However, the decision also designated 5 miles of new trails as open to motorized use.

- 2008 Pagosa District Travel Management Analysis of C and D Areas, Off-Road Vehicle Access and Seasonal Road and Motorized Trail Closures Decision

  This decision eliminated cross-country travel within C and D areas, as per direction from Department of Agriculture revised regulations (36 CFR 212, 251, 261 and 295) regarding travel management on National Forest System lands. However, the decision also designated 18 miles of motorized trails (vehicles 50 inches or less in width) as open to motorized use. In addition, this decision implemented seasonal road and trail closures, allowed for motorized travel up to 300 feet off of open roads for the purposes of dispersed camping, but prohibited off-road travel for any other purpose. The decision also designated the First Fork Road as opened to highway legal motorized vehicles only.

- Motorized and Non-motorized Recreation Demand

The recent creation of non-system hiking and mountain biking trails in the Turkey Springs area illustrates the increased interest in these types of recreation opportunity. Specific user groups with the motorized recreation community have expressed frustration and concern that the existing motorized trail system is inadequate and does not meet existing demand/opportunities for motorized recreation.

- Vegetation Management Projects

  Numerous vegetation management projects have been implemented, or are currently being implemented, in the analysis area including the Turkey Springs Fuels Reduction and Ponderosa Pine Restoration Project EA (2005), Lower Middle Mountain Research Project EA (2004), numerous fuels reduction projects covered under CE's, and several prescribed burn projects.

- Livestock Grazing

  Livestock grazing has occurred in the area since the early 1900s.

- Special Uses

  There are numerous special uses permitted in the analysis area including utility corridor right-of-ways and permitted road use (including road plowing during winter).

- Ongoing Road and Trail Maintenance

3.13.1.2 Reasonably Foreseeable Future Actions

- Motorized and non-motorized recreation demand

  The demand for recreation is expected to increase in the future as population of the area increases…

- Vegetation Management Projects

  Implementation of vegetation management projects will continue in the analysis area. New forest restoration, fuels reduction, and prescribed burning projects are expected to be planned and implemented in the future.

- Livestock Grazing

  Livestock grazing is expected to continue in the analysis area.

- Special Uses

  Special uses will continue to be permitted in the analysis area, including utility corridor right-of-ways and permitted road use (including road plowing during winter).

- Continuing Road and Trail Maintenance
- Decreasing Maintenance Budgets

3.13.2 Affected Resources and Consequences

The ID Team considered past, present and reasonably foreseeable future actions, combined with the action alternatives, to determine if there were cumulative impacts to each resource addressed in this EA. No cumulative effects were identified for recreation, transportation, roadless, vegetation, TES plants, social, economic, or cultural resources.

3.13.2.1 Rangeland Management

All action alternatives, in combination with the 2008 Pagosa District Travel Management Analysis of C and D Areas, Off-Road Vehicle Access and Seasonal Road and Motorized Closures Decision, establish critical links for motorized travel across the analysis area. These critical links could potentially impact livestock distribution and movement but is likely to have a negative effect on the range permittees ability to keep livestock within their allotted areas. It is also likely that the frequency of livestock operation disruptions would increase incrementally with number of motorized links made under each of the action alternatives, as motorized recreationists will have access to trails from multiple directions. No other cumulative impacts to rangeland management resources have been identified.

3.13.2.2 Watershed, Soils, and Geology

The analysis area has previously been, and continues to be, subjected to a large range of management activities and uses. These activities have resulted in impacts to the watershed, soil, and geologic resources of the management area, as discussed in 3.7.1.1. These past actions, combined with the proposed action and reasonably foreseeable future actions, will continue to have an impact on watershed and soil resources. The application of Forest Plan requirements (standards and guidelines) and project design criteria will ensure that these cumulative impacts to watershed, soil, and geologic resources are minor in nature. These minor impacts will consist primarily of incremental increases in erosion and sedimentation from trails and roads in some limited portions of the analysis area. However, as a whole, the proposed action will likely reduce impacts to watershed, soil, and geologic resources by anticipating and accommodating future increases in recreational usage.

3.13.2.3 Wildlife and Fish

Terrestrial. There has been a wide variety of activities occurring in the analysis are that have affected wildlife habitat and species. The area has experienced a long history of forest management actions as described under past and present actions considered in the cumulative effects section. These actions, combined with the proposed action and reasonably foreseeable future actions, will continue to affect wildlife habitat capability and effectiveness for MIS, migratory birds, and other wildlife. Cumulatively, these activities have and will continue contributing incremental increases in disturbance and likely incremental losses of habitat and key habitat attributes at a small scale. The resulting effects to wildlife will include displacement of species (short-term and/or long-term), shifts in behavior, and shifts in use patterns. These effects will likely result in minor influences to local populations, with species more sensitive to disturbance being impacted more than those less sensitive to disturbance. These influences are not expected to affect the viability of any species at the scale of the National Forest, given the small scale in which they typically occur, and the application of Forest Plan requirements (standards and guidelines) design criteria, and other measures to minimize impacts for project activities.

Cumulative effects for federally listed species and Forest Service sensitive species are disclosed in the Biological Evaluation.

Aquatic. The analysis area has experienced a long history of forest management actions as described under past and present actions considered in the cumulative effects section. Activities such as livestock grazing and motorized and non-motorized recreational use in and adjacent to the Devil Creek drainage have influenced fish habitat and fish species resulting in sediment deposition into the creek and causing

minor impacts to stream bank stability and vegetative cover. These same activities have had a much lesser influence to fish habitat in West Fork Devil Creek drainage due to the remote nature and very minimal activity occurring near the creek. Implementation of Alternatives 1, 2, or 3 is not expected to contribute any additional cumulative effects to the Devil Creek or West Fork Devil Creek fisheries. With application of watershed design criteria, implementation of Alternative 4 will contribute minor cumulative effects to the Devil Creek and West Fork Devil Creek fisheries.

3.13.2.4 Socioeconomic

The management of forest resources on the SJNF generates revenue and employment in the timber and wood products, agricultural, and recreation sectors of the local economy through the sale of timber, livestock grazing, permitting of special uses, and management of areas for recreational use. The Proposed Action would improve recreational opportunities within the analysis area, resulting in modest beneficial effects for recreation and tourism-based businesses. Cumulative effects for the local economy are anticipated to be beneficial.

3.13.2.5 Air Quality

The construction and use of new and existing single-track and ATV trails in the analysis area would have negligible to minor cumulative impacts on air quality. Past and present actions with air quality effects would have been detected in the regional air quality monitoring data collected in Pagosa Springs. As the monitoring data has shown, with the exception of the high wind events recorded in 2009 and 2010, air quality in the Pagosa Springs area is currently meeting the NAAQS, so past and present actions would not have contributed substantially to regional air quality impacts.

Reasonably foreseeable future activities that could have an impact on air quality include prescribed burning, ongoing road and trail maintenance, and increased use of motorized recreational vehicles on trails within the MA. Of these activities, prescribed burning would have the greatest potential impact on regional air quality. Ongoing road and trail maintenance and increased use of trails associated with population growth would have negligible to minor cumulative air quality impacts. Air quality impacts from these activities would be localized and would not be expected to have a measurable impact on regional air quality.

3.13.2.6 Scenic Resources

Past and present actions with effects on scenic resources in the analysis area include timber harvesting, livestock grazing, vegetation management projects, travel management actions, special uses such as utility ROWs, and the recent development of user-created non-system hiking and mountain biking trails. The cumulative effect of past and present actions on scenic resources is reflected in current scenic attractiveness or scenic integrity classifications within the analysis area.

Reasonably foreseeable future actions include a continuation of present management activities (i.e., vegetation management, fuels reduction, road and trail maintenance) and uses (i.e., livestock grazing, permitted special uses, motorized and non-motorized recreation). Future actions in the analysis area would be authorized with consideration for the VQOs established for the MAs in which they occur.

Implementation of the Proposed Action would have incremental effects on scenic resources, but would not result in reclassification of areas with regard to scenic attractiveness or scenic integrity, and would not

inhibit the ability of the District to manage uses consistent with MA VQOs. Therefore, no cumulative effects to scenic resources would be anticipated.

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5 LITERATURE CITED

Andrews, R., and R. Righter. 1992. Colorado birds: a reference to their distribution and habitat. Denver Museum of Natural History, Denver, CO. 442 pp.

Archuleta County. 2007. Revised Draft Technical Memorandum # 2 Survey and Demographic Analysis; Regional Parks, Recreation, Open Space and Trails Master Plan. http://www.archuletacounty.org/Development_Services/devservices.asp. Reviewed on March 7, 2011.

Beidleman, C. A. 2000. Partners in Flight land bird conservation plan: Colorado; version 1.0. Available on the World Wide Web at: http://www.rmbo.org.

Blahna, D.J. 2006. Travel management on Public Lands Workshop: Research, collaboration, and management approaches. USGS, Policy Analysis and Science Assistance Branch. Fort Collins, CO. Retrieved 7/6/2006 from: http://www.fort.usgs.gov/TMWorkShop/Presentation/Blahna.pdf.

Buskirk, S.W., and L.F. Ruggiero. 1994. American Marten. Pages 7-37 in he scientific basis for conserving forest carnivores in the western United States. L. F. Ruggiero, K. B. Aubry and S. W. Buskirk, eds. USDA For. Serv. Gen. Tech. Rep. RM-254. Ft. Collins, CO. 184 pp.

Cole, E. C., M. D. Pope, and R. G. Anthony. 1997. Effects of road management on movement and survival of Roosevelt elk. J. Wildl. Manage. 61:1115-1126.Colorado Department of Agriculture website. 2011. Colorado Noxious Weed List. [Retrieved] March 21, 2011, [from] http://www.colorado.gov/cs/Satellite/Agriculture-Main/CDAG/1174084048733.

Colorado Department of Public Health and Environment, Air Pollution Control Division (APCD). 2009. Final Revised PM10 Maintenance Plan for the Pagosa Springs Attainment/Maintenance Area. November 19.

———. 2010. Colorado Air Quality Data Report for 2009. August.

Colorado Division of Local Government (CDOLA). 2000. Preliminary Population Forecasts By Region, 2000 – 2040. http://dola.colorado.gov/dlg/demog/pop_totals.html. Reviewed on March 7, 2011.

Colorado Division of Wildlife (CDOW). 2008. The Economic Impacts of Hunting, Fishing and Wildlife Watching in Colorado. The Economic Impacts of Hunting, Fishing and WildlifeWatching in Colorado. Reviewed on March 9, 2011.

Colorado Off-Highway Vehicle Coalition (COHVCO). 2009. Economic Contribution of Off-Highway Vehicle Recreation in Colorado. Prepared by the Louis Berger Group, Inc., Lakewood, CO.

Colorado Weed Management Association. 2007. Noxious Weeds of Colorado. Ninth edition. Edited by Anthony, S., D'Amato, T., Doran, A., Elzinga, S., Powell, J., Schonle, I., and Uhing, K.

Cordell, H.K., Betz, C.J., Green, G., Owens, M. 2005. Off-highway vehicle recreation in the United States, regions and states: A national report from the National Survey on Recreation and the Environment (NSRE). USDA Forest Service General Technical Report, Southern Research Station. Athens, GA.

Crimmins, T. 1999. Colorado Off-Highway Vehicle User Survey: Summary of results. Colorado State Parks.

———. 2006. Management Guidelines for Off-Highway Vehicle Recreation. NOHVCC.

Dobbs, R.C., P.R. Martin, and T.E. Martin. 1998. Green-tailed towhee (Pipilo chlorurus). In A. Poole and F. Gill, editors, The Birds of North America, No. 368. The Birds of North America, Inc., Philadelphia, PA. 24pp.

Dollus. 2011. Personal communication indicating necessary construction tools and estimated hours to construct 1 mile of ATV trail.

Environmental Protection Agency, United States (EPA). 1998a. Compilation of Air Pollutant Emission Factors, Section 11.9, Western Surface Coal Mining, Tables 11.9-1 and 11.9-3 for emissions from uncontrolled open dust sources: bulldozing. July.

———. 1998b. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines. Document number: EPA420-R-98-016. August.

———. 2011. EPA Green Book – Designation of Areas for Air Quality Planning Purposes (40 CFR 81.306 - Colorado), available online at http://www.epa.gov/oaqps001/greenbk/a40cfr81.html Website accessed on February 10.

Executive Order 13186. 2001. Responsibilities of Federal agencies to protect migratory birds, January 10, 2001. 4 pp. Available: http://ceq.eh.doe.gov/nepa/regs/eos/eo13186.html . Accessed 5/24/2005.

Fisher, A.L., Blahna, D.J., Bahr, R. 2001. Off-highway vehicle uses and owner preferences in Utah. Professional Report IORT PR2001-03. Utah State University.

Keith, J. O. 2003. Abert's squirrel (Sciurus aberti): a technical conservation assessment. USDA Forest Service, Rocky Mountain region. Available online at: http://www.fs.fed.us/r2/projects/scp/assessments/abertsquirrel.pdf . Accessed 5/24/2005.

Kennedy, P. L. 2003. Northern goshawk (Accipiter gentilis atricapillus): a technical conservation assessment. USDA Forest Service, Rocky Mountain region. Available online at: http://www.fs.fed.us/r2/projects/scp/assessments/northerngoshawk.pdf . Accessed 5/24/2005.

Leege, Thomas A. 1984. Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho. Wildlife Bulletin No. 11. Idaho Department of Fish and Game. 38p.

Lyon, Jack L. 1979. Habitat Effectiveness for Elk as Influenced by Roads and Cover. Pages 658-660 Journal of Forestry. October.

Knight, R.L., and D.N. Cole. 1995. Factors That Influence Wildlife Responses to Recreationists. Pages 71-79 *In* Knight, R.L., and K.J. Gutzwiller, eds. Wildlife and Recreationists: Coexistence through Management and Research. Island Press, Covelo, CA. 384p.

Knight, R.L., and K.J. Gutzwiller, eds. 1995. Wildlife and Recreationists: Coexistence through Management and Research. Island Press, Covelo, CA. 384p.

Moore, R.L. 1994. Conflicts on multiple-use trails: Synthesis of the literature and state of the practice. Report No. FHWA-PD-94-031. Washington, D.C.: Federal Highway Administration.

Neary, D.G., Ice, G.G., and C.R. Rhett (Neary et. Al). 2009. Linkages between forest soils and water quality and quantity. Forest Ecology and Management 258: 2269-2281.

Nelson, S.M. 1990. Recreation opportunity preferences of all-terrain vehicle and trail bike riders, and the potential to provide desired summer riding opportunities in the Upper Wind River Winter Sports Area. USDA Forest Service, Region 6, Gifford Pinchot National Forest.

Olive, N. D., and J. L. Marion (Olive and Marion). 2009. The influence of use-related, environmental, and managerial factors on soil loss from recreational trails. Journal of Environmental Management 90(3): 1483-1493.

Preisler H. K., A. A. Ager, and M. J. Wisdom. 2006. Statistical methods for analyzing responses of wildlife to human disturbance. J. Appl. Ecolo. 43:164-172.

Reynolds, R. T, R.T., M. Graham, H. Rieser, , R.L.Bassett, P.L. Kennedy, D.A. Boyce, Jr., G. Goodwin, R. Smith and E.L. Fisher. 1992. Management recommendations for the Northern Goshawk in the Southwestern United States. Rocky Mountain. Forest and Range Experiment Station and Southwestern Region Forest Service, U.S. Forest Service, U.S. Dept. of Agriculture. Gen. Tech. Rep. RM-217.

Righter R. 1998. Green-tailed towhee. Pages 444-445 in H. E. Kingery, ed. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership. Denver, Colorado.

Rowland, M. R., M. J. Wisdom, B. K. Johnson, and J. G. Kie. 2003. Elk distribution and modeling in relation to roads. J. Wildl. Manage 64:672-684.

Ruediger Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger, and Al Williamson (Ruediger et.al). 2000. Canada lynx conservation assessment and strategy, 2nd Edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT.

Shribner, J. 2009. Horse Sense: Trail Safety on Multi-Use Trails. Western States Trail Foundation.

Sicking, Lois P. and Mark Zavala, 2002. United State Department of Agriculture, Forest Service. EPA and CARB Emission Standards to Control Nonroad Exhaust Emissions of Fire Pumps and Chain Saws. December.

Smith, K., Blahna, D. 1995. The social impacts and management of llamas as recreational packstock. Utah State University.

Thomas, J. W, H. Black, JR., R. J. Scherzinger, and R. J. Pedersen. 1979. Deer and elk. Pages 104-127 in J. W. Thomas, tech. ed. Wildlife habitats in managed forests of the Blue Mountains of Oregon and Washington. U.S. Dept. Ag. Agricultural Handbook 553.

USDA Forest Service. 1992. Amended Land and Resource Management Plan for the San Juan National Forest. Rocky Mountain Region, April.

———. 1998. Environmental Assessment, Pagosa Hut and Trail EA. Pagosa Ranger District, San Juan National Forest. USDA Forest Service, Region 2.

———. 1995. A Handbook for Scenery Management. Agriculture Handbook No. 701. Washington, DC: U.S. Department of Agriculture, Forest Service.

———. 2001. Special Areas; Roadless Area Conservation; Final Rule and Record of Decision. Federal Register Vol. 66, No. 9 (12 January 2001), Final Rule. pp. 3244 – 3273.

———. 2004. Environmental Assessment, Lower Middle Mountain Research Project. Pagosa Ranger District, San Juan National Forest. USDA Forest Service, Region 2.

———. 2005a. 36 CFR Parts 212, 251, 261, and 295. Travel Management: Designated Routes and Areas for Motor Vehicle Use; Final Rule.

———. 2005b. Abert's Squirrel Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 20 pp.

———. 2005c. American Marten Species Assessment for the San Juan National Forest. Unpublished Report, San Juan National Forest, Durango, CO. 20 pp.

———. 2005d. Draft American Black Bear Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 11 pp.

———. 2005e. Draft American Elk Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 20 pp.

———. 2005f. Draft Merriam's Wild Turkey Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 9 pp.

———. 2005g. Draft Mountain Bluebird Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 35 pp.

———. 2005h. Draft Northern Goshawk Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 20 pp.

———. 2005i. Green-Tailed Towhee Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 28 pp.

———. 2005j. Hairy Woodpecker Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 26 pp.

———. 2005k. Mule Deer Species Assessment, San Juan National Forest. Unpublished document on file at the Durango Public Lands Center, Durango, CO. 23 pp.

———. 2005. Environmental Assessment, Turkey Springs Fuels Reduction and Ponderosa Pine Restoration Project EA. Pagosa Ranger District, San Juan National Forest. USDA Forest Service, Region 2.

———. 2007. Invasive Species Action Plan: Three Year Actions for the Prevention and Management of Invasive Species. San Juan National Forest, San Juan Field Office, Canyons of the Ancients National Monument. Rocky Mountain Region.

———. 2008. Environmental Assessment, Pagosa District Travel Management Analysis of the C and D Areas, Off-Road Vehicle Access and Seasonal Road and Motorized Trail Closures. Pagosa Ranger District, San Juan National Forest. USDA Forest Service, Region 2. November.

———. 2009a. R2 Regional Forester's Sensitive Species List. Rocky Mountain Region; FSM Supplement No. 2600-2009-1, June 9, 2009.

———. 2009b. *Travel Planning Handbook. Forest Service Handbook* 7709.55. Washington, DC: U.S. Department of Agriculture, Forest Service. http://www.fs.fed.us/im/directives/dughtml/fsh7000.html.

———. 2011a. Travel Analysis Report. Pagosa Ranger District, San Juan National Forest. USDA Forest Service, Region 2. February.

———. 2011b. Engineering Report: Analysis of Road No. 622 (First Fork) for Motorized Mixed Use Designation. San Juan Public Lands, Pagosa Ranger District/Field Office. USDA Forest Service, Region 2. February.

———. 2011c. Visitor Use Report; San Juan USDA Forest Service, Region 2, National Visitor Use Monitoring. Data collected FY 2006. http://apps.fs.usda.gov/nrm/nvum/results/. Reviewed on March 9, 2011.

———. 2011d. Rulemaking for Colorado Roadless Areas – Revised Draft Environmental Impact Statement. USDA Forest Service. Colorado National Forests. February.

United States Fish and Wildlife Service (USFWS). 1995. Recovery Plan for the Mexican spotted owl: Volume. I. Albuquerque, New Mexico.

———. 2008. Birds of Conservation Concern 2008. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. Available on the world wide web at: http://migratorybirds.fws.gov/reports/bcc2008.pdf.

———. 2011. Unit Species List of Federal Threatened, Endangered, and Candidate species for the San Juan Public Lands, May 13, 2011. Email from USDI Fish and Wildlife Service, Grand Junction, CO. On file at the Pagosa Public Lands Office, Pagosa Springs, CO.

Wilson, J. P., and J. P. Seney (Wilson and Seney). 1994. Erosional impacts of hikers, horses, motorcycles, and off-road bicycles on mountain trails in Montana. *Mountain Research and Development* 14: 77–88.

Yankoviak, B.M. 2005. Off-road vehicle policy on USDA National Forests: Evaluating user conflicts and travel management. MS Thesis, University of Montana.

Appendix A - Glossary

Appendix A: Glossary

Adoption ~ Refers to the designation of a non-system route as a National Forest System trail or National Forest System road.

Arterial road ~ A National Forest System road that provides service to large land areas and usually connects with other arterial roads or public highways.

All-terrain vehicle (ATV) A type of off-highway vehicle that travels on three or more low-pressure tires; has handle-bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator (FSM 7700).

Background ~ The distant part of a landscape. The landscape area located from 4 miles to infinity from the viewer.

Big game ~ Large wild animals that are hunted for sport and food. This hunting is controlled by state wildlife agencies. Big game animals found on this Forest include deer and elk.

Closure ~ Refers to prohibiting a certain type of use on a forest road or trail that was previously allowed.

Collector road ~ A National Forest System road that services smaller areas than an arterial road and that usually connects arterial roads to local roads or terminal facilities.

Conversion ~ Refers to changes made to a system road or trail's Managed Use(s) and/or Designed Use.

Cumulative effects ~ Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Decommission ~ The closure of a system or non-system road or trail to public use and the restoration of the route to a more natural state (FSM 7734).

Design Parameters ~ Technical guidelines for the survey, design, construction, maintenance, and assessment of a trail, based on its Designed Use and Trail Class (FSH 2309.18 zero code).

Designated road, route, or trail ~ A National Forest System road or National Forest System trail that is designated for motor vehicle use pursuant to 36 CFR 212.51 on a motor vehicle use map (36 CFR 212.1).

Designed Use ~ The Managed Use of a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable Trail Class, determines which Design Parameters will apply to a trail (FSH 2309.18 zero code).

Ephemeral stream - A stream that flows only in direct response to precipitation in the immediate locality (watershed or catchment basin), and whose channel is at all times above the zone of saturation.

Forest road or trail ~ A road or trail wholly or partially within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (36 CFR 212.1).

Forest transportation atlas ~ A display of the system of roads, trails, and airfields of an administrative unit (36 CFR 212.1).

Forest transportation system ~ The National Forest System roads, trails, and airfields on National Forest System lands (36 CFR 212.1).

Highway-legal vehicle ~ Any motor vehicle that is licensed or certified under State law for general operation on all public roads within the State. Operators of highway-legal vehicles are subject to state traffic law, including requirements for operator licensing (FSM 7700).

Intermittent stream - A stream or reach of stream channel that flows, in its natural condition, only during certain times of the year or in several years. Characterized by interspersed, permanent surface water areas containing aquatic flora and fauna adapted to the relatively harsh environmental conditions found in these types of environments.

Local road ~ A National Forest System road that connects a terminal facility with collector roads, arterial roads, or public highways and that usually serves a single purpose involving intermittent use.

Maintenance level (ML) ~ Defined in FSH 7709.58, 10, 12.3 as the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives and maintenance criteria.

Maintenance level 1 road ~ Defined in FSH 7709.58, 10, 12. 3 as service roads typically closed to public vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities.

Maintenance level 2 road ~ Defined in FSH 7709.58, 10, 12.3 as roads open for use by high-clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses.

Maintenance level 3 road ~ Defined in FSH 7709.58, 10, 12.3 as roads open and maintained for travel by prudent drivers in a standard passenger car. User comfort and convenience are low priorities. Roads in this maintenance level are typically low speed, single lane with turnouts, and spot surfacing. Some roads may be fully surfaced with either native or processed material.

Managed Use ~ A mode of travel that is actively managed and appropriate on a trail, based on its design and management (FSH 2309.18 zero code).

Mixed-use road ~ Segments of National Forest System roads that are identified and signed as open to state licensed and unlicensed vehicles; generally more than 50 inches in width and usually, but not always, low maintenance roads with no high-speed traffic.

Motor vehicle ~ Any vehicle which is self-propelled, other than: (a) a vehicle operated on rails; and (b) any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212.1).

Motor vehicle use map (MVUM) ~ A map reflecting designated roads, trails, and areas on an administrative unit or a ranger district of the National Forest System (36 CFR 212.1).

Motorcycle ~ A two-wheeled motor vehicle on which the two wheels are not side-by-side but in line (FSM 7700).

Motorized mixed use ~ Designation of a National Forest System road for use by both highway-legal and non-highway legal motor vehicles (FSM 7700).

Motorized trail ~ A travelway usually, but not always, less than 50 inches in width usually, but not always, available for use by all-terrain vehicles (ATVs) and/or motorcycles. These travelways may also be made available to high-clearance four-wheel drive vehicles, and may also be used by bicycles, horses, and hikers.

MVUM ~ See "Motor vehicle use map."

National Forest System Road ~ A forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (36 CFR 212.1).

National Forest System Trail ~ A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (36 CFR 212.1).

No Action (Alternative) ~ The most likely condition expected to exist if current management practices continue unchanged. The analysis of this alternative is required for Federal actions under NEPA.

Non-highway-legal vehicle ~ Any motor vehicle that is not licensed or certified under state law for general operation on all public roads within the state. Operators of non-highway-legal vehicles are subject to state requirements, if any, for licensing and operation of the vehicle in question (FSM 7700).

Non-system road or trail ~ A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas (36 CFR 212.1).

Non-system route ~ Could refer to either an unauthorized road or unauthorized trail, or (plural) both.

Off-highway vehicle (OHV) ~ Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212.1).

Off-road vehicle (ORV) ~ See "Off-highway vehicle."

Over-snow vehicle (OSV) ~ A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow (36 CFR 212.1).

Perennial stream - A stream or reach of a channel that flows continuously or nearly so throughout the year and whose upper surface is generally lower than the top of the zone of saturation in the areas adjacent to the stream.

Private road ~ A road under private ownership authorized by an easement granted to a private party or a road that provides access pursuant to a reserved or outstanding right.

Public road ~ The road under the jurisdiction of and maintained by a public road authority and open to public travel (23 U.S.C. 101 (a)).

Proposed Action ~ A proposal made by the Forest Service or other Federal agency to authorize, recommend, or implement an action to meet a specific purpose and need.

Qualified engineer ~ An engineer who by experience, certification, education, or license is technically trained and experienced to perform the engineering tasks specified and is designated by the Director of Engineering, Regional Office.

Recreation Opportunity Spectrum (ROS) ~ A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into seven classes—primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, roaded natural non-motorized, rural, and urban. These are defined in this Glossary under their individual entries.

Removal ~ Generally refers to the taking of a system road or trail off of the Forest Transportation System, but not necessarily decommissioning it.

Road ~ A motor vehicle route over 50-inches wide, unless identified and managed as a trail (36 CFR 212.1).

Road construction or reconstruction ~ Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road (36 CFR 212.1).

Road decommissioning ~ Activities that result in restoration of unneeded roads to a more natural state (FSM 7734).

Road maintenance ~ Ongoing upkeep of a road necessary to maintain or restore the road in accordance with its road management objectives (FSM 7714).

ROS ~ See "Recreation Opportunity Spectrum."

Route ~ A road or trail.

Scenic Integrity Objective (SIO) ~ Management objectives that were adopted from the scenic class values. Scenic Integrity is a measure of the degree to which a landscape is visually perceived to be "complete." The highest scenic integrity ratings are given to those landscapes that have little or no deviation from the character valued by constituents for its aesthetic appeal.

Scoping ~ The process the Forest Service uses to determine, through public involvement, the range of issues that the planning process should address.

Single-track motorized trail ~ a forest trail that is open to motorcycles but not ATVs, and is typically less than 24" in width.

System Route, Road, or Trail ~ A road or trail has been officially designated as part of the Forest Transportation System and is either a National Forest System road or a National Forest System trail.

Temporary road or trail ~ A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or a forest trail and that is not included in a forest transportation atlas (36 CFR 212.1).

Trail ~ A route typically 50 inches or less in width that is identified and managed as a trail (36 CFR 212.1).

Trail Class ~ The prescribed development for a trail, representing its intended design and management standards (FSH 2309.18 zero code).

Trailhead ~ The transfer point between a trail and a road, water body, or airfield, which may have developments that facilitate transfer from one mode of transportation to another. For purposes of the interpretation of FSM 2353.27, a trailhead is a site designed and developed to provide staging for trail use and does not include: a) Junctions between trails where there is no other access; or, b) Intersections where a trail crosses a road or users have developed an access point, but no improvements have been provided beyond minimal signage for public safety (FSM 2353.05).

Travel management atlas ~ An atlas that consists of a forest transportation atlas and a motor vehicle use map or maps (36 CFR 212.1).

Unauthorized road or trail ~ See "non-system road or trail."

Unauthorized route ~ See "non-system route."

Utility-Terrain Vehicle (UTV) or Side-by-Side ~ A type of off-highway vehicle that travels on 4 or more low-pressure tires, has a steering wheel or tiller, provides side-by-side seating, and is of various widths. (FSM2353.05).

Wheelchair or mobility device ~ A device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area. A person whose disability requires use of a wheelchair or mobility device may use a wheelchair or mobility device that meets this definition anywhere foot travel is permitted (Title V, sec. 507c, of the ADA).

Appendix B – Public Comment Summary

Appendix B: Public Comment Summary

Item No.	Comment Summary
EA Content - General	
1	It is inappropriate to not have an action alternative that directly addresses the need to prevent resource damage caused by unauthorized routes, in the simplest and most direct fashion – through enforcement of existing regulations.
Response: Such an alternative would not meet the purpose of and need for this analysis as described in Section 1.6 of the EA in that it would fail to address the need to improve opportunities for certain user groups, which is an essential component of this undertaking.	
2	The EA lacks adequate discussion of the historic use of the area. The lack of historical perspective contributes to a misunderstanding of the socio-economic impacts. Prior to 2008, "non-motorized" trails in the analysis area had been legally available for use by motorbikes, and were maintained by BRC members.
Response: Historical perspective regarding recreation usage in the analysis area is provided in EA sections 3.1.1.4 and 3.13.1.1. The commenter is correct in stating that in the past, some trails in the analysis area that are currently non-motorized were open to motorized use and logged out by local single-track riders; however, the date of 2008 is incorrect. The 2008 Travel Management EA and Decision Notice did not change use designations on any system trails, nor were any "non-motorized" trails in the analysis area being maintained by BRC members at this time, to the best of our knowledge. As noted in section 3.1.1.4, it was an EA and Decision Notice completed in 1997 that closed certain system trails in the analysis area to motorized use that were at the time receiving maintenance from local single-track riders.	
3	The EA should disclose environmental impacts of any decommissioning efforts resulting from the decision.
Response: The effects from decommissioning are discussed in the EA in sections 3.1 (recreation), 3.2 (transportation), 3.5 (vegetation), 3.7 (watershed, soils, and geology), 3.9 (socioeconomic), 3.10 (cultural resources), 3.11 (air quality), and 3.12 (scenic resources).	
Consistency with Plans and Policies	
1	Proposed change in designation of NFST 600 from non-motorized to motorized is not consistent with the prescription for Management Area 6B (*Emphasis on Livestock Grazing*).
Response: The Plan provides the following direction for MA 6B: "Provide trails for cross-country skiing, snowmobile, foot, and horse travel." However, nowhere in the direction for MA 6B does it state that additional types of trails, motorized or non-motorized, cannot be provided. In fact, additional direction found for 6B directs managers to "Prohibit motorized vehicle use off Forest System roads and trails in alpine shrub and Krummholz ecosystems," and provides guidance on the number of PAOTs/mile to be managed for motorized trails (Page III-182). So, not only is it clear that motorized trails are not prohibited within this MA (except in specific environs such as alpine shrub, etc.), guidance is actually specifically provided for the management of motorized trails. Where the Plan seeks to restrict or prohibit motorized use in other MAs, the language employed is specific and unambiguous. Examples of this include MA 3A ("Prohibit or restrict motorized use"), 5B ("Provide trails only when needed to access other management areas"), and 10D ("Close existing trails to motorized vehicle use"). As such, our understanding is that while the Plan is encouraging the development of certain trails in MA 6B (skiing, snowmobile, foot, and horse), it is clearly not prohibiting other types of trails, which is consistent with travel management maps published immediately after the last Plan Amendment in 1993.	
2	The Piedra Special Management Area was designated for extra protection for reasons that compliment the wild aspects of the adjacent Weminuche Wilderness. Allowing motorized use in the Piedra Area Adjacent Inventoried Roadless Area would diminish its ability to buffer the Piedra Special Management Area. The project area's proximity to the Piedra Special Management Area dictates that recreational uses be sensitive to the wild nature of the area.

Item No.	Comment Summary
Response: Allowing motorized use in areas adjacent to the Piedra Special Management Area (PSMA) does not violate any law, regulation or policy. The ID team reviewed Forest Plan management direction and determined that the alternatives analyzed comply with the Forest Plan (EA, Section 1.5.4). Motorized trails are not prohibited in either Inventoried Roadless Areas or in Colorado Roadless Areas. Neither of these rules, as currently written, would prohibit motorized trails (EA sections 1.5.5 and 3.3).	
3	Concern that some stakeholders incorrectly interpret that the Roadless Rule imposes restrictions on motorized route designation in Roadless Areas. Neither the 2001 Roadless Rule nor the draft Colorado Roadless Rule prohibits motorized access along roads and trails in Roadless Areas.
Response: It is stated in the EA in both Chapter 1 (EA section 1.5.5) and in Chapter 3 (EA section 3.3) that motorized trails are not prohibited in either Inventoried Roadless Areas or in Colorado Roadless Areas. In section 3.3 of the EA it states "Neither of these rules, as currently written, would prohibit motorized trails." Any comments from stakeholders regarding their perceived restrictions in roadless areas will be responded to using the language present in the Rule.	
4	The proposed opening of NFSR 622 (First Fork Road) to OHV use is not consistent with the conclusions of the 2008 First Fork Road Mixed Use Survey Report. The Mixed Use Survey Report identified risks to public safety should First Fork Road be opened to OHVs, prior to implementation of recommended mitigations. The EA does not disclose that these mitigations have been completed, or explain why the conclusions of the 2008 report have been reversed.
Response: A second Mixed-Use Analysis was undertaken for the First Fork road in February of 2011 to reflect changes in road conditions and options available to mitigate hazards. It has been attached as an appendix to the Final EA. As with the 2008 analysis, a variety of mitigation measures have been identified in the 2011 analysis that would need to be performed prior to the road being opened to mixed-use. A proposal to re-open the road to mixed use has been included in this analysis because of the importance of the connectivity this road provides to the proposed trail system in each of the alternatives and the reduction in costs associated with the mitigation requirements.	
Seasonal Closure of Motorized Routes	
1	Request that motorized trails be open by the Friday before Memorial Day weekend, with closing date the Tuesday following Labor Day.
Response: All new ATV trails are proposed to have opening and closing dates consistent with existing ATV trails on the District (open May 15 through November 30), which includes both the Memorial Day and Labor Day weekends. Proposed new single-track trails have more restrictive operating dates for several reasons. For the opening date of June 15, this is derived from Plan direction for MA 6B (wherein the majority of proposed single-track trails reside), which directs managers to "Restrict disruptive human activity in calving and fawning areas during the last two weeks of May and the first two weeks of June" (Forest Plan p. III-184). For a more detailed discussion of this issue, see response to Item #s 2 and 3 immediately below. As for the fall closure date of August 31, the date was chosen to reduce potential disruptions to hunters and outfitters that have historically operated and/or recreated in areas through which the single-track trails pass. Extending the date into September would have the likely effect of causing conflicts with archery hunters, both guided and unguided, in historically popular hunting areas along the trails and would increase the potential for unwanted economic impacts to the outfitters operating in the area. Additionally, we believe that by providing a consistent and easy-to-display date for the seasonal closures to single-track trails in the analysis area, compliance with the closures will be more likely. While we can certainly appreciate the desire of the commenters to have both a longer operating season and a season that includes the two holiday weekends, we believe the trade-off to be too great in terms of potential negative effects to change the seasonal closure period.	
2	Seasonal closures which restrict only motorized trail users are biased and too restrictive. Research suggests that wildlife is disturbed by *any* human presence; wildlife species respond similarly when they encounter motorized and non-motorized user groups (refer to USFS General Technical Report 586 published in 2003). Seasonal closure to motorized use is arbitrary and discriminatory; the rationale is not supported by scientific evidence.

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Response: Seasonal closures for ATV trail use are in effect across the entire District. These closures are based on the 2008 Travel Management EA and Decision Notice. Seasonal closures for new single-track motorized use are in place to comply with Forest Plan direction. Plan direction for MA 6B (wherein the majority of proposed single-track motorized trails reside), directs managers to "restrict disruptive human activity in calving and fawning areas during the last two weeks of May and the first two weeks of June" (Forest Plan p. III-184). As noted in section 3.8.8.1 of the EA, wildlife habitat capability and effectiveness are greatest for many species in the central portion of the analysis area (area in which most single-track motorized trails are proposed). Habitat effectiveness in the central portion is high for many wildlife species due to the more remote nature of the habitat and lack of human presence and disturbance. The central portion provides the greatest amount of quality calving and fawning habitat for elk and mule deer due to minimal disturbance, and contains required life requisites for rearing young (abundant forage, cover, and water). Existing non-motorized human disturbance is minimal during big game calving and fawning periods. Non-motorized use occurring in the central portion during the calving and fawning periods is limited in scope (type and amount of use) and scale (area affected) and is therefore not expected to adversely impact calving and fawning activity in the area. The level of non-motorized human disturbance from the proposed action is expected to remain similar to existing condition and therefore effects to big game calving and fawning are also expected to be similar and not warrant seasonal closures. Although confined to designated trails, the proposed single-track motorized use is expected to be more disruptive to big game calving and fawning. Disturbance is expected to be larger in scope and scale as it will be the only designated single-track motorized trail on the west side of the District. The designated motorized loop route has potential to generate additional disturbance across a large area due to easy access and mode of travel, thereby warranting seasonal closures to minimize adverse impacts during the calving and fawning periods.	
3	The Forest Service has taken the necessary hard look, and found that no species viability will be affected, and Congress has repeatedly told the Forest Service that its job is to provide sustainable goods and services for human use. Therefore, it is not rational to impose seasonal closures on only one type of use. There is no research that even remotely suggests that motorcycles have any special ability to cause unusual disturbance such that the singling out of motorcycles for closures could be justified.
Response: Refer to the response provided for Item No. 2.	
4	Seasonal closure of motorized trails is helpful, but do not adequately protect wildlife resources during important times of the year. Concern that an end date for ATV trail closure of May 14 is too early as related to possible detrimental effects on calving or fawning, and trail damage due to snow/wet soils. A May 31 date, or just prior to Memorial Day, would provide more helpful protections to wildlife and trails. Another comment stated that wildlife is in need of year-round protection, not just seasonal.

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	Response: The end date for ATV trail closures of May 14 is based on the 2008 Travel Management EA and Decision Notice. The decision allows ATV use on designated trails from May 15 through November 30. We concur that a later, early date for the seasonal closure would lessen impacts to big game calving and fawning. Section 3.8 of the EA also recognizes there will be potential impacts to big game during the early calving and fawning periods (mid-May through mid-June). We feel these potential impacts are limited in scope and scale due to the lack of designated motorized ATV trails present across the District. The majority of existing ATV trails occur in areas within close proximity to developed areas or receive motorized use from full sized vehicles, and in some instances, receive limited use except during the big game hunting seasons. Designated ATV trails located in areas close to human development (such as Turkey Springs area), or near designated roads open to full sized-vehicles, generally provide poor calving and fawning potential due to repeated human disturbance. Potential impacts to calving and fawning from motorized use in areas where use is currently prohibited are of greater concern, and warrant additional protection. These areas, such as those in the central portion of the analysis area, provide more effective calving and fawning potential due to lack of human disturbance and greater habitat quality. In terms of trail damage due to snow/wet soils, we concur that a later, early date for the seasonal closure would lessen the potential for damage on trails due to snow/wet soils. The EA contains design criteria that require condition surveys to be completed on all trails subject to changes in designation to help determine if resource damage is occurring as a result of these changes in use. These surveys will be conducted annually for a 5 year period. This design criteria goes on to state that if unacceptable levels of resource damage are found to be occurring, the trail will be closed to all new uses until such time as conditions are satisfactorily improved. It is also possible to implement a special closure order on a trail if it is found that resource damage is occurring.
5	ATV's are used by some hunters as their primary travel tool. However, there are studies that indicate that the majority of sportsmen are interested in seeing fewer ATV's on their hunting grounds rather than more - hence the December 1 closure start appears to be a late date for this management action. Trends in SW Colorado game units indicate greater hunter interest in the early non-rifle seasons. Protecting this interest would necessitate what many would denote as "very early" seasonal closures for motorized trails.
	Response: Opportunities are ample, both within and outside the analysis area, for hunting opportunities that are free from motorized use. The popular hunting area between Devil Mountain and Devil Creek will remain non-motorized during the early hunting seasons by virtue of the September 1 closure to motorized use on single-track trails. Other areas proposed open to ATV use have either historically been open to such use and as such are often sought out by ATV-hunting enthusiasts or are readily avoidable by those seeking non-motorized hunting opportunities.
Economics	
1	Implementation of the proposal will require a commitment of additional Forest Service budget resources for maintenance, education, and enforcement. The District does not have the resources to properly maintain the existing trail system and the addition of a more extensive and significantly more expensive trail system is therefore unjustified. Funding proposed to expand trails would be better used to properly sign existing trails and enforce regulations.
	Response: Many comments were received stating that new trails should not be added to the system or constructed at a time when existing system trails are in need of repair, resources are limited, etc. While we can certainly appreciate—and share in many respects—this concern, we believe that the Proposed Action as developed (see 2.3.3.1 and 2.3.5) adequately addresses these issues. Monitoring, funding, maintenance, and design requirements have been included in the EA (either through design criteria or directly as part of the proposed actions) and crafted to minimize the impacts on existing trail management resources. Some may argue that such mechanisms will still not be adequate; although we believe they will be adequate, the EA stipulates further that should any trails receive unacceptable levels of impacts as result of changes in designation, they will be closed to the newly designated uses until such time as they are repaired.

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2	Reliance on sources of funding other than appropriated dollars for trail maintenance (and reliance on volunteers) is optimistic and not realistic. The OHV fund is not a reliable source of funding. It is not prudent to recommend that NFSTs 600, 601, 603, 604 and 605 be converted to single track motorized trails that will require reconstruction and more regular maintenance than if they were to remain non-motorized.
Response: See response to Item #1 above. Additionally, the conversion of trails 601, 603, and 604 to motorized use is not included in the Proposed Action, in part due to sustainability concerns and excessive maintenance burdens (see EA sections 3.1.2.4 and 3.7.2.4). Reliance on external sources of funding for construction of new trails is a requirement for implementation, as specified in the Design Criteria in Section 2.3.5.1; in the event that such funding is not available, the trails will not be constructed. As for trail maintenance, we disagree that reliance on the OHV fund, volunteers, and other potential external sources to augment standard appropriations for trail maintenance is "not realistic"; they are in fact tried and true means of accomplishing trail maintenance activities on the District, and we have no indication that such sources will not be available in the future.	
3	More motorized use in the back country will diminish hunting prospects and the economic stimulus tied to local hunting activities.
Response: See response to "Seasonal Closures" Item #5 above.	
4	We suggested in our scoping comments that "the need to adjust both the core transportation system and recreation travel network in light of funding limitations for maintenance, monitoring, and enforcement" should be part of your purpose statement - we believe this issue was not adequately addressed. We reason this is one of a handful of the most important issues to focus on within the EA. an essential part of it being whether or not the district can afford the actions proposed in Alternative 3. The funding sustainability issue is addressed somewhat in the EA, but we believe the root issue is glossed over and its absence in the purpose statement certainly did not help to keep a focus on this issue.
Response: See response to Item #s 1 and 2 above. Additionally, the District completed a District-wide Transportation Analysis that addressed both the need for additional motorized trails in the analysis area and funding-related mechanisms and concerns associated with the management of the District's transportation system. The findings from this analysis have been used to inform the present EA, including the development of the Proposed Action. Further, while the financial sustainability of the proposed trail system was not specifically mentioned by name in the purpose and need statements of the EA, by stating that the trail system should be "socially and ecologically sustainable" in the purpose statement, the financial feasibility of any proposal would necessarily be a critical component to consider, as a trail system could be neither socially nor ecologically sustainable if it were not able to be properly constructed and/or maintained due to inadequate financial resources.	
5	Reservations about the COHVCO study's validity have been expressed by economists from the university and conservation communities in Colorado. Because a thorough review along with a written assessment has not yet been completed by "outside" economists we will only note a couple concerns that their initial findings detail. A central issue relates to the amount of money spent per day by motorized users of public lands. The seemingly high per diem numbers might likely relate to the figures obtained from non-residents whose lodging and meal expenses would be their most significant expenditures as a percentage of total costs. As we understand the survey questions for non-resident motorized users to have been posed, the data gathered included mostly information that was relevant to visiting Colorado whether or not the intended activity was motorized trail use. These figures therefore are not necessarily specific to motorized use and the possible revenue to local businesses likely reflect the expenditures by any type of non-resident recreational visitor to Colorado. The expenditure figures therefore are not necessarily attributable to motorized users with the implied COHVCO reasoning that "motorized user contribute a great deal of revenue to local businesses" – rather these expenditures are probably similar to those of other forest recreational users including those mountain biking, hunting, fishing, hiking, etc.

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Response: Validation of other organizations survey methods is outside the scope of this analysis, and in response to issues raised, expenditure estimates cited in both CDOW 2008 and COHVCO 2009 have been deleted from Section 3.9.1. Forest Service National Visitor Use Monitoring (NVUM) results support that trip type (e.g., day trip versus overnight, or overnight on the Forest versus overnight off the forest) accounts for more of the variation in visitor spending than recreational activity. Additional data from the 2006 NVUM survey for the San Juan National Forest has been incorporated into Section 3.9.1, to clarify this point. The positive economic contributions of both motorized and non-motorized recreational users were considered in the EA, and this clarification does not affect the overall conclusions regarding socioeconomic impacts of the alternatives.	
Enforcement	
1	The EA does not address enforcement, even though all the assessments rely on public compliance with the plan. Expect that existing problems with user-created routes will continue to be an issue under the action alternatives unless an enforcement plan is in place.
Response: The EA did not include a Law Enforcement plan as such because current practices for addressing enforcement issues would remain largely unchanged regardless of the alternative selected. These practices include patrolling, making public contacts, appropriate signage, and issuing warnings or violation notices. To further address concerns related to enforcement issues, the EA contains a design criteria that will focus travel management related law enforcement and monitoring efforts on the newly designated motorized trails during the first three years following implementation. If violations are observed, possible actions that could be taken include, but are not limited to, issuing violation notices, or reverting back to prior non-motorized designations.	
2	Seasonal closures can be a useful and effective management tool, as long as they are backed with monitoring and enforcement. It is unclear from the EA how seasonal closures will be enforced.
Response: See response to Item # 1 above. Additionally, seasonal closures will be enforced through standard mechanisms such as signage, maps (MVUM), and gates.	
Public Health and Safety	
1	The EA does not adequately address the safety of horsemen on trails that would be open for shared equestrian and single-track (mountain bike and motorcycle) use. Shared equestrian/single track trails are often the cause of accidents involving horsemen.
Response: The EA did address safety-concerns relating to horsemen in several locations (see EA Design Criteria, Section 2.3.5.1, and Recreation Consequences discussion, Section 3.1.2). As noted in the EA, between the seasonal restrictions, design criteria/signage, and relatively low levels of use, we believe that the actual risks associated with combining single-track vehicle use with horseback use on certain trails will not be any greater than the existing risks associated with horseback travel on the majority of the other trails on the District (e.g., trails with high levels of exposure, large numbers of dogs or llamas, difficult water crossings, steep solid rock surfaces, long sections above treeline, etc.). Additionally, it is perhaps worth noting that, for those users still uncomfortable with the idea of sharing these trails with vehicles, there are the shoulder seasons during which the trails are closed to motor vehicles, and literally hundreds of miles of other trails on the District closed to all vehicular use.	
2	The high speed of motorcycles present safety hazards for horsemen on shared trails. The proposed single track motorized trail includes a ridge line that is next to a barbed wire fence along much of the trail. There are areas along this fence line where it would spell disaster for horses and motorcycles to share the trail with no room to maneuver and no room for horses to get out of the way quickly. Riders of both could become tangled in the wire and severe injuries could result.
Response: See response to Item #1 above. Additionally, the EA includes a design criteria requiring that the barbed wire fence in question will be moved to a location that will not affect trail users, prior to the trail being designated as open to motorized vehicles. This is also required as part of direction found in the proposed action listed in 2.3.2.1 and Table 2 for Design Clearing.	

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3	The conversion of NFST 600,603,604 and 605 to single-track motorized presents a serious hazard to horsemen and hikers. There are portions of these trails where passing would be highly dangerous and visibility limited. Although the EA discounts the potential hazards as being avoidable with signage and education, our experience has shown us that bikers watch the ground, not what's up ahead, regardless of signage, regardless of education, and regardless of who legally has the right-of-way. *This poses a grave, potentially life-threatening danger* to *horsemen.* Safety should always be given the highest priority, regardless of the user group in question.
Response: See responses to Item #s 1 and 2 above.	
Recreation	
1	The Proposed Action is imbalanced and primarily benefits motorized trail users. The proposal satisfies one small sector of recreational interest to the detriment of quiet forest users and outfitters permitted for horse travel and hunting activities. Noise from motorized uses diminishes the recreational experience of "quiet" non-motorized users, and the hunting experience. New motorized trails will disrupt backcountry hunting and negatively affect permitted outfitters.
Response: The Proposed Action actually adds approximately 28 miles of non-motorized trails and 26 miles of motorized trails to the system, so we're not sure how the proposal can be deemed unbalanced in favor of motorized use. Regardless, as noted in Section 3.1.1.4, opportunities for motorized recreation on the District and within the analysis area are inadequate on several fronts; improving this situation is therefore an essential part of this undertaking. As for concerns over motorized use disrupting backcountry hunting opportunities, outfitters, and quiet recreationists, see response to Seasonal Closures Item #1, and EA Section 3.1.2.3 wherein it is noted that in the Proposed Action there are still over 370 miles of trails on the District closed to motorized use, which is a ratio of non-motorized trails to motorized trails of almost 4:1. Additionally, with over 230,000 acres of the Pagosa District designated as Wilderness or quasi-Wilderness (the Piedra Area), opportunities for recreation use free from the effects of motor vehicles are ample.	
2	Equestrian users do not agree with the EA assumption that use of the area by horsemen and hikers is "light". Concern that the recreational preferences of horsemen are given less weight in the EA.
Response: All accounts by Forest Service employees, volunteer surveyors, and partnering agencies indicate that the trails between Devil Mountain and Devil Creek receive some of the lowest use on the District relative to other trails on the District, with the exception of hunting seasons. While the accounts are based on professional knowledge and experience, they are backed by years of repeated visits to the trailheads that serve the area and two years of extensive field reconnaissance of the trails in question. As for the recreational preferences of horsemen being given less weight in this analysis, with no single-track motorized trails, very few trails suitable to mountain bike use, and a ratio of non-motorized trails to motorized trails of almost 4:1 on the Pagosa District, we believe that it is the preferences of other users that are in need of attention, which is clearly stated in the purpose and need for this undertaking. Additionally, the effects of the proposed actions on horse users have been documented in the Recreation Environmental Consequence sections.	
3	Motorized uses are the most disruptive, and displace all other users groups, due to the noise, pollution, and trail damage they cause. Motorcycle travel results in rutting that makes the trail difficult, if not impossible, for foot or horse travel, effectively making mixed-use motorized trails "motorized only". Horseback riding and hiking are unsafe on motorized single track trails, and non-motorized users will avoid motorized single track trails to avoid injury. So in essence, trails designated for single-track motorized become single-use trails.
Response: For concerns relating to social issues, see above responses. As for resource-related concerns associated with rutting and trail degradation, see Design Criteria #2 in Section 2.3.5.1 which stipulates that if a trail gets damaged as a result of a change in use designation, it will be closed to that use until such time as it is repaired. Condition surveys will be performed on these trails yearly for the first five years of implementation to determine is such damage is occurring. Simply put, the District is intent on keeping these trails open to multiple uses and not allowing them to become degraded and unusable to non-motorized users.	

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4	Wilderness experience and motorized use are contra-indicated. Areas of beauty such as the ridge-top trail are unique and rare, and deserve special consideration. Retain the ridge-top for non-motorized use in order to retain its wilderness value. Non-motorized travel compliments wildness.
Response: Motorized use is not being proposed in any designated Wilderness Areas. It is assumed that the ridge-top trail being referred to is Trail 600 which runs from Devil Mt. to Horse Mt. to the Monument Park Hut. This trail is not within wilderness, but is within both management areas (MA's) 6B (emphasis on livestock grazing) and MA 7E (emphasis on wood fiber production and utilization). These MA's provide management direction by emphasizing a particular resource and identifying associated guidelines for management activities. The ID team reviewed this direction and determined that the alternatives analyzed in detail comply with the Forest Plan (EA Section 1.5.4), including the actions proposed along Trail 600.	
5	Alternative 4 most closely meets the needs of the motorized community. Alternative 3 excludes several of the expert level single-track trails and eliminates loop opportunities for both single track and ATV trail users.
Response: While the District would like to accommodate a wide variety of experiences and skill levels in all of the recreation opportunities it provides, such a goal is not realistic for every use group, especially given the terrain, management, and size limitations of the present analysis area.	
6	In the Turkey Springs area, we find that there is already a generous allocation of motorized routes down low, so we don't believe that any motorized recreational user group is "underserved." We acknowledge that motorized recreation is growing; however, we don't believe the USFS should take that statistic as a mandate to open more roads at the expense of seriously devaluing the recreational experience to other, quieter users.
Response: See response to Recreation Item #s 1 and 2 above, as well as Section 3.1.1.4, where the problems facing motorized users in the Turkey Springs area are discussed in depth. In light of these facts, we find the position expressed in this comment untenable and not supported by the actual conditions on the ground.	
Wildlife	
1	Concern that new motorized trails will degrade wildlife habitat, lead to further habitat fragmentation, disrupt migration routes & nesting areas, and generally stress or displace wildlife. Designating NFSTs 600, 601, 603, 604 and 605 as motorized will interfere with big game wildlife migration in Horse Creek. There are a significant number of big game animals that use this canyon in the spring. Several comments expressed support of seasonal closure of motorized trails to benefit wildlife.

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Response: Section 3.8.1.1 of the EA (Terrestrial MIS) describes the direct and indirect effects to terrestrial and aquatic species and their habitats for each alternative. Direct effects to terrestrial habitat from the action alternatives include the removal of vegetation, standing dead trees, and course woody debris. Direct impacts to habitat are expected to be minimal ranging from 11.6 acres under Alternative 2 to 35.9 acres under Alternative 4. The minor loss of habitat constitutes a very small percentage of the total available habitat for each species analyzed, and is not expected to lead to further habitat fragmentation. An abundance of remaining habitat will continue to provide important life requisites (breeding, foraging, and security) for all species.

Wildlife species will be influenced primarily by the indirect effects associated with human presence and disturbance. Although habitat capability will be minimally affected, the increase in motorized and non-motorized disturbances will reduce habitat effectiveness for species. Habitat effectiveness will be affected most under Alternative 4, followed by Alternatives 3, 2, and 1. As noted in the EA in Section 3.8, habitat effectiveness will be reduced and impact species in the Horse Mountain area under Alternatives 3 and 4 with the addition of single-track motorized trails in an area that provides quality habitat for all species due to limited human disturbance. The application of seasonal closures from September 1 through June 14 would minimize impacts to big game migration during spring and fall. Seasonal closures will also minimize disturbance to wildlife prior to peak birthing seasons; however, disturbance impacts would still occur during the post-birthing periods, the time when young are developing behavioral skills used later during subadult and adult life stages. Species impacted most will include those more sensitive to human disturbances such as black bear, elk, mule deer, and northern goshawk. The degree of impact would depend on the amount of motorized use occurring at a given time, and may result in either temporary or long-term displacement. Displacement has the potential to reduce productivity and survival through increased competition for available resources (food, cover, and water). The direct and indirect effects associated with the proposed action are not expected to affect the viability of any species Forest-wide, but may result in minor impacts to local populations, affect distribution and movement patterns for species more sensitive to disturbance, and use of available habitat.

2	The EA over-estimates impacts of human disturbance to habitat effectiveness. Studies conducted by Hayden-Wing Associates and Dzialak et al. (2011) found that displacement caused by human disturbance is a temporary effect, and does not cause a loss of habitat.

Response: The analysis provided in section 3.8.1.1 does not associate displacement of wildlife species with loss of habitat, but rather, with reduced habitat effectiveness. As mentioned in the response to Item No. 1 above, indirect effects from human disturbance will result in either temporary or long-term displacement of wildlife. As noted in the EA, the minor loss of habitat constitutes a very small percentage of the total available habitat for each species analyzed. Habitat capability in the analysis area will continue to provide important life requisites (breeding, foraging, and security) for all species; however, habitat effectiveness will be reduced resulting in minor impacts to local populations, affect distribution and movement patterns for species more sensitive to disturbance, and use of available habitat.

Item No.	Comment Summary
3	Relative to the seasonal closure as recommended in the EA, it is noted that non-motorized and motorized recreational use are treated together, for example page 56, and 75, 77, 78 to cite just four of some 58 examples throughout the document. "Human disturbance" is also discussed as a factor in habitat effectiveness, with no distinction between motorized and non-motorized uses. This is a fair and objective presentation of the effects of all human disturbances, as the Forest Service's own research, General Technical Report 586 (Gaines, Singleton, and Ross) published in 2003 showing the effects of motorized and non-motorized disturbance to be almost exactly the same. Gaines also takes great pains to point out that an "interaction" such as a human passing by on a trail may or may not have a negative outcome; usually there is nothing but an alert response from the wildlife and numerous other research (reported in almost all the articles in Knight & Gutzwiller, Wildlife and Recreationists: Coexistence through Management, Island Press 1995) shows that wildlife habituation reduces the wildlife displacement that may be caused by the simple presence of humans on a designated trail. The EA continues to examine the species-wide effects, and finds, with respect to both motorized and nonmotorized recreational activity, "These negative influences will impact local populations (displacement to areas with fewer disturbances) of black bear, elk, and mule deer more than Alternative 3, but are not expected to affect the viability of any species Forest-wide." (Alternative 4) (EA page 82). Yet with no rationale given, the Forest Service arbitrarily proposes to impose seasonal closures on motorcycle use only (EA page 16).
Response: This comment is addressed under Seasonal Closure of Motorized Routes, Item No. 2.	
4	Best available science has found there is a disproportionate negative response to people approaching on foot when compared to approaching on a motor vehicle. The impact of humans dismounting vehicles and/or approaching wildlife on foot has been noted to increase wildlife responses Yellowstone (White and Davis 2005). Elk in Yellowstone have consistently displayed a higher level of disturbance response to the approach of cross country skiers when compared to snowmobiles (Cassirer et al 1992). A Montana Study found that snowmobiles are less distressing than cross country skiers on ungulates (Canfield et al. 1999). This disproportionate wildlife response should be acknowledged in the EA.
Response: The wildlife analysis in section 3.8.1.1 identifies direct and indirect effects to wildlife resources from motorized and non-motorized activities. The analysis focuses on activities proposed to facilitate motorized and non-motorized recreation in the area (decommissioning and closing of roads, and construction, reconstruction, and maintenance of trails), the type of use proposed (motorized, non-motorized, or both in some locations), and the timing and intensity of the activities. Factors considered include effects to wildlife habitat and key habitat components, risk of injury or mortality due to collisions with motorized and non-motorized travel, and disturbance to species. The analysis describes potential impacts to species and habitats from summer related recreation activities based on local knowledge of the species present and habitats utilized in the analysis area. The intent of the analysis is to disclose the general direct and indirect effects to species under each Alternative, rather than disclosing or fully articulating the disproportionate negative responses between motorized and non-motorized use from summer and winter recreation activities. There are numerous studies and published research discussing effects to species from motorized and non-motorized use, and is often noted that disturbance differs among species. Response to disturbance is dependent on many variables such as timing and extent of activity, habitat suitability, and scale at which disturbances occur; therefore, response to similar activities occurring in different geographic areas may not be the same. It is reasonable to conclude that disturbance to species from motorized and non-motorized use in the analysis area is likely to be greater in areas with a larger number of motorized and non-motorized trails proposed and greater in areas with currently minimal disturbance and influences from human activities. The analysis also notes that some species may habituate to disturbance particularly, those less sensitive to human disturbance.	

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5	No reason is given for singling out motorized use for seasonal closure. It could be more rational to single out non-motorized use, based on the research. The EA fails to emphasize that there are no restrictions on foot traffic, but the motorized traffic is restricted to the trail. Thus, the effects of the foot traffic have a greater potential for negative effects by virtue of people exploring off-trail. It would be just as rational to close out all types of use. Yet we know that the NEPA ' does not require the agency to place natural values above all others, but only to take a "hard look" at the environmental consequences. The agency has done so and determined that no species will be significantly affected (EA page 89 discussing the effects of alternative 2, 3, and 4). Thus, the purpose of imposing any closure at all is unclear.
Response: This comment is addressed under Seasonal Closure of Motorized Routes, Item No. 2.	
6	Concern that EA analysis for wildlife may rely on GIS modeling that has not been verified with site-specific data. Reliance on models without verifiable data is not good science. Computer modeling has not been proven to be a very accurate or useful tool to predict wildlife habitat effectiveness.

Response: The wildlife analysis in Section 3.8.1.1 of the EA was prepared by using a combination of GIS modeling, field reconnaissance, and experience and knowledge of local wildlife and habitats in the analysis area. The project GIS Specialist and Wildlife Biologist conducted two key GIS analyses to estimate effects to Management Indicator Species (MIS) and other wildlife from the proposed action. The first stage included modeling existing habitat for MIS using the Forest's vegetation database and habitat models described in Forest-wide MIS Assessments. The models are based on habitat structural stage information described by Towry (1984), habitat and species distribution information across the San Juan National Forest (SJNF) from past and ongoing species inventory and monitoring efforts, professional judgment of wildlife biologists on the SJNF, and consultations with Colorado Parks and Wildlife Biologists and District Wildlife Managers (DWMs) in the San Juan Basin. The combination of habitat modeling, field reconnaissance, and information presented in the MIS Assessments, represents the best available science for species analyzed in the analysis.

The second stage included overlaying miles of motorized and non-motorized travel routes in MIS and other wildlife species habitats. This approach was used to evaluate indirect effects associated with disturbance, to determine the relative degree of habitat effectiveness. The analysis calculated route miles in MIS habitats instead of applying distance disturbance buffers from travel routes, as there are no commonly agreed distance buffers that illustrate disturbance response for each species. As mentioned in the EA, response to disturbance differs among species; however, it is reasonable to conclude that disturbance to species from motorized and non-motorized use is likely to be greater in areas with a larger number of trails proposed and occupied by species. As stated in section 3.8.1.1, Alternative 4 will reduce wildlife habitat effectiveness for most species to a greater extent than Alternative's 3, 2, and 1, due to the greater number of motorized and non-motorized travel routes proposed in habitats occupied by species. Consequently, Alternative 4 is expected to have the largest negative influence to wildlife species, followed by Alternative's 3, 2, and 1.

7	The importance of strongly supporting the wildlife resource does not transfer directly to the Proposed Action. The sum total of the research from motorized trail use effects on wildlife; the significant scope of the importance of the wildlife in the western zone of the analysis area; and concerns expressed by wildlife managers, stakeholders and members of the general public all point to the need to provide secure habitat rather than increasing detrimental motorized trail use. The Proposed Action recommends the opposite of what the analysis outlines as being important to these species (elk and deer) and, as we read it, the science does not support the proposed management action.

Item No.	Comment Summary
Response: This proposed action was driven by the need to address recreation opportunities and existing problems relating to the network or system and non-system trails in the analysis area (EA Section 1.6). The range of alternatives analyzed in the EA was established after a thorough review of comments received during public scoping. Impacts to wildlife, specifically, impacts to big game calving and fawning, and migration corridors, was considered a key issue (EA Section 2.1), which was considered in the establishment of the action alternatives. The wildlife analysis in Section 3.8 of the EA is based on the best available science. We feel it adequately analyzed and disclosed the effects of the action alternatives, as well as the No Action alternative, which does not increase motorized trail use in the analysis area. Included in the Wildlife section is an analysis of the impacts of increasing motorized trail use in the analysis area, and a discussion of the importance of the western portion of the analysis area to wildlife. We believe the Proposed Action represents the best alternative to meet the purpose and need for this undertaking, while reducing unwanted impacts to forest resources, including wildlife.	
Natural/Forest Resources	
1	Motorized uses cause noise, air and water pollution which are detrimental to wildlife and diminish the experience for other forest users. Noise of motorized vehicles is very disturbing and can harm people's mental and physical health. Noise from motorized travel on the ridgeline will project into the Special Management Area and to further wilderness areas, violating the intent of these designations. Although allowing motorized vehicles on more trails would not cause a regulatory exceedance per air quality regulations, the microenvironment of the area will be affected by odors and particulates.
Response: Section 3.1 – Recreation and Wilderness, includes a discussion on the impact of noise to various users. This section acknowledges that each of the action alternatives could have potential negative impacts to users that prefer "quiet" forms of recreation since motorized use would increase under each alternative. It is anticipated that disruption of quiet use will be confined largely to motorized trail corridors where this use is occurring, and should not extend to other areas or trails, including the Piedra Area or Weminuche Wilderness (which is approximately 11 air miles away from the ridgeline trail mentioned in the comment). Section 3.11 – Air Quality, includes a discussion on the impacts on air quality. This analysis acknowledges that air quality in the immediate vicinity of the motorized trails would be impacted when recreational vehicles would pass a given point. It concludes that impacts to air quality would be negligible to minor in Alternative 2 and minor for Alternatives 3 and 4 since vehicles would pass any given point quickly and the total emissions would be spread out along the entire length of the trail. Perceptible concentrations of pollutants would not remain at any point along the trail for more than a few minutes following vehicle passage. In addition, concentrations of pollutants would drop off rapidly with increasing distance from the motorized trails. Section 3.7 – Watershed, Soils, and Geology analyzes potential for roads and trails to introduce sediment into a drainage network. Design criteria and trail construction standards are provided that will help maintain proper drainage, reduce sedimentation into drainages, and trap sediment before it reaches drainages. Monitoring is also being required that requires trail condition surveys be conducted on all routes with changes in designation (including new construction) annually for five years to determine if resource damage, such as erosion, is occurring as a result of the changes in use (EA Section 2.3.6). Section 3.8 – Wildlife and Fish, includes a discussion on impacts related to disturbances caused by motorized use of trails. Specifically, habitat effectiveness, which refers to the spatial use of potential habitats in the context of human disturbance, is discussed for each alternative.	
2	Motorcycle travel over soils and terrain found in the project area will cause erosion and scar the land, and is not sustainable.
Response: While motorcycle travel can be associated with increased erosion, analysis of the Proposed Action found that with employment of the project design criteria, the level of increased erosion would not be significant. Additionally, the routing of trails under the Proposed Action, combined with appropriate project design criteria would produce a trail system that was sustainable over time.	
3	Because motorized users travel faster and further, they impact more area in a day compared to nonmotorized use. The EA does not acknowledge this.

Item No.	Comment Summary
Response: While the idea that motorized users travel faster and further is not specifically mentioned in the EA, the impacts of motorized use is thoroughly analyzed in the EA. Impacts related to disturbance caused by motorized use are specifically addressed in both the recreation and wildlife section.	
4	Motorized trails should be designated only in: 1) areas where the noise impacts are minimized - lower elevations of undulating terrain are appropriate, ridgelines are not, 2) areas with moderate slopes - steep grades and traverses on steep slopes are not appropriate locations, 3) in areas where there is no possible interface with wetlands, wet meadows, streams, spring and other riparian zones – dryland territory is appropriate, 4) in areas where user conflicts are minimized or at least reduced - for example, trails that are known to be regularly traversed by pack stock that include narrow/steep locales are inappropriate, and 5) in areas where the adverse effects on wildlife do not exist, for example, there should be no negative effects on fawning and calving zones as well as areas that are important elk and deer habitat for such needs as foraging, migration, etc. The security of habitat for other species should also not be diminished to allow increased recreational use. The above reasoning is predicated on these central concepts: 1) motorized trail use is an adverse noise impact on forest wildlife and users and therefore should be not allowed in some areas and designated only in appropriate zones, 2) motorized trail use has a very significant adverse impact on soils and trails, 3) motorized use is destructive and polluting to wet areas - if streams are crossed as part of a trail segment than bridges are the appropriate management tool, 4) the likely adverse effects to wildlife are not acceptable, and 5) trail user conflicts should be minimized if at all possible.
Response: During the analysis of all proposed trails the slope, aspect, grade, soil type, and local drainage patterns were considered through a combination of GIS and field analysis. Trails selected in the Proposed Action were those trails whose various physical factors, combined with the project design criteria, resulted in minimal watershed and soil impacts. All trails analyzed in this EA were evaluated by a combination of GIS and field work for their proximity to wetlands, wet meadows, streams, springs, and riparian zones. The careful routing of trails in the Proposed Action avoids wetlands, while seasonal timing restrictions and project design criteria would successfully mitigate impacts to wet meadows, streams, springs, and riparian zones.	
Route Preferences	
1	New proposed ATV trail that crosses the West Fork of Devil Creek (route 11f) should be included in the Proposed Action. Construction of 11f would connect two trail systems, divert ATV traffic off FS roads, and eliminate conflicts with Snow Angel Ranch. Like to see this trail approved as part of this action and shelved until there is adequate funding to construct.
Response: In its proposed alignment the analysis corridor around Trail 11f does not offer any options for sustainable construction and usage. This is due to a combination of very steep terrain, and highly erodible soils. Under the current EA, alternative routing outside to the proposed trail corridor cannot be considered. However, the USFS will consider future site specific analysis of other routes that accomplish the same objectives (linking two system trails) using a different trail alignment.	
2	Prefer that 16e (from 9x to 9w) be retained in the Proposed Action (it is identified for decommissioning). 16e provides a good connection from Martinez Canyon back to Gate 5. This trail is well-used by bikers and walkers.
Response: We agree that adding this trail segment to the system would provide additional desirable connectivity in the trail network.	
3	Designate 12b and NFST 603 and 604 as motorized single-track in the Proposed Action.

Item No.	Comment Summary
Response: Trail 12b: In its proposed alignment the analysis corridor around Trail 12b does not offer any options for sustainable construction and usage. This is due to a combination of very steep terrain, and highly erodible soils. Under the current EA, alternative routing outside to the proposed trail corridor cannot be considered. However, the USFS will consider future site specific analysis of other routes that accomplish the same objectives (linking two system trails) using a different trail alignment. NFST 603: Within the analysis area, the Devil Creek Trail (NFST 603) has evidence of substantial erosion and subsequent sediment introduction to Devil Creek. Additionally, in its current alignment, the Devil Creek Trail closely parallels and crosses the channel at several points, passes through the riparian corridor, and traverses steep slopes and erodible soils. The existing non-motorized use of this trail has had minor negative impacts on floodplain function, substantial erosion, and sediment introduction Due to the prolonged close alignment of the trail and stream, and multiple stream crossings, opening this trail to motorized use would substantially accelerate, and increase in severity, the existing impacts if corrective measures were not undertaken prior to re-designation. Consequently, multiple sections of NFST 603 would require relocation away from the drainage bottom and improved stream crossings to comply with direction found in EM 7720.103 and FSH 2309.18 and Forest Plan standards and guidelines pertaining to soil and hydrological resources. Even with these structural mitigations, it is anticipated that erosion issues would still pose a concern for trail managers and that intensive and regular maintenance would be required to maintain the effectiveness of the structural improvements. NFST 604: The reason this trail was not selected was wildlife impacts (I believe) not watershed.	
4	Alternative 3 would be more acceptable if it retained balanced experience for back country non-motorized trails in the western section. NFST 600 to NFST 590 and 605 should remain non-motorized. They provide a loop trail with NFST 604 for non-motorized travel, keep Horse Mountain ridge the only non-motorized ridge, link nonmotorized trail to the Piedra Area through NFST 601, and retain continuous wildlife habitat from one ridge barrier to river by not dissecting the Park with motorized trails. These trails importantly give non-motorized wilderness access during the 'shoulder' seasons.
Response: As noted in sections 3.1.1.4 and 3.1.2.3, opportunities for non-motorized trail-based recreation are ample on the Pagosa District, with almost four times as many trail miles being open to non-motorized users than to motorized users. Many of these non-motorized trails are accessible during the “shoulder” seasons, including several within the analysis area itself. Furthermore, the seasonal restrictions proposed for NFST 600 and NFST 605 would provide opportunities for non-motorized users to utilize these trails free from the presence of motorized vehicles (i.e., the “shoulder” seasons).	
5	Support decommissioning of 16c in Proposed Action; it is too close to Forest boundary. Wheel Club would like to be involved in the relocation of 16c to 9f.
Response: Comment noted.	
6	Include 16f as a non-motorized trail in the Proposed Action. The experience of this trail is distinct from other trails.
Response: We agree that this trail offers a unique experience compared to other trails in the network.	
7	Do not include construction of routes 12a and 12e in the Proposed Action due to proximity to Piedra Area.
Response: No law, regulation or policy regarding the Piedra Area is being violated by including Trails 12a and 12 in the proposed action. The impacts of not including Trails 12a and 12e were analyzed under Alternatives 1 and 2	
8	Add the following to the Proposed Action: 1) a short non-motorized connector trail joining the eastern end of the “power line” road to the two trails running south from Gate 5, and 2) non-motorized single-track connecting NFSR 629 to the loop road at the top of Chris Mountain.
Response: Routes that were not identified prior to or during scoping cannot be included in the present analysis because they were never surveyed or evaluated.	

Item No.	Comment Summary
9	There are certainly trail corridors (for single track users) possible out west, down from Horse Mountain ridge and out of park basins. Try an off-ridge connection to Devil Mountain via 12d between the old road to Lost Spring continuing to NFSR 630. Item 6c connects to NFST 691. Item 4a is unnecessary to connect NFST 590. With the number of motorized trails increasing and planned within this side of the ridge, it hardly would change area characteristics.
Response: Routes that were not identified prior to or during scoping cannot be included in the present analysis because they were never surveyed or evaluated. Trail 4a is desirable because it currently exists on the ground, is in good condition, and provides a single-track connection to and from the West Monument Trailhead that does not involve travel on the Level 1 road/ATV trail 590.	
10	Add the following to the Proposed Action: 1) segments 9ee to 9x, 2) connector at 16g between 9e and 16f, and 3) non-system trails at 9p and 9q.
Response: 9p and 9q are included in the Proposed Action already; the connector is duplicative of other routes in the area and was therefore not included in the Proposed Action; 9ee is duplicative of 9x and was therefore not included in the Proposed Action.	
11	Retain NFST 600 and 605 as non-motorized trails. They are high-quality equestrian trails that have been maintained by volunteer equestrian users.
Response: While these trails have indeed been recovered and maintained by equestrian users in recent years, prior to 1997 both trails were maintained by single-track motorized users when they were open to such travel. The trails at that point were considered high-quality motorcycle trails. The condition of the trails, the connectivity they provide, and the experience they afford make them an essential component of the Proposed Action. The omission of these trails from the Proposed Action would, in our opinion, result in an inadequate system for single-track motorized users. Comparable alternative routes either do not exist or are too impacting to social and natural resources (namely, NFST 604). Equestrians will still have use of the trail, both free from the effects of concurrent motorized user during the shoulder seasons, and as a shared trail between June 15 and August 31.	

Appendix C – Action Alternatives Descriptions

Appendix C – Action Alternative Descriptions

This Appendix provides details**,** in narrative format, on the specific actions being proposed in each of the action alternatives. General direction discussed in Chapter 2 for each alternative, such as seasonal closure dates, design requirements, etc., is not repeated below. The numbering system corresponds to the graphical displays of the particular action listed and are not necessarily in order and/or applicable to a given alternative. Actions that are not applicable to an alternative are noted as such; gaps in numbering sequence are intentional and employed to maintain consistency between the various alternatives and their graphical displays. For graphical displays of each item listed below, please see the alternative maps provided in Chapter 2.

Alternative 2

1. Close the following system roads:
   a. 629.B1
   d. 629.D
   e. 629.B portion past gate

2. Decommission system road:
   a. 630.G1

3. Convert the following system trails to single-track motorized trails:
   N/A to this alternative

4. Adopt the following non-system routes as single-track motorized trails:
   N/A to this alternative

5. Improve parking area:
   N/A to this alternative

6. Designate ATV trails on the following system roads (still maintaining the ML1 road on the transportation system):
   c. Road 730 after the end of trail 690
   d. 923.A
   e. 629.D

7. Adopt the following non-system routes as ATV trails:
   a. Non-system road from Devil Mtn. Road 626 southeast to private boundary
   c. Non-system road north and east of Road 629.D connecting to Brockover Road 919
   d. Non-system road off trail 690 accessing dispersed campsite.

8. Designate non-motorized trails on the following system roads to (still retaining ML1 road on the transportation system):
   N/A to this alternative

9. Adopt the following non-system routes as non-motorized (system) trails:
   k. Portion of Ski Trail west of Newt Jack 923 to Turkey Springs Guard Station (as part of the proposed all season trail coincident with the ski trail)
   m. Non-system trail ("Corn Cob") connecting trail (9k), non-system trail from obliteration candidate road (9j) and trail 923.A
   v. Non-system trail loop along rim from Gate #5 and back
   x. Non-system trail from Gate #5 west, including southern loop to tie into road 923.A
   z. Trail between (9x) and (9v)

10. Convert the following motorized trails to non-motorized trails:
   c. 569 (Fourmile) east of Piedra Road to private property boundary

11. Construct new ATV trail:
   a. Portion between non-system route south of Road 626 and trail 704
   c. Portion between trails 689 and 691
   d. Re-route on Road 730 around landslide
   e. Portion between Brockover Road 919 gate and non-system ATV route south

12. Construct new single-track motorized trail:
   N/A to this alternative

13. Construct new non-motorized trail:
   d. Trail between Road 923.A and "Corn Cob" trail (9m)

14. Decommission non-system road:
   a. Non-system road off of Snow Ranch Road 628
   b. Non-system road off of Turkey Springs Road 629 to private property boundary

15. Remove from system and/or decommission system trail:
   N/A to this alternative

16. Decommission non-system trail:
   a. ATV trail use on road 629.D from non-system trail (7c) to private land
   b. Non-system trail off of (9m)
   c. Non-system trails west of Fremont Court north of Newt Jack Road 923
   d. Portion of non-system ATV loop on trail (7c) north of road 629.D
   e. Non-system trails between (9x), (9y) and (9e)
   f. Non-system trail between trail (9v) loop
   g. Shortcut non-system trail on (9w)
   h. Non-system trail going down into Martinez Creek and up to non-system power-line road
   i. Non-system trail between (9x) and the power-line road
   j. Non-system trail loop south of power-line road to private land and back to road
   k. Non-system trail running between two portions of Newt Jack Road 923
   l. Non-system trails between trail 583 and obliteration road south of Brockover Road 919

m. Non-system trail ("PBR") connecting Brockover Road 919 to non-system trail (9x) to the east
n. Non-system trail ("Park Ave") connecting obliteration candidate road with Ski Trail (9k)
o. Non-system trail ("PBR") connecting 919 to non-system trail (16p) to the southwest
p. Non-system trail east of 629.D from trail (16l) east to trail (16j)

17. Convert system road from status of "highway-legal vehicles only" to "open to all vehicles":
N/A to this alternative

18. Establish no camping zone:
a. East Monument Road 630 parking area

Alternative 3 – Proposed Action

Specific Actions

Note: Actions that are in addition to those listed in Alternative 2 are shown in bold type; actions listed but not shown in bold are included in both Alternatives 2 and 3.

1. Close the following system roads:
a. 629.B1
b. ML2 portion of Newt Jack Road 923
c. Portion of Brockover Road 919 past the gate/fence
d. 629.D
e. 629.B portion past gate

2. Decommission system road:
a. 630.G1

3. Convert the following system trails to single-track motorized trails:
a. Trail 600 between trail 590 and Mule Mtn. Trail 691 (Devil Mtn. D 626.D)
b. Trail 605 between trails 600 and 704
f. Trail 605 between trail 704 and road 628

4. Adopt the following non-system routes as single-track motorized trails:
a. Non-system trail between trail 600 and the new trail construction proposed west of West Monument Road 730.

5. Improve parking area:
a. Newt Jack Road 923 at intersection of trail 569
b. Brockover Road 919 at intersection with road 923.A

6. Designate ATV trails on the following system roads (still maintaining the ML1 road on the transportation system):
a. 630.J

b. 630 (East Monument) after the closure gate
c. Road 730 after the end of trail 690
d. 923.A
e. 629.D

7. Adopt the following non-system routes as ATV trails:
   a. Non-system road from Devil Mtn. Road 626 southeast to private boundary
   c. Non-system road north and east of Road 629.D connecting to Brockover Road 919
   d. Non-system road off trail 690 accessing dispersed campsite.
   e. Non-system road off of road 630.J

8. Designate non-motorized trails on the following system roads to (still retaining ML1 road on the transportation system):
   a. ML2 portion of road 923 (Newt Jack)
   b. Portion of Brockover Road 919 past the gate/fence to intersection with non-system trail past the non-system power-line road
   c. 629.B1 to where the old stock trail takes off
   d. Portion or road 979 from Asplin Hut to trail between 979 and trail 603 (9g)
   e. Middle portion of road 630.G

9. Adopt the following non-system routes as non-motorized (system) trails:
   a. Piedra Hot Springs trail
   b. Pre-1940 Piedra Stock Driveway Trail segment between road 629.B1 and trail 603
   c. Part of obliteration candidate road south of road 919 (except the first 0.1 miles)
   d. Non-system trails between trail 583 and obliteration road south of Brockover Road 919
   e. The last 0.84 miles portion of the non-system power-line road off of Brockover Road 919
   f. Trail running between two portions of Newt Jack Road 923
   g. Trail between road 979 and trail 603
   h. Trail east of 629.D from trail (9d) east to trail (9u)
   j. Obliteration candidate road going west off of Newt Jack Road 923
   k. Portion of Ski Trail west of Newt Jack 923 to Turkey Springs Guard Station (as part of the proposed all season trail coincident with the ski trail)
   m. Non-system trail ("Corn Cob") connecting trail (9k), non-system trail from obliteration candidate road (9j) and trail 923.A
   n. Non-system trail ("Park Ave") connecting obliteration candidate road with Ski Trail (9k)
   p. Non-system trail ("PBR") connecting 919 Brockover to non-system trail (9x) to the east
   q. Non-system trail ("PBR") connecting 919 to non-system trail (9h) to the southwest
   r. Non-system trail connecting road 919 west to the PBR trail (9q) following the power-line
   s. Trail east of Coral Mountain Road 863 (a.k.a Piedra Stock 583)

t. Portion of old Piedra Stock Trail south of Piedra Stock Trail 583 and Driveway Spring
u. Trail loop south of power-line road to private land and back to road
v. Trail loop along rim from Gate #5 and back
w. Trail going down into Martinez Creek and up to the power-line road
x. Trail from Gate #5 west, including southern loop to tie into road 923.A
y. Trail between (9x) and (9e)
z. Trail between (9x) and (9v)

10. Convert the following motorized trails to non-motorized trails:
a. 569 (Fourmile) east of Piedra Road to intersection with new loop trail (13e) before the private property boundary
b. Asplin Hut Trail 686 between East Monument Road 630 and trail 603
c. N/A to this alternative

11. Construct new ATV trail:
a. Portion between non-system route south of Road 626 and trail 704
b. Portion between non-system route off of 630.J and East Monument Road 630
c. Portion between trails 689 and 691
d. Re-route on Road 730 around landslide
e. Portion between Brockover Road 919 gate and non-system ATV route south

12. Construct new single-track motorized trail:
a. Portion from First Fork Road 622 east 1 mile to trail (12e)
d. Portion between trail 600/605 intersection and road 730
e. Portion from West Monument Road 630 west for 2 miles to trail (12a)

13. Construct new non-motorized trail:
a. Reroute on south loop non-system trail south of power-line near Martinez Creek to keep trail from crossing private property
b. Two trails east of Newt Jack Road 923 connecting with trail 569
d. Trail between Road 923.A and "Corn Cob" trail (9m)
e. Loop trail off of trail 569
h. Trail between 923.A/919 intersection and obliteration candidate road south of Brockover road 919
i. Trail between Asplin Hut northeast to trail 603
j. Small segment of trail connecting old Piedra Stock Trail to Devil Mtn. trail 600.

14. Decommission non-system road:
a. Non-system road off of Snow Ranch Road 628
b. Non-system road off of Turkey Springs Road 629 to private property boundary

15. Remove from system and/or decommission system trail:
b. Middle Mountain Trail 654 at intersection with trail 582 south through private property
c. Trail 569 past new loop trail intersection to private property

d. Segment of Piedra Stock Trail 583 (including motorized portion on Coral Mtn. Road 863) north of East Monument Road 630 to the point where it intersects with the old stock driveway alignment
e. Motorized portion of Asplin Hut trail 686 from trail 603 to Asplin Hut

16. Decommission non-system trail:
    a. ATV trail use on road 629.D from non-system trail (7c) to private land
    b. Non-system trail off of (9m)
    c. Non-system trails west of Fremont Court north of Newt Jack Road 923
    d. Portion of non-system ATV loop on trail (7c) north of road 629.D
    e. Non-system trails between (9x), (9y) and (9e)
    f. Non-system trail between trail (9v) loop
    g. Shortcut non-system trail on (9w)
    h-p. N/A to this alternative

17. Convert system road from status of "highway-legal vehicles only" to "open to all vehicles":
    a. First Fork Road 622

18. Establish no camping zone:
    a. East Monument Road 630 parking area

Alternative 4

Note: Actions that are in addition to those listed in Alternatives 2 and 3 are shown in bold type; actions listed but not shown in bold are included in Alternative 2 and/Alternative 3.

1. Close the following system roads:
    a. 629.B1
    b. ML2 portion of Newt Jack Road 923
    c. Portion of Brockover Road 919 past the gate/fence
    d. 629.D
    e. 629.B portion past gate

2. Decommission system road:
    a. 630.G1

3. Convert the following system trails to single-track motorized trails:
    a. Trail 600 between trail 590 and Mule Mtn. Trail 691 (Devil Mtn. D 626.D)
    b. Trail 605 between trails 600 and 704
    c. Trail 601 from trail 600 down to switchback south of First Fork bridge (but outside of 10D area)
    d. Trail 603 from trail 686 to point 1.1 miles from private land
    e. Trail 604 between trails 600 and 605
    f. Trail 605 between trail 704 and road 628

4. Adopt the following non-system routes as single-track motorized trails:
   a. Non-system trail between trail 600 and the new trail construction proposed west of West Monument Road 730
   b. Non-system road south of First Fork bridge area to drainage on switchback just south of 10D area
   c. Obliteration candidate road off of Chris Mtn. Road 681

5. Improve parking area:
   a. Newt Jack Road 923 at intersection of trail 569
   b. Brockover Road 919 at intersection with road 923.A

6. Designate ATV trails on the following system roads to (still maintaining the ML1 road on the transportation system):
   a. 630.J
   b. 630 (East Monument) after the closure gate
   c. Road 730 after the end of trail 690
   d. 923.A
   e. 629.D

7. Adopt the following non-system roads as ATV trails:
   a. Non-system road from Devil Mtn. Road 626 southeast to private boundary
   c. Non-system road north and east of Road 629.D connecting to Brockover Road 919
   d. Non-system road off trail 690 accessing dispersed campsite.
   e. Non-system road off of road 630.J

8. Designate non-motorized trails on the following system roads to (still retaining ML1 road on the transportation system):
   a. ML2 portion of road 923 (Newt Jack)
   b. Portion of Brockover Road 919 past the gate/fence to intersection with non-system trail past the non-system power-line road
   c. 629.B1 to where the old stock trail takes off
   d. Portion or road 979 from Asplin Hut to trail between 979 and trail 603 (9g)
   e. Middle portion of road 630.G

9. Adopt the following non-system routes as non-motorized (system) trails:
   a. Piedra Hot Springs trail
   b. Pre-1940 Piedra Stock Driveway Trail segment between road 629.B1 and trail 603
   c. Part of obliteration candidate road south of road 919 (except the first 0.1 miles)
   d. Non-system trails between trail 583 and obliteration road south of Brockover Road 919
   e. The last 0.84 miles portion of the non-system power-line road off of Brockover Road 919
   f. Trail running between two portions of Newt Jack Road 923
   g. Trail between road 979 and trail 603
   h. Trail east of 629.D from trail (9d) east to trail (9u)
   j. Obliteration candidate road going west off of Newt Jack Road 923

k. Portion of Ski Trail west of Newt Jack 923 to Turkey Springs Guard Station (as part of the proposed all season trail coincident with the ski trail)
m. Non-system trail ("Corn Cob") connecting trail (9k), non-system trail from obliteration candidate road (9j) and trail 923.A
n. Non-system trail ("Park Ave") connecting obliteration candidate road with Ski Trail (9k)
p. Non-system trail ("PBR") connecting 919 Brockover to non-system trail (9x) to the east
q. Non-system trail ("PBR") connecting 919 to non-system trail (9h) to the southwest
r. Non-system trail connecting road 919 west to the PBR trail (9q) following the power-line
s. Trail east of Coral Mountain Road 863 (a.k.a Piedra Stock 583)
t. Portion of old Piedra Stock Trail south of Piedra Stock Trail 583 and Driveway Spring
u. Trail loop south of power-line road to private land and back to road
v. Trail loop along rim from Gate #5 and back
w. Trail going down into Martinez Creek and up to the power-line road
x. Trail from Gate #5 west, including southern loop to tie into road 923.A
y. Trail between (9x) and (9e)
z. Trail between (9x) and (9v)
aa. Trail system in southeast corner between Gates #9 and #11
bb. Trail between (9v)
cc. Trails between (9x), (9y) and (9e)
dd. Non-system trail and portion of obliteration candidate road between (9m) and (9n)
ee. Trail segment between segments of (9x)
ff. Old Piedra Stock Trail from near Forest boundary to connection with motorized segment of trail 569. Trail crosses road 629 twice and road 629.D once.
gg. Old Piedra Stock trail from East Monument Road 630 south of Dunagan Canyon (9hh) to connection with new 583 location at (9s)
hh. Non-system trail down Dunagan Canyon to connection with Devil Creek
ii. Non-system trail from Old Piedra Stock trail (9gg) down Devil Creek to connection with trail 603

10. Convert the following motorized trails to non-motorized trails:
a. 569 (Fourmile) east of Piedra Road to intersection with new loop trail (13e) before private property boundary
b. N/A to this alternative
c. N/A to this alternative

11. Construct new ATV trail:
a. Portion between non-system route south of Road 626 and trail 704
b. Portion between non-system route off of 630.J and East Monument Road 630
c. Portion between trails 689 and 691
d. Re-route on Road 730 around landslide
e. Portion between Brockover Road 919 gate and non-system ATV route south

f. Portion between non-system route south of First Fork Bridge and trail (12a)

12. Construct new single-track motorized trail:
    a. Portion from First Fork Road 622 east 1 mile to trail (12e)
    b. Portion between trail 603 and non-system road off of Chris Mtn. Road 681
    c. Portion between trail 601 and non-system road south of First Fork bridge outside of 10D area
    d. Portion between trail 600/605 intersection and road 730
    e. Portion from West Monument Road 630 west for 2 miles to trail (12a)

13. Construct new non-motorized trail:
    a. Reroute on south loop non-system trail south of power-line near Martinez Creek to keep trail from crossing private property
    b. Two trails east of Newt Jack Road 923 connecting with trail 569
    d. Trail between Road 923.A and "Corn Cob" trail (9m)
    e. Loop trail off of trail 569
    h. Trail between 923.A/919 intersection and obliteration candidate road south of Brockover road 919
    i. Trail between Asplin Hut northeast to trail 603
    j. Small segment of trail connecting old Piedra Stock Trail to Devil Mtn. trail 600
    k. Segment between Turkey Springs Road 629 and old Piedra Stock trail (9ff)

14. Decommission non-system road:
    a. Non-system road off of Snow Ranch Road 628
    b. Non-system road off of Turkey Springs Road 629 to private property boundary

15. Remove from system and/or decommission system trail:
    b. Middle Mountain Trail 654 at intersection with trail 582 south through private property
    c. Trail 569 past new loop trail intersection to private property
    d. Segment of Piedra Stock Trail 583 (including motorized portion on Coral Mtn. Road 863) north of East Monument Road 630 to the point where it intersects with the old stock driveway alignment
    e. N/A to this alternative

16. Decommission non-system trail:
    a. ATV trail use on road 629.D from non-system trail (7c) to private land
    b. N/A to this alternative
    c. Non-system trails west of Fremont Court north of Newt Jack Road 923
    d. Portion of non-system ATV loop on trail (7c) north of road 629.D
    e. N/A to this alternative
    f. N/A to this alternative
    g. Shortcut non-system trail on (9w)
    h-p. N/A to this alternative

17. Convert system road from status of "highway-legal vehicles only" to "open to all vehicles":
    a. First Fork Road 622

18. Establish no camping zone:
    a. East Monument Road 630 parking area

Appendix D – 2011 First Fork Road Mixed Use Survey

Engineering Report

San Juan Public Lands

Pagosa Ranger District/Field Office

Analysis of Road # 622 First Fork

MP 0.39 (Forest Boundary)

to MP 12.3 (road ends/First Fork Trailhead)

For Motorized Mixed Use Designation

Revised February 23, 2011

Public Lands: SJNF District/Field Office: Pagosa

Road Number: 622 Road Name: First Fork

Beginning Mile Post: 0.39 (US Hwy 160) Ending Mile Post: 12.3 (road ends)

Traffic Service Level: ☐ A ☒ B ☐ C ☐ D

Objective Maintenance Level: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Operational Maintenance Level: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Maintenance by: Forest Service

Non-Forest Service ROW or jurisdiction? ☐ Yes ☒ No

Any road use agreements, maintenance agreements, or other encumbrances?
☒ Yes ☐ No

Description of agreements or encumbrances:
There is a Schedule A agreement with Archuleta County

Subject to Highway Safety Act? ☒ Yes ☐ No

Non-highway-legal vehicles currently permitted? ☐ Yes ☒ No

Is motorized mixed use consistent with State and local laws? ☒ Yes ☐ No

Description of road management objectives, existing use, and proposed use:

Motorized use consists primarily of recreation and access for non-motorized recreational activities and commercial access by outfitters. A minor component of motorized use is for resource management activities. The first segment of this roadway between US Highway 160 (MP 0.0) and MP 0.39 crosses private property and is under County Jurisdiction, and as such, was not evaluated under this analysis.

The season of use varies by road segment. The section between MP 0.39 and MP 0.88 is open year-round and the segment between MP 0.88 and MP 12.3 is open May 15 through November 30.

A unit-wide Pagosa Ranger District/Field Office travel management decision issued in December 2, 2008 included a restriction of motorized use on First Fork Road to only highway-legal vehicles until such time that mitigation measure could be implemented to reduce crash risk. The purpose of this report is to document mitigation measures that have been implemented and provide an updated engineering analysis based on current road conditions.

The Pagosa RD/FO is conducting an environmental analysis of the Turkey Springs area, which includes the First Fork Road. This analysis includes alternatives that would permit motorized use by non-highway-legal vehicles on this roadway.

Summary of Findings: This report documents safety conditions that existed at the time of the field inspection. Additional engineering analysis may be conducted at any time, including when there is a changed condition in the roadway characteristics, traffic, or accident history, and may result in a revision of the mitigation strategy.

NFSR 622 – First Fork Road is used primarily for recreation and as an access for motorized and non-motorized recreational activities. There is some motorized use for resource management activities and commercial outfitter guiding. Dispersed camping and parking areas along the first mile of the road are used as staging areas for offloading OHVs for recreational access to various routes, both authorized and unauthorized, that can be accessed from First Fork Road. The season of use is mid-May through November, with the peak use occurring during the fall and corresponding to hunting season. A traffic study conducted in 2008 reported a mean volume of 50 ADT in the early season. The traffic volume during the peak season is estimated to be 97 ADT. Sight distance along the road varies from good to fair, with distances most reduced along curved sections. There are some large diameter trees immediately adjacent to the roadway, which are fixed object obstruction hazards. There are several deep culvert inlets along the road that are not marked by object markers. There is a steep embankment along much of the roadway that would likely result in rollover type accidents for vehicles that have left the roadway. Various types of delineators are used to mark the road prism, but many are inconsistent with current standards. There is a documented history of three accidents on this roadway, one of which occurred on the County jurisdiction segment.

The crash probability is assessed to be medium due to the traffic type, which consists of both of recreational use and commercial outfitter use, a winding alignment and tight radius curves in some areas, a narrow road width and steep terrain beyond MP 4, low to moderate travel speeds, minimal roadside vegetation to impede sight distance, and the presence of roadside obstructions (trees) in some areas. The crash severity was assessed to be medium between MP 0.39 and MP 4 due to the flat to rolling terrain, moderate travel speeds and minimal conflict points. The crash severity was assessed to be high beyond MP 4 due to the steep embankments along the roadway that would likely result in a rollover type accident for vehicles that leave the roadway, and the rockfall/landslide hazard. Mitigation measures could be implemented to reduce the crash probability and severity risk.

Factors Considered:

1. Operator considerations:

Operators include recreationists seeking motorized and non-motorized opportunities, hunters, and anglers. Operator considerations include motorized use by visitors that may not be familiar with the road or mountainous driving conditions and the presence of trucks pulling horse trailers and Off-highway vehicles (OHVs), including ATVs and unlicensed motorcycles. OHV use is occurring, although current travel management direction permits only highway legal vehicles on this road. This continued OHV use is because funding constraints have limited the Forest's ability to implement the travel management direction on the ground through signing and law enforcement presence.

Colorado State law allows operation of OHVs by individuals 10 years of age and older on routes designated as open to these vehicles. Unlicensed operators must be under the immediate supervision of a licensed operator. There are no training requirements and helmets are not required. The County does not regulate the use of OHVs on public lands.

2. Crash history:

Archuleta County Road and Bridge Department has a record of two accidents that have occurred on this road, one at MP 0.3 that occurred in 2003, which is under County jurisdiction, and one at MP 4.16 that occurred in 2004. These were both single vehicle accidents that resulted from driver errors (inattentiveness and speeding) and both resulted in injuries. The Colorado State Patrol has record of one single vehicle accident at MP 4 that occurred in 2009, which was a result of careless driving and the driver was cited for driving under the influence. The U.S. Forest Service has no record of accidents on this route.

The crash history indicates few accidents have occurred on this road since 2003 and the accidents tend to be concentrated in the road segment with a mostly straight alignment and higher travel speeds.

3. Traffic volume and type:

Non-highway-legal vehicles:
☒ < 12 inch tread width ☒ < 50 inch tread width ☐ >50 inch tread width

Highway-legal vehicles:
☒ Passenger cars ☒ Commercial vehicles ☐ Recreation vehicles (RV's)

This road is used by highway legal vehicles, ATVs and motorcycles. A high percentage of the highway legal vehicles are pickup trucks hauling trailers containing pack and saddle livestock. A traffic study conducted in 2008 reported a mean volume of 50 ADT in the early season. The traffic volume during the peak season, which corresponds to hunting season, is estimated to be 97 ADT.

Dispersed camping and parking areas located along the first mile of the road are frequently used as unloading areas for OHVs. OHV users then travel north on First Fork Road from which they can access several trails, NFSR 804 which is a maintenance level 1 (closed) road, West Monument Road, and numerous unauthorized roads.

4. Speed - Anticipated average speed (85^{th} percentile):

Anticipated travel speeds were determined to be the average travel speed maintained on the roadway during the mixed use analysis. Typical travel speeds varied by the road segment, with speeds between MP 0.39 and MP 4 being moderate, estimated to be 20-30 MPH and speeds on curved segments being low, estimated to be 20 MPH or less.

5. Road surface type: Gravel

The gravel road surface is in fair condition. The aggregate is in a deteriorated state with many exposed subgrade rocks. Washboarding and potholes do occur along most of this road typically on steeper grades and coming out of curves and other locations where drainage is poor. Road maintenance (blading) is performed at least one time annually, but because little gravel remains to blade, the road surface does not remain smooth beyond a few weeks.

6. Intersections with other roads and trails:

MP 0.8 – User-created routes east and west
MP 1.0 – Dispersed campsite
MP 4.7 – Skewed intersection NFSR 804, a ML 1 (closed) road that is in use as an OHV trail.
MP 6.8 – Offset Tee intersections with NFSR 630.1 – West Monument on the east and Sheep Creek TH on the west
MP 9.4 – Skewed intersection with an unmarked motorized trail
MP 10.7 – Dispersed campsite
MP 11.8 – Tee intersection with road to horse trailer parking area and dispersed campsite, one lane bridge
MP 12.3 – First Fork Trailhead, a non-motorized trail

7. Other roadway factors:

NFSR 622 varies in width from one-half lanes (16-18 feet) predominantly between MP 0.39 and MP4 and the road generally narrows to a single lane (10-12 feet) beyond MP 4 to the end at MP 12.3. There are numerous turnouts along the entire length of the road that allow for passage of opposing traffic. The terrain varies from flat to rolling between MP 0.39 and MP 4 and becomes mostly mountainous beyond MP 4. Roadway grades along the entire length are less than 10 percent. The alignment varies from good (fairly straight with good sight distance, to poor (numerous tight radius curves with fair sight distance). The embankments both above and below the road are unstable making the roadway prone to rockfall and landslides and resulting in soft shoulders and narrowed road sections in some areas.

The steep embankments and narrow road beyond MP 4 tends to slow travel speeds and heighten driver attention. This assessment is confirmed by the lack of accidents occurring in these sections.

Since the original Engineering Analysis was conducted in 2007, signing has been improved. These improvements include elimination of excess signage, predominately in the first six miles of the road. In particular, non-standard signs and hazard signs not located in the immediate area of a hazard were removed or relocated, as necessary. Type 3 delineators were installed along a segment of road that was reconstructed using a retaining wall.

8. Roadside conditions:

The slopes along much of the roadway are steep with embankments heights of 30 feet or greater. There is a retaining wall near MP 7.5 that is marked with reflective delineators. The roadside vegetation was cut using brushing equipment in 2009 which has improved sight distance and reduced roadside obstructions. Some large diameter trees were left in-place and continue to be roadside obstructions. There are several deep culvert inlets along the road that are not marked by object markers. Sight distance is fair in the curved segments where a steep uphill embankment is present, but generally good elsewhere.

9. Risk without mitigation:

Crash probability: ☐ High ☒ Med ☐ Low

Crash severity: ☒ High ☐ Med ☐ Low

The crash probability is assessed to be medium due to the traffic type, which consists of both of recreational use and commercial outfitter use, a winding alignment and tight radius curves in some areas, a narrow road width and steep terrain beyond MP 4, low to moderate travel speeds, minimal roadside vegetation to impede sight distance, and the presence of roadside obstructions (trees) in some areas. The crash severity was assessed to be medium between MP 0.39 and MP 4 due to the flat to rolling terrain, moderate travel speeds and minimal conflict points. The crash severity was assessed to be high beyond MP 4 due to the steep embankments along the roadway that would likely result in a rollover type accident for vehicles that leave the roadway, and the rockfall/landslide hazard.

The crash probability assessment was reduced from High in the assessment conducted in 2007 to Medium in this analysis because of the following. The roadside brushing conducted in 2009 significantly improved sight distance along the road, allowing drivers more time to react to anticipate conditions and avoid accidents. Modifications to the on-the-ground signing have reduced sign pollution and will improve driver attentiveness to hazard warnings. Three additional years of accident data suggest that accidents on this road are infrequent and that the segments where severity would be highest have experienced no accidents, indicating that road and topographical conditions are effective in moderating driver behavior to practice a higher level of caution in these areas.

Mitigation Measures:

In the 2007 Engineering Analysis, guardrail was proposed as a mitigation measure for a one-mile segment of this road. That recommendation is rescinded in this report for the following reasons. The road segment in which guardrail was proposed was a single lane and too narrow to safely accommodate traffic and the width necessary to accommodate the guardrail. In essence, the guardrail would become a roadway obstruction. Type 3 object markers, for vertical drops and delineators would be as effective in this section due to the low travel speed and better visibility. The revised recommended mitigation measures to reduce accident risk are described below.

Hazard signing could be improved to better inform the travelling public of hazards and remove remaining excess signage. A sign inventory and assessment was conducted by San Juan National Forest Engineering staff in 2010 and included recommended sign changes that would improve the information conveyed to drivers. The signing improvements outlined in the report include signing standardization, removal of excess signs, and updating to current Forest Service and MUTCD standards. Delineators, which now include carsonites with retro-reflective stickers on one or both sides, steel u-posts with amber or white button-type delineators on one or both sides and Type 2 object markers should be standardized. Object markers are needed at culvert crossings with deep inlets. A switchback warning sign located near MP 10.6 should be moved closer to the start of the switchback section (MP 11.0). In general, delineators should be installed along fill slopes steeper than 1:1 and greater than 10 feet in height from the road shoulder to the toe of slope.

In addition, one (1) “Share the Road” sign should be installed near MP 0.39 to alert drivers on NFSR 622 of the potential presence of OHV operating on the roadway.

Brushing should be repeated as necessary to ensure good sight distance is maintained along both sides of the road. Remove approximately 10 trees 16 to 24 inches in diameter that are immediately adjacent to the roadway.

The estimated cost for implementation of these mitigations measures is $5,007.00

Conclusion:

I have considered the applicable driver, traffic and roadway factors; applicable State and local laws and USDA Forest Service regulations, directives and guidelines pertaining to motorized mixed use on the subject road. The crash probability risk and crash severity risk would be reduced with the implementation of mitigation measures described herein.

Prepared by:

Mary J. Blanchard
Civil Engineer

Date: 2/25/2011

Reviewed by:

Pete Merkel
Roads Manager

Date: 9/20/11

Approved by:

Ben Martinez, Qualified Engineer
San Juan National Forest Engineer

Date: 20 Sept 2011

Cost Estimate

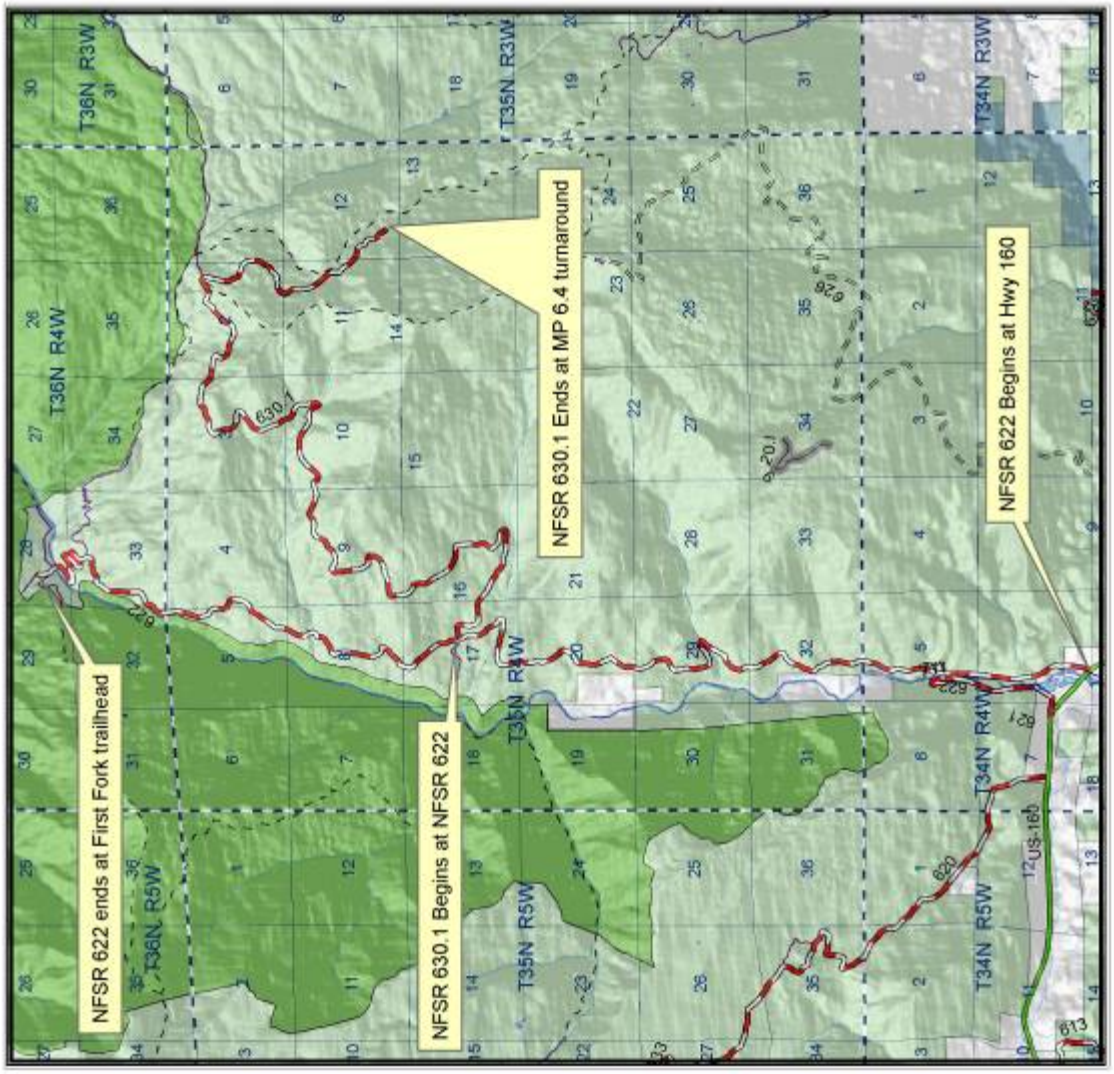
Mitigation Measures Implementation

Route No. : **622**

Route Name: **First Fork**

Date: **2/23/2011**

Mitigation Measure	Item	Quantity	Unit	Unit Cost	Cost
Signing					
Share the Road Sign	Sign	1	ea	$84.00	$84.00
Object marker (5 locations, 4 sign/location)	Type 2 Sign	20	Ea	$5.00	$100.00
Delineator	Delineator - button type, white	150	ea	$0.70	$105.00
Relocate/Remove/Install sign	Labor	32	hr	$30.00	$960.00
	Post - 8-foot 2-inch square galvanized	5	ea	$45.00	$225.00
	Post - U-channel 6-ft green	85	ea	$16.80	$1,428.00
	Tufnut and bolt	10	ea	$2.00	$20.00
	nuts & bolts	85	ea	$1.00	$85.00
Tree removal	Tree removal	10	Ea	$200.00	$2,000.00
				Total	$5,007.00


Mixed Use Analysis
NFSR 622 & 630.1
N
E
S
W
0 0.5 1 2
Miles
Legend
Forest Service Roads
2 - HIGH CLEARANCE VEHICLES
3 - SUITABLE FOR PASSENGER CARS
4 - MODERATE DEGREE OF USER COMFORT
5 - HIGH DEGREE OF USER COMFORT
UNDETERMINED STATUS
OBLITERATION CANDIDATES
CL 1 - PRIMARY HIGHWAY
CL 2 - SECONDARY HIGHWAY
CL 3A - LIGHT DUTY PAVED ROAD
CL 3B - LIGHT DUTY GRAVEL RD
CL 3C - LIGHT DUTY NATIVE SURFACED ROAD
CL 4 - UNIMPROVED ROAD
Forest Service Motorized Trails
Forest Service Trails
Rivers and Streams
FSSDE plss_tk_trails_mp
FSSDE plss_tk_section
Lakes and Reservoirs
Bureau of Land Management
Bureau of Reclamation
Colorado Division of Wildlife
National Forest
Indian Reservation
National Park Service
Patented Lands
State Lands
Wilderness
Special Areas
Polyconic Projection
NAD 83
NFSR 622 ends at First Fork trailhead
NFSR 630.1 Begins at NFSR 622
NFSR 630.1 Ends at MP 6.4 turnaround
NFSR 622 Begins at Hwy 160
T36N R5W
T36N R4W
T36N R3W
T35N R5W
T35N R4W
T35N R3W
T34N R5W
T34N R4W
T34N R3W
630.1
620
628
US-160

NFSR 622 at MP 0.39

NFSR 622 – 1.5-lane width before MP 4.0

NFSR 622- trees and brush on roadway shoulder near MP 4

NFSR 622 - Chevrons near MP 4

NFSR 622 – Single lane road with steep embankment.
Road narrows to single lane near MP 6

NFSR 622 - Type 3 Delineators near MP 6.1

NFSR 622 - Type 2 Delineator on one side of post only

NFSR 622 - Non-standard amber delineators on one side of post only
Located at culvert near MP 6.9

NFSR 622 – intersection with NSR 630.1- West Monument near MP 6.8

NFSR 622 – MP 12.2
horse trailer parking area to right
road dead-end and First Fork Trailhead across bridge to left