Rulemaking for Colorado Roadless Areas
Revised Draft Environmental Impact Statement

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Cooperating Agency:	State of Colorado
Responsible Official:	Secretary of Agriculture
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Abstract:
The U.S. Department of Agriculture, Forest Service, in cooperation with the State of Colorado, proposes to promulgate a state-specific rule to manage roadless area values and characteristics on National Forest System (NFS) lands in Colorado. The proposal is responsive to a recognized need to balance local, State, and national interests in providing management direction for roadless areas on NFS lands in Colorado. This environmental impact statement (EIS) analyzes and displays expected physical, biological, and social-economic consequences of four alternatives of the proposed Colorado Roadless Rule. Alternative 1 (2001 Roadless Rule), would establish a state-specific roadless rule for Colorado that would retain the inventoried roadless area boundaries and roadless area management provisions contained in the 2001 Roadless Rule, for management of roadless areas on NFS lands in Colorado. Alternative 2 (proposed Colorado Roadless Rule), would establish a state-specific roadless rule for Colorado that modifies the roadless area boundaries and roadless area management provisions from the existing 2001 Roadless Rule, primarily to provide for additional management flexibility in roadless areas. Additionally alternative 2 designates 562,200 acres of roadless areas as upper tier, which are areas receiving a higher level of protection. Alternative 3 (forest plans alternative-no action) would not establish a state-specific roadless rule for Colorado but would use management direction contained in the land management plans (forest plans) for each of the national forests in Colorado. Alternative 4 (provisions of alternative 2 with public proposed upper tier) would establish a state-specific roadless rule for Colorado with the same provisions as alternative 2 but would include 2,614,200 acres designated as upper tier.

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SUMMARY OF THE ENVIRONMENTAL IMPACT STATEMENT

DOCUMENT STRUCTURE

The Forest Service has prepared an environmental impact statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal laws and regulations. The EIS discloses the potential environmental consequences that may result from the proposed action and alternatives. This summary presents the pertinent information from the full EIS in abbreviated form.

Supporting documents for the EIS may be found in the EIS record, located at the Forest Service's Rocky Mountain Regional Office, 740 Simms Street, Lakewood, CO. Some supporting documents, and the full EIS, are also available on the Web at www.roadless.fs.fed.us/colorado.

BACKGROUND

The Forest Service administers approximately 14,520,000 acres of publicly-owned lands in Colorado distributed among eight national forests and two national grasslands. These national forests and grasslands are characterized by a diverse array of landscapes, ecosystems, natural resources, and land use activities. Management of each national forest and grassland is governed by a land and resource management plan (forest plan), along with numerous land management laws, regulations, policies, and agency directives. Laws and regulations take precedence over management direction in the forest plans where conflicts in management direction exist.

In January 2001, a Roadless Area Conservation Rule (2001 Roadless Rule) was adopted into regulation at 36 CFR 294, following completion of a final EIS (USDA Forest Service 2000a). The 2001 Roadless Rule applied to national forests nationwide. It provided overarching protections for 58.5 million acres[1] of inventoried roadless areas (IRAs) (about 30 percent of NFS lands in the country) by prohibiting road construction and reconstruction and timber harvest in IRAs except under certain exceptional circumstances. The intent of the 2001 Roadless Rule was "to provide lasting protection for IRAs within the context of multiple-use management" (USDA Forest Service 2000a).

[1] *Approximately 9.3 million acres of roadless areas in Alaska's Tongass National Forest were exempted from the 2001 Roadless Rule.*

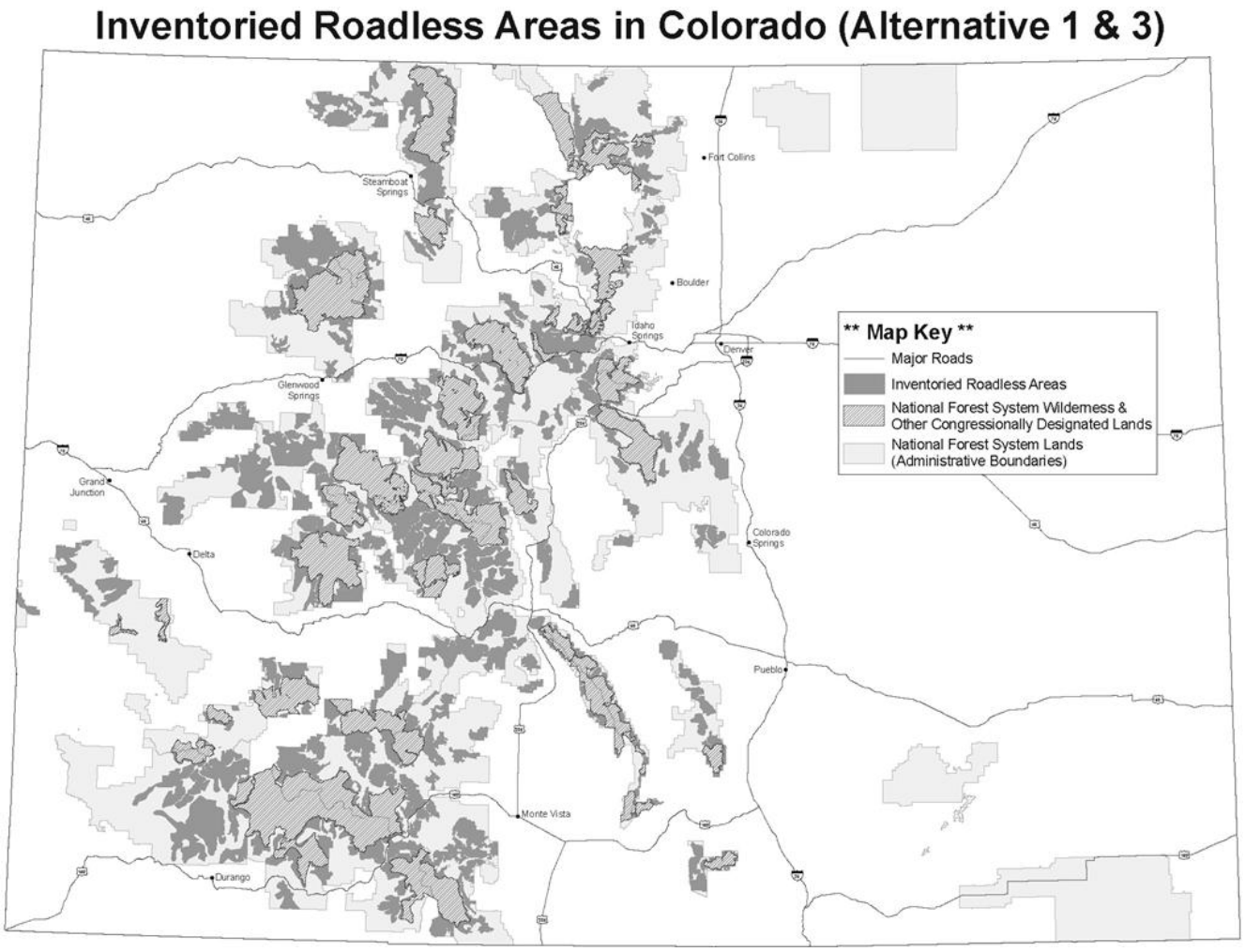

Figure 1. Inventoried roadless areas in Colorado

The 2001 Roadless Rule identified approximately 4,433,000 acres, or about 31 percent, of the National Forest System (NFS) lands in Colorado as IRAs. For this EIS, private land and congressionally designated land was removed from the inventory. Management of congressionally designated land is governed by laws that supersede any roadless area rule[2]. Figure 1 displays the IRAs that are evaluated in this EIS, and are common to alternatives 1 and 3. There are 4,243,600 acres within the IRAs for these two alternatives. Maps are available in the full EIS and on the Web at www.roadless.fs.fed.us/colorado.

Roadless area characteristics, as defined in the 2001 Roadless Rule preamble (66 FR 3244) and referred to in the proposed Colorado Roadless Rule, are summarized as follows: high quality or undisturbed soil, water, or air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land; primitive, semi-primitive motorized, and semi-primitive non-motorized classes of dispersed recreation; reference landscapes; natural-appearing landscapes with high scenic quality; traditional cultural

[2] *Congressionally designated areas include such lands as Wilderness, Wild and Scenic Rivers, and Protection Areas (described in EIS Appendix A, Table A-1)*

properties and sacred sites; and, other locally identified unique characteristics.

In May 2005 Colorado enacted Senate Bill 05-243 (C.R.S. § 36-7-302) directing formation of a 13-person bipartisan taskforce to make recommendations to the Governor regarding the appropriate management of roadless areas on the national forests in Colorado. In November 2006, Colorado Governor Bill Owens petitioned 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 in accordance with the Administrative Procedures Act, section 553(e) of the U.S. Code of Federal Regulations (CFR) and the Department of Agriculture's rulemaking procedures at 7 CFR §1.28. In April 2007, newly-elected Governor Ritter resubmitted the petition with minor modifications (Colorado Office of the Governor 2007). In June 2007, the State and the U.S. Forest Service presented the petition with modifications to the Department's Roadless Area Conservation National Advisory Committee (RACNAC). The RACNAC provided recommendations on the State petition to the Secretary of Agriculture (USDA RACNAC 2007a). In August 2007, the Secretary of Agriculture accepted the State's petition and directed the Forest Service to work in cooperation with the State of Colorado to initiate rulemaking (USDA RACNAC 2007b).

The Forest Service published a proposed rule to establish direction for conserving roadless areas on NFS land in Colorado on July 25, 2008 (73 FR 43544). Throughout the process, the United States Department of Agriculture (USDA), State, and Forest Service repeatedly heard public comment requesting a reduction in the scope of the proposed exceptions for tree-cutting, sale or removal and road construction and reconstruction. Based on these public comments, the State requested the USDA to postpone further rulemaking efforts until the State considered revision of its petition.

The State held a comment period from August 3 to October 3, 2009. The State received approximately 22,000 comments, with most being form letters. The result was a revised petition submitted to the Secretary of Agriculture on April 6, 2010. Based on the petition, the State and the Forest Service developed regulatory language for a proposed Colorado Roadless Rule that would govern management of roadless areas on NFS lands in Colorado. Because of the changes in the boundaries of the Colorado Roadless Areas (CRAs) and the number of changes in the proposed rule, the Secretary of Agriculture initiated a public comment period on the revised proposed rule and this EIS.

Purpose of and Need for Action

The Department, the Forest Service, and the State of Colorado agree there is a need to provide management direction for the conservation of roadless area values and characteristics within roadless areas in Colorado. In the petition, the State of Colorado has indicated that there is a need to develop state-specific regulations for the management of Colorado's roadless areas for the following reasons:

1. Roadless areas are important because they are, among other things, sources of drinking water, important fish and wildlife habitat, semi-primitive or primitive recreation areas, and naturally appearing landscapes. There is a need to provide for the preservation of roadless area characteristics.
2. As recognized in the 2001 Roadless Rule, tree-cutting, sale or removal, and road

construction/reconstruction have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate, long-term loss of roadless area values and characteristics and there is a need to generally prohibit these activities in roadless areas. Since the 2001 Roadless Rule was promulgated, some have argued that linear construction zones (LCZs) also need to be restricted.

3. In addition to the concerns articulated in the 2001 Rule, there is a need to accommodate State-specific situations and concerns in Colorado's roadless areas. These include the following:
    a. reducing the risk of wildfire to communities and municipal water supply systems
    b. permitting exploration and development of coal resources in the North Fork coal mining area
    c. permitting of construction and maintenance of water conveyance structures
    d. permitting access to current and future electrical power lines
    e. accommodating existing permitted or allocated ski areas.
4. There is a need to ensure that Colorado roadless areas are accurately mapped.

Proposed Action

The Department, in cooperation with the State of Colorado, proposes to promulgate a state-specific rule to manage roadless areas and conserve roadless area characteristics on NFS lands in Colorado.

The Colorado Roadless Rule would establish a system of Colorado Roadless Areas (CRAs) with protections for management of these areas replacing the Inventoried Roadless Areas (IRAs) for National Forest land in Colorado. CRAs would be identified on a set of maps maintained at the Forest Service national headquarters office, including records of adjustments to such maps pursuant to the final Colorado Roadless Rule. The CRAs upper tier acres, which are a subset of CRAs receiving a higher level of protection, would be identified on the same set of maps.

The proposed Colorado Roadless Rule would use the most accurate mapping information and adjust roadless area boundaries by:

a. correcting mapping errors that primarily resulted from improvements in inventory data and mapping technology;
b. excluding private land;
c. excluding land substantially altered by roads and timber harvest activities;
d. excluding ski areas under permit or allocated in forest plans to ski area development;
e. excluding congressionally designated lands such as wilderness and other designations that take legal precedence over roadless area regulations; and
f. including unroaded areas outside IRAs that contain roadless area characteristics.

The CRAs would encompass approximately 4.19 million acres of NFS land in Colorado, distributed among 363 separate roadless areas (Appendix A). The proposed Colorado Roadless Rule provides for future adjustments to be made to CRA boundaries (Map Packet, Map 3), subject to a public review and comment, and applicable NEPA or rulemaking requirements. The Forest Service national headquarters office would maintain the official map of CRAs, which would be readily available to the public.

The Colorado Roadless Rule includes a management strategy for activities and land uses within CRAs that are tailored to meet the unique circumstances present in Colorado. Road construction and reconstruction, tree-cutting, sale or removal and linear construction zones are prohibited within the CRAs with limited exceptions. Chapter 2 describes the proposed rule in greater detail, along with other alternatives considered in this analysis.

Table 1. National forest administrative units in Colorado and associated forest plan approval date

National forests in Colorado	Date of approved forest plan
Arapaho-Roosevelt National Forests	1997
Grand Mesa, Uncompahgre, and Gunnison National Forests	1983
Manti-La Sal National Forest [3]	1986
Routt National Forest	1998
Pike-San Isabel National Forests	1984
Rio Grande National Forest	1996
San Juan National Forest	1983 (Revision in progress; draft revised plan 2007)
White River National Forest	2002

The proposed Colorado Roadless Rule establishes boundaries for Colorado roadless areas (CRAs) and associated provisions for managing those areas. The rule maintains many of the 2001 Roadless Rule prohibitions on road construction and reconstruction and tree-cutting activities in roadless areas; however, there are some important differences. The proposed rule differs from the 2001 Rule primarily by adding an upper tier with more restrictions than the 2001 Rule, by adding additional requirements to exceptions found in the 2001 Rule, and by providing a limited set of exceptions that are not found in the 2001 Rule.

As requested by the Governor's petition, the proposed Colorado Roadless Rule adjusts roadless area boundaries by: (a) adjusting some roadless area boundaries to correct mapping errors that primarily resulted from improvements in inventory data and mapping technology; (b) not including acres substantially altered by existing roads and past timber harvest activities; (c) not including ski areas currently under permit or allocated to ski area management areas adjoining operating ski areas in forest plans; (d) not including congressionally designated lands such as wilderness that take legal precedence over roadless area regulations; (e) including in CRAs some additional unroaded acreages that are outside IRAs.

The proposed CRAs encompass approximately 4.186 million acres, or about 29 percent, of NFS land in Colorado, distributed among 363 separate roadless areas (Figure 2). The scope of the proposed action is primarily limited to tree-cutting, road construction and reconstruction, and the use of linear construction zones within roadless areas. Portions of the CRAs are designated

[3] *Only 27,000 acres of the 1.4 million-acres of the Manti-La Sal National Forest occur in Colorado; the rest are in Utah and not subject to the EIS.*

as upper tier acres with fewer exceptions to the prohibitions. The proposed rule would not affect land use permits, contracts, or other legal instruments issued prior to the effective date of a rule. The scope of the proposed rule is programmatic in nature and intended to guide future actions proposed to occur within CRAs. This proposal does not authorize the implementation of any ground-disturbing activities, but rather it describes circumstances under which certain activities may be allowed or restricted within roadless areas in the future. Where conflicting management direction exists between forest plans and a Colorado Roadless Rule provision, the more restrictive direction would prevail.

Alternative 4 has the same CRA boundaries as alternative 2 and the same rule provisions. The difference is there are more acres within the CRAs that are designated as upper tier acres where there are fewer exceptions to the prohibitions (Figure 3).

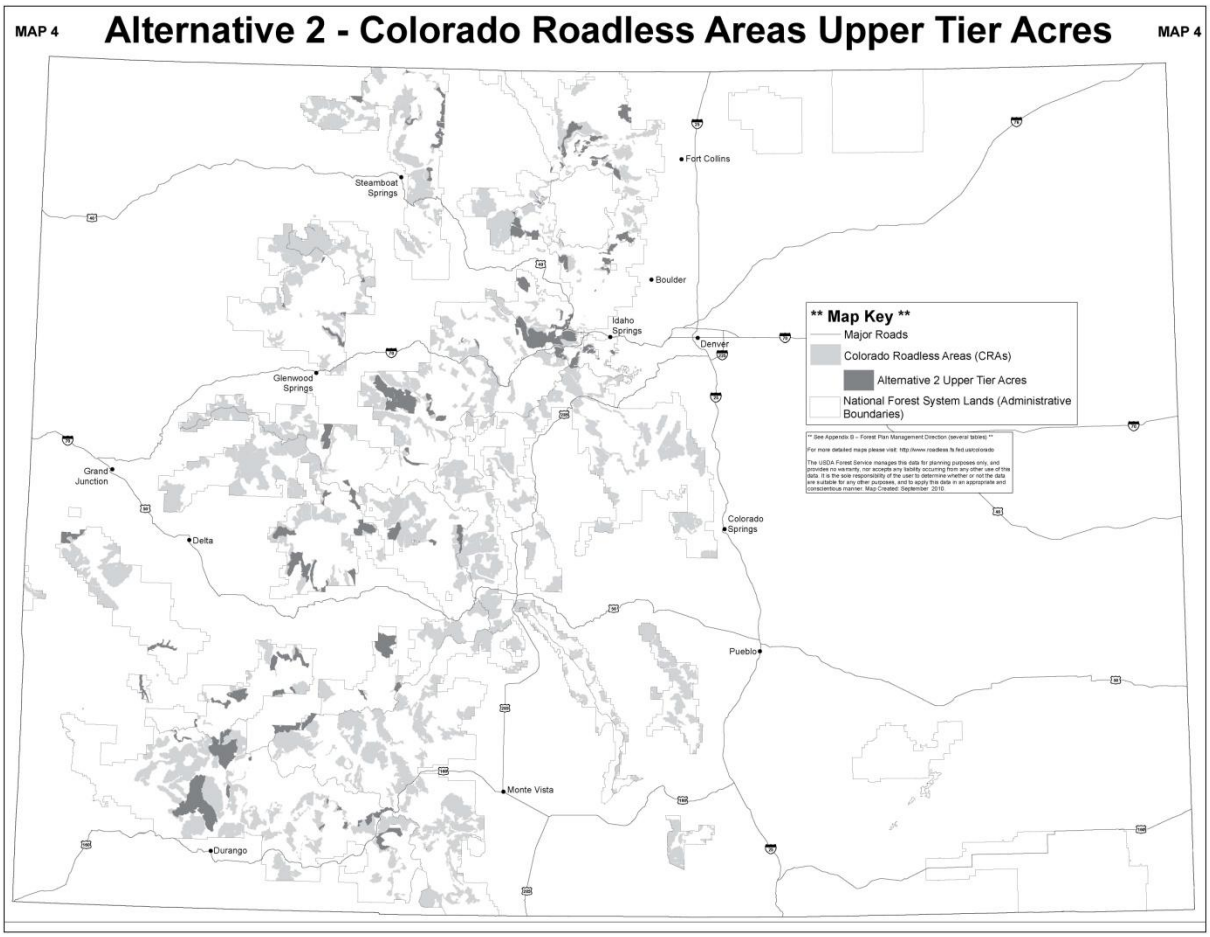

Figure 2. Alternative 2 Proposed Colorado roadless areas with Upper Tier Acres

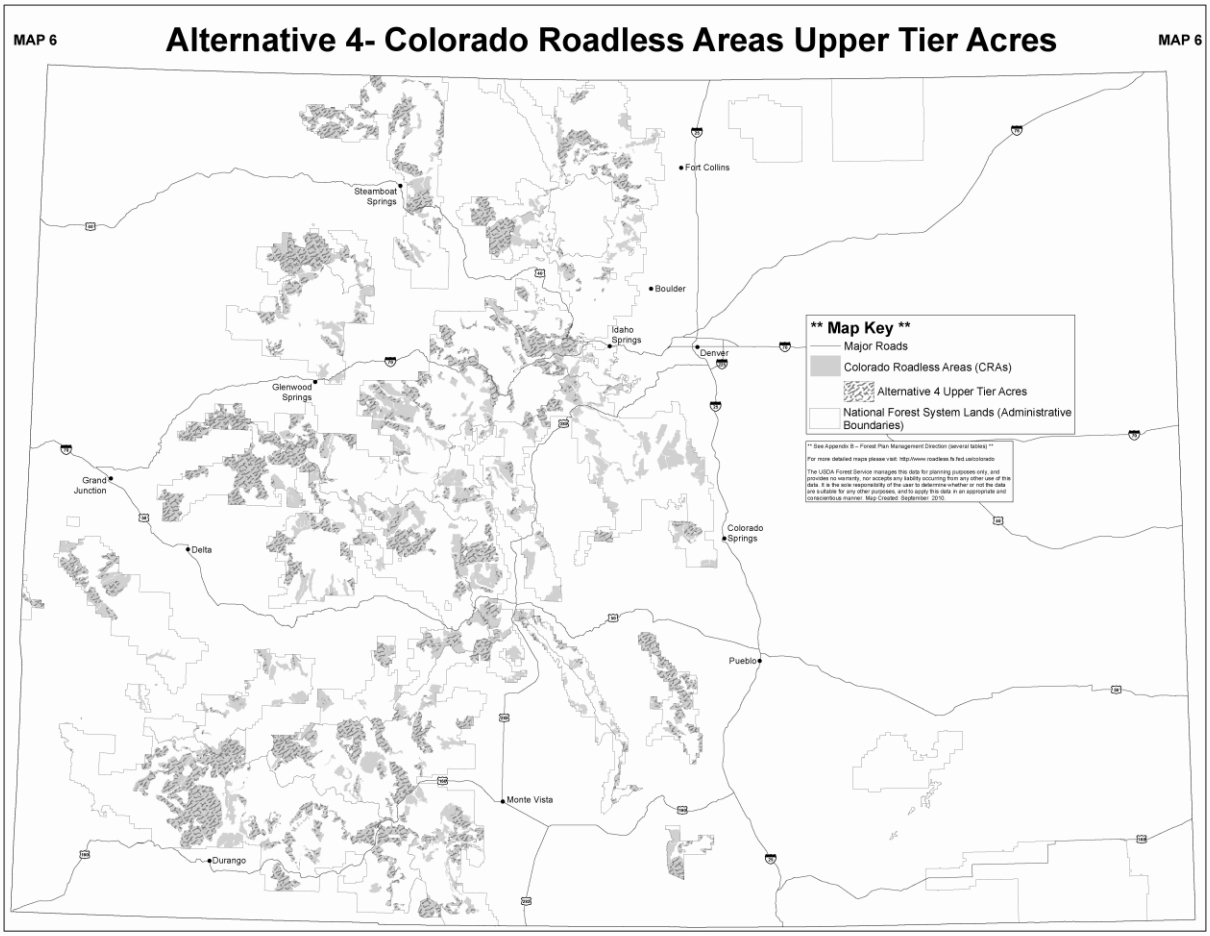

Figure 3. Alternative 4 Proposed Colorado roadless areas with Upper Tier Acres

DECISION FRAMEWORK

The Secretary of Agriculture or a delegated designee will decide whether to promulgate the Colorado Roadless Rule as proposed or one of the other alternatives analyzed in this EIS. Promulgation of a rule involves establishing regulations, which would be issued under Title 36 of the Code of Federal Regulations (CFR) Part 294. The decision to be made involves a choice among the four alternatives analyzed in detail in this EIS, which means determining whether to:

1. Promulgate a state-specific rule to manage IRAs in Colorado pursuant to the provisions contained in the 2001 Roadless Rule (alternative 1); or
2. Promulgate a state-specific rule to manage Colorado's CRAs based on the State's petition (alternative 2) with portions of the CRAs identified as CRA upper tier acres; or
3. Take no action. No state-specific roadless rule would be promulgated. IRAs in Colorado would be managed in accordance with the forest plans in the eight national forests (alternative 3); or
4. Promulgate a state-specific rule to manage Colorado's CRAs based on the State's petition with portions of or entire CRAs identified as CRA upper tier acres different

from those identified under alternative 2 (alternative 4); or

5. Some combination of the provisions and inventories in the above four alternatives.

PUBLIC INVOLVEMENT

The Forest Service and the State of Colorado have solicited public involvement and comments on the development of a Colorado Roadless Rule. Below is a description of the public involvement efforts of the Forest Service and the State of Colorado.

Forest Service Public Involvement

The Forest Service, to date, has solicited public involvement in the following ways:

- On December 27, 2007, the Forest Service published a notice of intent in the Federal Register to prepare an EIS on roadless area conservation on NFS lands in Colorado (Fed. Reg. Vol. 72 No. 246, 72982). The Forest Service solicited comments from interested parties from December 27, 2007 through February 25, 2008. Approximately 88,000 comments were received.
- On July 25, 2008, the Forest Service published a proposed rule to establish state-specific management direction for conserving roadless areas in Colorado (73 FR 43544). A notice of availability for the DEIS was published in the *Federal Register* (73 FR 44991) and legal notice in the newspaper of record on August 1, 2008. The availability of the regulatory risk assessment for the proposed rule was published in the *Federal Register* on September 18, 2008 (73 FR 54125). All comment periods closed on October 23, 2008. In total, approximately 106,000 comments were received.
- The RACNAC held open public meetings in Washington, DC in June of 2007 and January, July and November of 2008. In addition a meeting was held in Salt Lake City, Utah in October of 2008. Public comments were accepted at these meetings, which helped the RACNAC develop their December 5, 2009 recommendations to the Secretary of Agriculture.
- The Forest Service consulted with all potentially affected tribes regarding the proposed rule from October 2007 through October 2008. Tribal consultation on this proposed Colorado Roadless Rule is ongoing.

State of Colorado Public Involvement

In their petition process, the State of Colorado has, to date, solicited public involvement in the following ways:

- Senate Bill 05–243, signed into Colorado law on June 8, 2005, created and identified a 13-member bipartisan task force to make recommendations to the Governor regarding inventoried roadless areas on NFS lands in Colorado. The task force held nine public meetings throughout the State, held six deliberative meetings that were open to the public, and reviewed and considered over 40,000 public comments.
- The State of Colorado held a comment period from August 3 to October 3, 2009 on a State modified version of the July 2008 proposed Colorado Roadless Rule.

TRIBAL CONSULTATION

There are two resident tribes in Colorado – Ute Mountain Ute and Southern Ute – who retain some of their traditional land base as reservations. These two tribes retain specific hunting rights and other aboriginal rights throughout their traditional territory including portions of the roadless areas in Colorado. Over a dozen other tribes located outside Colorado maintain tribal interests, including aboriginal and ceded territories, and inherent aboriginal rights within Colorado. In 1874, Congress approved an agreement between the United States and certain Ute Indians in Colorado, known as the "Brunot Agreement". Under this agreement, the Utes ceded certain land to the United States but reserved a right to hunt on those lands. These lands are predominately on the San Juan National Forest.

The Forest Service has ongoing consultation with all the potentially-affected tribes. Tribal consultation was initiated in October 2007 and no reply letters were received during the scoping period. However, tribal concerns that surfaced during other consultations are discussed in the EIS. Consultation with interested or affected tribes will continue throughout the analysis and decision-making process.

ISSUES

The NEPA implementing regulations at 40 CFR §1501.2 requires federal agencies to develop and evaluate alternatives to recommended courses of action in any proposal that involves unresolved conflict concerning alternative uses of available resources. Public involvement was used to identify points of disagreement about the proposed Colorado Roadless Rule and to identify issues to use as a basis for developing and evaluating alternatives.

Comments that support the purpose of and need for the proposed action are not listed here as issues but are evaluated in this EIS as to how well each alternative addresses the purpose and need (refer to Purpose and Need section for details). For example, the alternatives are evaluated for the degree to which they meet the stated purpose and the need to conserve roadless area characteristics within the context of Colorado specific situations and concerns.

NEPA regulations require the agency to identify and eliminate from detailed study those issues that are not significant or that have been covered by prior environmental review, to narrow the scope of the analysis. Reasons for eliminating issues from detailed study include when the issues are:

- General opinions or position statements not specific to the proposed action
- Addressed by other laws, regulations, or policies
- Not relevant to the potential effects of the proposed action, or otherwise outside the scope of this analysis.

The following issues were eliminated from detailed study in this EIS because they are outside the scope of the decision to be made by the Secretary of Agriculture on the proposed Colorado Roadless Rule relative to other alternatives analyzed in this EIS (refer to sections on Decision Framework and Scope and Applicability of the Rule):

- National Park Service management issues

- General conditions of public lands
- Conditions of roads and facilities on national forests
- Political motivations or integrity of government officials
- Public participation processes or procedures
- Funding priorities and government expenditures
- Alternative energy on national forests
- Wilderness protection or recommendations for wilderness designation
- Motorized vehicle use and routes or other travel management topics
- Access associated with livestock grazing permits and allotment management
- How the proposed Colorado Rule may set a precedent for management of roadless areas in other states.

The following issues were carried through the analysis process to evaluate differences in the consequences among the alternatives.

Issue—Potential effects to opportunities for community wildfire protection. Prohibiting road construction or reconstruction and tree-cutting, sale or removal can influence the effectiveness of efforts to reduce wildfire impacts to communities and water supply systems.

Issue – Potential loss of roadless area characteristics. The exceptions, in which road construction or reconstruction, use of LCZs, tree-cutting, sale or removal, and some other activities may occur in roadless areas under the proposed Colorado Roadless Rule, may result in a loss of roadless area characteristics.

Issue – Potential loss of opportunities to explore for and develop oil and gas resources. Prohibiting road construction or reconstruction to access oil and gas basins in roadless areas that have not been leased prior to the effective date of rulemaking may result in a loss of opportunities to explore for and develop oil and gas resources in those areas.

Issue – Potential reduction in native species diversity. The exceptions, under which road construction or reconstruction, use of LCZs, tree-cutting, sale or removal, and some other activities may occur in roadless areas under the Colorado Roadless Rule, may affect populations of wildlife, fish, and plants, including the potential for:

- An increase in the prevalence of invasive plants, animals, and other organisms that can out-compete and dominate diverse native plant and animal communities.
- A loss or reduction of wildlife or fish habitat or population viability, resulting from reductions in unfragmented interior habitat, migration corridor connections, and security and quality of habitat for some "at risk" species or important game species.
- A loss or reduction of threatened, endangered, or sensitive plant species habitat or populations.

Issue – Potential loss of opportunities to explore for and develop coal resources outside the North Fork coal area. Prohibiting construction/reconstruction of roads to access coal reserves in areas that have not been leased (prior to the effective date of rulemaking) and/or are located outside the North Fork coal mining area may result in a loss of opportunities to explore for and

develop coal resources in those areas.

Issue - Potential reduction in soil and water quality. Wildfire effects can also reduce soil and water quality. The effects of wildlife could potentially be reduced by fuels treatments. On the other hand, the exceptions in which road construction or reconstruction, the use of LCZs, and tree-cutting, sale or removal may occur in roadless areas under the proposed rule may result in a decline in soil or water quality, including the potential for:

- Accelerated soil erosion or other soil impacts that can affect long-term productivity.
- Increases in stream sedimentation that can affect water quality and water uses off-site and downstream from the roadless areas.

Issue - Potential reduction in semi-primitive recreation and related values. The exceptions in which road construction or reconstruction, use of LCZs, tree-cutting, sale or removal, and some other activities may occur in roadless areas under the proposed Colorado Roadless Rule may result in a reduction in semi-primitive recreation opportunities away from the sights and sounds of human activities and built environments, including the potential for:

- A reduction in opportunities for solitude
- A reduction in scenic quality
- Reductions in scientific and heritage benefits that might be derived from preserving the undeveloped nature of roadless areas for future generations

Issue – Potential loss of opportunity to feasibly transport oil and gas resources using pipelines. Prohibiting oil and gas pipelines from going through roadless areas from lands outside roadless areas may result in a loss of opportunity to feasibly extract and transport oil and gas resources.

ALTERNATIVES

- **Alternative 1: Provisions of the 2001 Roadless Area Conservation Rule (2001 Roadless Rule)**. This alternative establishes a state-specific roadless rule for Colorado that retains IRA boundaries and roadless area management provisions for management of roadless areas on NFS land in Colorado contained in the 2001 Roadless Rule. If a decision is made to select this alternative, it would not revoke, suspend, or modify any permit, contract or other legal instrument authorizing the occupancy and use of NFS lands issued before the effective date of the final Rule.
- **Alternative 2: Proposed Action, Colorado Roadless Rule**. This alternative establishes a state-specific roadless rule for Colorado. It modifies Alternative 2 from the DEIS based on public comments and the revised petition submitted by the State of Colorado. It is based on the provisions of the 2001 Roadless Rule, but provides prohibitions and specific exceptions relevant to the State of Colorado. There are 562,200 acres identified as CRA upper tier under this alternative. Upper tier acres have fewer exceptions to the prohibitions than the other CRA acres. If a decision is made to select this alternative, it would not revoke, suspend, or modify any permit, contract or other legal instrument authorizing the occupancy and use of NFS lands issued before the date of the final Rule.

- **Alternative 3: No Action, Forest Plan Direction.** This alternative does not establish a state-specific roadless rule for Colorado and all lands in the IRAs and CRAs would be managed according to forest plan direction. The boundaries of the roadless areas shown in this alternative for information purposes are those in the most recent forest plans and are the same IRAs as those in alternative 1.
- **Alternative 4: Colorado Roadless Rule with Public Proposed Upper Tier**. This alternative establishes a state-specific roadless rule for Colorado. This alternative provides the same prohibitions and exceptions as alternative 2. The difference is that 2,614,200 acres are identified as CRAs upper tier acres in this alternative (over 2 million more acres in upper tier than alternative 2). If a decision is made to select this alternative, it would not revoke, suspend, or modify any permit, contract or other legal instrument authorizing the occupancy and use of NFS lands issued before the date of the final Rule.

Features Common to All Alternatives

The following features apply equally to all alternatives and are not repeated in the alternative descriptions.

- **Federal and State Requirements.** Management of NFS lands in Colorado are governed by a variety of federal statutes, regulations, executive orders, and the Forest Service Directive System. In addition, some State and local laws and regulations apply on NFS lands within the State. All alternatives in this analysis assume that these governing authorities are not affected.[4]
- **Forest Plans.** The National Forest Management Act (NFMA) and its implementing regulations at 36 CFR 219 obligate the Forest Service to develop, amend, or revise forest plans. Direction set forth in forest plans for the national forests in Colorado would continue to govern project and activity decision-making on NFS lands, including roadless areas except where the direction contained in the chosen alternative is more restrictive.
- **Project Specific Environmental Analysis.** All future proposals for road construction and reconstruction, tree-cutting and removal, and other activities that are permissible under any alternative must undergo appropriate environmental analysis and decision-making processes pursuant to NEPA and its implementing regulations.
- **Reserved and Outstanding Rights.** Under all alternatives, the exercise of outstanding rights for access, occupancy, and use of NFS lands within designated roadless areas would not be affected. These include those that exist by law, treaty rights or other authority.
- **Existing Land Use Authorizations.** All of the alternatives allow for the continuation, transfer, or renewal of valid and existing land use authorizations (in permits, contracts, and other written instruments) for activities in roadless areas, for those authorizations that exist at the time the applicable roadless rule becomes effective. For clarification,

[4] *One example of a federal statute is the General Mining Law of 1872, which would allow for road construction and use within roadless areas as needed for the exploration and development of valid claims of locatable ("hard rock") minerals.*

"existing" authorizations under the alternatives that establish a state-specific roadless rule for Colorado (alternatives 1, 2 and 4) would be those that currently exist or are issued prior to adoption of the final rule. Most land use authorizations are discretionary and authorized by the Secretary of Agriculture or his designated Forest Service official. Examples include but are not limited to the following land uses:

- Use of existing roads and trails, including motorized travel on roads and trails
- Livestock grazing
- Recreational activities, including but not limited to hunting, fishing, hiking, camping, mountain biking, and skiing.

Management of congressionally designated areas is governed by legislated direction that overrides rulemaking direction for management of roadless areas. Therefore, for the purposes of this analysis, 185,000 acres of congressionally designated areas are not included in roadless areas under any alternative.

All alternatives identify specific areas to be managed as roadless areas. For purposes of this analysis, alternatives 1 and 3 have the same IRA boundaries. Alternatives 2 and 4 propose modifications of those roadless area boundaries and are referred to as CRAs. The area analyzed for environmental effects is the same for all alternatives. Analysis for each alternative considers both those areas within each alternative's roadless inventory and managed as roadless according to that alternative; and those areas outside each alternative's roadless inventory that is managed according to each respective forest plan. Under alternative 3, all areas are managed according to the forest plan.

Alternative 1: Provisions of the 2001 Roadless Rule

This alternative establishes a state-specific roadless rule for Colorado that retains IRA boundaries[5] and roadless area management provisions contained in the 2001 Roadless Rule for management of roadless areas on NFS land in Colorado. The newly identified roadless acres (409,500) are not within the IRAs and would be managed according to forest plan direction under this alternative.

Alternative 1 would allow roads to be constructed or reconstructed in roadless areas under certain circumstances, such as those needed for:

- Protect public health and safety
- Emergency environmental response under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Reserved and outstanding rights, existing land use authorizations
- Road-related resource damage
- Certain federal highway projects
- Road traffic safety

[5] *Congressionally designated acres as well as mapping errors associated with private lands and Wilderness have been eliminated from the IRA boundaries; 4.24 million acres in IRAs.*

- Reasonable access to leaseable minerals in existing lease areas.

Alternative 1 allows tree-cutting, sale, or removal in IRAs under certain conditions, such as:

- To maintain or improve threatened, endangered, proposed, or sensitive species habitat
- To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects
- Where it is incidental to the implementation of a management activity not otherwise prohibited by this subpart
- Where needed for personal or administrative uses provided for in 36 CFR Part 223- Sale and Disposal of National Forest System Timber
- Within portions of IRAs where roadless area characteristics have been substantially altered by the construction of a NFS road and subsequent timber harvest.

Alternative 2: Proposed Action – Colorado Roadless Rule

Under alternative 2, the Colorado Roadless Rule, approximately 4.19 million acres of NFS lands in Colorado would be identified as CRAs. The Colorado Roadless Rule establishes general prohibitions on road construction and reconstruction, LCZs, and tree-cutting, sale or removal within CRAs, while permitting those activities under certain exceptions to address State and local land management needs. Under this alternative, substantially altered acres within the IRAs have been removed from the CRA inventory and would be managed following forest plan direction. An additional 409,500 roadless acres were added to the inventory.

This alternative designates 562,200 acres as CRA upper tier acres[6] . These areas were identified in forest plans, or during forest plan revision processes, as areas where tree-cutting and road building restrictions would be appropriate.

Alternative 2 generally prohibits the cutting, sale, or removal of trees within CRAs with limited exceptions. The Responsible Official must first determine the activity is consistent with the applicable forest plan, and one or more of the roadless area characteristics would be maintained or improved over the long-term (except for where tree-cutting is incidental or for personal or administrative uses). Tree-cutting is allowed in the upper tier only for the following two exceptions:

- Purposes incidental to management activities that are not otherwise prohibited by this proposed Rule;
- Personal or administrative use, as provided for in 36 CFR 223- Sale and Disposal of National Forest System Timber.

For the standard tier acres (CRA acres not designated as upper tier acres, also referred to as "non-upper tier acres"), the above exceptions apply as do these:

- The Regional Forester determines tree-cutting is needed to reduce the wildfire hazard to an at-risk community or municipal water supply system when within the first ½ mile of

[6] *Colorado Roadless Areas upper tier acres refer to areas identified in a set of maps maintained at the national headquarters office of the Forest Service, including records regarding any adjustments or modifications to such maps. Further detail on the upper tier acres are found in Appendix Table B-8.*

the community protection zone or within the next one-mile of the community protection zone where proposed projects are within an area identified in a Community Wildfire Protection Plan (CWPP). Projects would focus on small diameter trees to create fuel breaks that modify fire behavior while retaining large trees to the maximum extent practical as appropriate to the forest type;

- The Regional Forester determines tree-cutting is needed outside of the community protection zone where there is a significant risk that a wildland fire disturbance event could adversely affect a municipal water supply system or the maintenance of the system. Projects would focus on cutting and removing generally small diameter trees to create fuel breaks that modify fire behavior while retaining large trees to the maximum extent practical as appropriate to the forest type;
- Tree-cutting is needed to maintain or restore the characteristics of ecosystem composition, structure and processes; or
- To improve threatened, endangered, proposed, or sensitive species habitat in coordination with the Colorado Department of Natural Resources including the Colorado Division of Wildlife.

Roads may only be constructed in CRAs if the responsible official determines that certain limited circumstances exist. Before allowing road construction, the official must consider a no-road option and a temporary road option. All temporary roads constructed in CRAs would be decommissioned and the affected landscape restored when the road is no longer needed. Within a native cutthroat trout catchment or identified recovery watershed, the responsible official must determine that road construction would not diminish, over the long-term, conditions in the water influence zone and in the native cutthroat habitat.

The exceptions in alternative 2 that would allow roads to be constructed or reconstructed in CRAs are those needed to:

- Exercise reserved and outstanding rights, or as provided for in statute and treaty; this is the only exception for road construction applicable to the upper tier acres within the CRAs;
- Repair road-related resource damage;
- Improve road traffic safety; or
- The Regional Forester determines a road is needed for the construction, reconstruction, or maintenance of water conveyance structures operated pursuant to a pre-existing water court decree.

The exceptions in alternative 2 that would allow temporary roads to be constructed or reconstructed in CRAs are:

- For public health and safety;
- When the Regional Forester determines a temporary road is needed to facilitate tree-cutting, sale or removal to reduce the wildfire hazard to an at-risk community or municipal water supply system within the first one-half mile of a community protection zone;
- When the Regional Forester determines a temporary road is needed to facilitate tree-

cutting to maintain or restore the characteristics of ecosystem composition, structure and processes within the first one-half mile of the community protection zone;

- For exploration or development of an existing oil and gas lease that otherwise does not prohibit road construction or reconstruction; or
- For coal exploration and coal-related activities in the 20,000 acre North Fork coal mining area.

Roads constructed in CRAs under all circumstances would be closed to public motorized use. Those roads may be used for authorized or administrative purposes, including emergencies and law enforcement purposes.

Alternative 2 generally prohibits the use of linear construction zones within CRAs. Exceptions to the prohibitions are when the Regional Forester determines motorized access without a linear construction zone is not technically feasible; that within a native cutthroat trout catchment or identified recovery watershed, a linear construction zone would not diminish, over the long-term, conditions in the water influence zone and in the native cutthroat habitat; a linear construction zone is consistent with the applicable land management plan direction; and one of the following exceptions applies:

- The construction, reconstruction, or maintenance of water conveyance structures operated pursuant to a pre-existing water court decree
- The construction, reconstruction, or maintenance of existing or future authorized electrical power lines or telecommunication lines, if there is no opportunity for the lines to be implemented outside a CRA without causing substantially greater environmental damage.
- Where the Regional Forester determines a linear construction zone is needed to allow for the construction or reconstruction of a pipeline associated with an oil and gas lease that allows surface use within a CRA or the construction or reconstruction of a pipeline needed to connect to existing infrastructure within a CRA from outside a CRA where such a connection would cause substantially less environmental damage than alternative routes. The construction of pipelines for the purposes of transporting oil or natural gas through a CRA where the source(s) and destination(s) of the pipeline are located exclusively outside of a CRA shall not be authorized.

Alternative 3: Forest Plans

Alternative 3 does not establish a state-specific roadless rule for Colorado and all lands would be managed according to direction in the forest plans for the eight national forests in Colorado. This alternative serves as the required baseline (per regulations at 40 CFR 1502.14) for comparison of alternatives. This alternative displays roadless areas in each forest plan or its associated records of decision which currently coincide with the 2001 Roadless Rule IRAs as described in alternative 1. As with alternative 1, the roadless areas under alternative 3 cover 4.24 million acres.

Forest plan direction that applies to the management of all lands within the IRAs and the CRAs includes forest plan goals (desired conditions), objectives, forest-wide standards and guidelines, management area standards and guidelines, and descriptions of suitable uses. In each forest plan, roadless areas overlap a number of different land management allocations.

Forest plans may be updated through an amendment or revision process to reflect changed conditions or specific public or management needs. The revision process includes a review and update of the roadless area inventory of potential wilderness areas for evaluation as recommended wilderness. In addition, project-level amendments to forest plans may be made to make a specific project consistent with the forest plan. Subsequent forest plan amendments and revisions may result in changes to roadless area boundaries or management direction. In the past few years, the trend has been to allocate more roadless areas to management prescriptions that conserve roadless area characteristics.

Alternative 3 follows forest plan direction regarding road construction and reconstruction and applicable Forest Service directives and regulations. The directives and regulations discourage construction of new permanent roads and require responsible officials to minimize the miles of permanent roads to those determined to be necessary. Furthermore, the directives encourage use of temporary roads when needed for single-use projects and authorizations.

Alternative 3 differs from the other three alternatives in that it does not include a general prohibition on road construction or reconstruction in the roadless areas. Road construction in these roadless areas is prohibited or limited only where there is specific forest plan direction. Forest plan direction for road construction and reconstruction generally falls into one of four categories:

- **Road construction is prohibited** except where needed for reserved and outstanding rights or other exemptions mandated by law, regulation, or policy
- **Road construction is generally restricted** based on a desired condition or a guideline; not a mandatory restriction
- **Road construction is limited** under certain circumstances, such as those related to the purpose for the road, road density standards, or protection of natural resources
- **Road construction is allowed** for any multiple-use management need, where consistent with law, regulation, or policy.

Appendix B of the EIS contains more details about road construction and tree-cutting permissions and prohibitions under forest plan direction for each national forest. A map of Alternative 3 in the EIS map packet shows how forest plan direction applies to each IRA. Further details on how forest plan direction applies to the IRAs are contained in the EIS record.

Under alternative 3, there is no general prohibition on tree-cutting, sale, or removal within the IRAs. Tree-cutting, sale, or removal would be allowed in IRAs anywhere those activities are not specifically prohibited or limited by forest-wide or management area direction in the applicable forest plan.

Like road construction and reconstruction, forest plan direction for tree-cutting, sale or removal generally falls into one of four categories:

- **Tree-cutting, sale, or removal is prohibited** except where needed for reserved and outstanding rights, or for other exemptions mandated by law, regulation, or policy
- **Tree-cutting, sale, or removal is generally restricted** based on desired conditions or guidelines; non-mandatory direction
- **Tree-cutting, sale, or removal is limited** to certain circumstances, such as those related

to the purpose of the activity or protection of natural resources

- **Tree-cutting, sale, or removal is allowed** as needed to meet multiple-use management purposes.

Although management direction in the forest plans regarding tree-cutting differs by national forest, some direction is common among plans. Common to all forest plans, tree-cutting for non-timber purposes such as hazardous fuel reduction or wildlife habitat improvement may occur on NFS lands that are considered unsuitable for timber production. Also common to all forest plans, tree-cutting for timber production purposes is limited to NFS land identified as suitable for timber production.

Forest Service planning regulations allow forest plans to be amended or revised such that the permissions or prohibitions on road construction or tree-cutting are subject to change over time. These changes in forest plan direction may occur as long-term programmatic amendments or shorter-term project-specific amendments, or as forest plan revisions.

Alternative 4: Colorado Roadless Rule with Public Proposed Upper Tier Acres

Alternative 4 has the same general prohibitions on tree-cutting, sale or removal, road construction and reconstruction, and LCZs within CRAs, while permitting those activities under the same exceptions as alternative 2. Identical to alternative 2, substantially altered acres within the IRAs have been removed from the CRA inventory and would be managed following forest plan direction, and 409,500 roadless acres have been added to the inventory.

The only difference between alternative 4 and alternative 2 is that alternative 4 designates 2,614,200 acres as CRA upper tier acres.[7] Under this alternative, roads would be allowed on a portion of the CRA upper tier acres that contain existing oil and gas leases.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by the National Environmental Policy Act (NEPA) regulations to explore and evaluate all reasonable alternatives to a proposed action and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

Three alternatives were submitted in response to information from scoping and comments on the DEIS and were considered and eliminated from detailed study. Below is a description of each of the three alternatives and the reasons why the alternative was eliminated from detailed study:

- An alternative that provides the roadless area conservation provisions from alternative 1, together with the CRA boundaries from alternative 2.

This alternative is similar to alternative 1. The provisions of the 2001 Roadless Rule do allow for updating of the Inventoried Roadless Area maps[8]. This alternative is within the range of the

[7] *Further details on the CRA upper tier acres in Alternative 4 are found in Appendix C and Map 6 in the map packet.*

[8] *In §294.11 Definitions for Inventoried Roadless Area is: "Areas identified in a set of inventoried roadless area maps, contained in Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps."*

alternatives and could be selected as alternative 1 modified because it falls within the range of the alternatives analyzed in this EIS and to eliminate redundancy in the analysis.

- An alternative that allows for more commercial use such as increased timber harvesting.

Alternative 3 allows for increased levels of commercial use. Another alternative that allows for increased levels of commercial use compared to alternative 2, but less than alternative 3, while meeting the purpose and need of protecting roadless area characteristics would not result in differences that can be meaningfully analyzed.

- An alternative that offers reduced road densities, creation of new roadless areas, and more protective management than any of the alternatives analyzed in the DEIS.

Reducing road densities is outside the scope of this rule-making and decision framework and is best decided during travel management analysis. In addition, alternatives 2 and 4 allow for additions to CRAs, if needed. Alternatives 2 and 4, in response to public comments, have identified CRAs or portions of CRAs that are proposed to be managed as upper tier acres. On upper tier acres, more limited exceptions to the tree-cutting and road construction prohibitions are allowed. Additional protections would not meet the purpose and need to accommodate state-specific situations and concerns.

ENVIRONMENTAL CONSEQUENCES

This section compares the estimated environmental consequences of each alternative in summary form (Table 2). These environmental consequences are described in detail in chapter 3 of the full EIS, and are summarized at the end of chapter 2 of the full EIS. The comparison table focuses on the key differences among the alternatives and the most likely consequences. Comparisons are based on the purpose and need for the proposed Colorado Roadless Rule as well as the issues associated with this proposed action, as previously described. Because the proposed rulemaking and its alternatives are broad, programmatic, and do not involve any proposed site-specific actions, the consequences are appropriately broad and qualitative rather than quantitative.

Table 2. Comparison of alternatives by environmental consequences (refer to chapter 3 for details)[9]

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Fire and Fuels	1,800 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year (900 acres within IRAs). Least flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems.	5,900 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year (5,300 acres within CRAs). Medium flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems. Unable to conduct hazardous fuels reduction on 12% of 0.5 mile CPZ and 13% of 1.5 mile CPZ due to upper tier acre prohibitions.	13,100 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year. Greatest flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems.	2,200 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year (1,600 acres within CRAs). Within the CRAs that are not upper tier acres, the flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems is identical to alternative 2. Unable to conduct hazardous fuels reduction on 48% of 0.5 mile CPZ and 52% of 1.5 mile CPZ due to upper tier acre prohibitions.
Ecosystem Composition, Structure and Processes	500 acres per year in the analysis area have projected tree-cutting activities (300 acres within IRAs) for forest health purposes. Fewest opportunities to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors.	1,000 acres per year in the analysis area have projected tree-cutting activities for forest health purpose (400 acres within CRAs). More opportunities than alternatives 1 and 4, but fewer opportunities than alternative 3 to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors. Unable to treat upper tier acres.	3,500 acres per year within the analysis area have projected tree-cutting activities for forest health purposes. Greatest opportunities to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors.	800 acres per year in the analysis area have projected tree-cutting activities for forest health purposes (200 acres within CRAs). More opportunities to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors than alternative 1 but less than alternative 3 and alternative 2 due to upper tier acres.

[9] *The analysis area is all acres within either the IRAs or the CRAs, or acres that are common between the two and are within both the IRAs and the CRAs. This totals 4,653,100 acres. Table 3-1 explains this in more detail.*

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Aquatic Species and Habitat	Least risk for adverse impacts on aquatic species. Site specific design criteria and mitigation measures are expected to minimize risk.	More risk than alternatives 1 and 4, less than alternative 3 for adverse impacts on aquatic species. Site specific design criteria and mitigation measures are expected to minimize risk.	Greatest risk of adverse impacts on aquatic species. Site specific design criteria and mitigation measures are expected to minimize risk.	Less risk for adverse impacts on aquatic species than alternatives 2 and 3; greater risk than alternative 1. Site specific design criteria and mitigation measures are expected to minimize risk.
Threatened Endangered or Sensitive Plants	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. Least risk to adverse impacts to sensitive plants Site specific design criteria and mitigation measures are expected to minimize risk.	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. More risk of adverse impacts to sensitive plants than alternatives 1 or 4; less than alternative 3. Site specific design criteria and mitigation measures are expected to minimize risk.	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. Greatest risk of adverse impacts to sensitive plants. Site specific design criteria and mitigation measures are expected to minimize risk.	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. More risk of adverse impacts to sensitive plants than alternative 1; less than alternatives 2 or 3. Site specific design criteria and mitigation measures are expected to minimize risk.

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Economics	Average annual jobs associated with –	Average annual jobs associated with –	Average annual jobs associated with –	Average annual jobs associated with –
	Oil/gas drilling = 489 jobs	Oil/gas drilling = 489 jobs	Oil/gas drilling = 553 jobs	Oil/gas drilling = 489 jobs
	Oil/gas production = 360 jobs	Oil/gas production = 360 jobs	Oil/gas production = 406 jobs	Oil/gas production = 360 jobs
	Coal production = 1,033 jobs	Coal production = 1,912 jobs	Coal production = 1,912 jobs	Coal production = 1,912 jobs
	Average annual labor income associated with –	Average annual labor income associated with –	Average annual labor income associated with –	Average annual labor income associated with –
	Oil/gas drilling = $25.3 million	Oil/gas drilling = $25.3 million	Oil/gas drilling = $28.6 million	Oil/gas drilling = $25.3 million
	Oil/gas production =$ 24.6 million	Oil/gas production =$ 24.6 million	Oil/gas production =$ 27.8 million	Oil/gas production =$ 24.6 million
	Coal production = $75.2 million	Coal production = $139.1 million	Coal production = $139.1 million	Coal production = $139.1 million
	Average annual value of production associated w/ –	Average annual value of production associated w/ –	Average annual value of production associated w/ –	Average annual value of production associated w/ –
	Oil/gas drilling = $156.9 million	Oil/gas drilling = $156.9 million	Oil/gas drilling = $177.6 million	Oil/gas drilling = $156.9 million
	Oil/gas production = $269.4 million	Oil/gas production = $269.4 million	Oil/gas production = $303.9 million	Oil/gas production = $269.4 million
	Coal production = $305.9 million	Coal production = $566.2 million	Coal production = $566.2 million	Coal production = $566.2 million
	No difference expected between alternatives at the State level in recreation, tourism, or wood products due to the lack of project specific data needed for analysis, and the ability to substitute sites and resources at the larger, State-wide scale.			
Soils	No major difference among alternatives related to the risk of soil impacts. Alternatives 1 and 4 would have the least risk of adverse effects, and alternative 2 would have a slightly higher risk, followed by alternative 3. However, these differences are insignificant because they would be small in magnitude and spread over a wide geographic area. Most of the potential effects would be mitigated by site-specific mitigation measures. The risk of post-fire soil erosion may be higher under alternative 1 and lowest under alternative 3 as a result of projected levels of fuel treatments.			

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Developed Ski Areas	Least opportunities for ski area development and expansion. 6,600 acres within the IRA boundaries and under permit prior to the effective date of rulemaking would allow for road construction and tree-cutting, sale or removal. Forest Plan allocations for ski areas outside of existing permit areas (1,700 acres) would prohibit road construction.	Greater opportunity for ski area development and expansion. Forest Plan allocations for ski areas outside of existing permit areas (1,700 acres) would allow road construction and tree-cutting more than alternative 1.	Forest plans can be amended or revised to expand ski area allocations beyond the current allocation.	Same as alternative 2.
Scenic Quality	Least risk to scenic resources.	More risk to scenic resources than alternatives 1 and 4. Upper tier acres same as alternative 1.	Greatest risk to scenic resources.	Same as alternative 2 within CRA boundaries that are not upper tier; upper tier areas same as alternative 1.
Social Values	No disproportionate negative impact on minority or low-income groups as defined in the Bureau of the Census' Current Population Reports. Preference towards preservation of non-development social values.	No disproportionate negative impact on minority or low-income groups as defined in the Bureau of the Census' Current Population Reports. Slightly less than alternative 1 preference towards non-development social values.	No disproportionate negative impact on minority or low-income groups as defined in the Bureau of the Census' Current Population Reports. Less preference towards non-development social values than alternatives 1, 2, and 4.	Same as alternative 2.
Terrestrial Species and Habitat	Least risk to terrestrial species and habitat. Site specific design criteria and mitigation measures are expected to minimize risk.	More risk than alternative 1 and 4 to terrestrial species and habitat. Tree-cutting to improve habitat for TEPS species prohibited in upper tier acres. Site specific design criteria and mitigation measures are expected to minimize risk.	Greatest risk to terrestrial species and habitat. Site specific design criteria and mitigation measures are expected to minimize risk.	More risk than alternative 1 to terrestrial species and habitat. Tree-cutting to improve habitat for TEPS species prohibited in upper tier acres. Site specific design criteria and mitigation measures are expected to minimize risk.

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Recreation Settings	Likely to retain the greatest proportion of acreage in primitive or semi-primitive settings The substantially altered portion of the IRA inventory would continue to be inconsistent with primitive or semi-primitive settings. The newly identified roadless acres (409,500 acres) where road construction and tree-cutting, sale or removal is projected to occur that are not within the IRAs could shift to less primitive settings.	Likely to retain a high proportion of acreage in primitive or semi-primitive settings. However, some areas where road construction and tree-cutting, sale or removal is projected to occur could shift to less primitive settings. The exclusion of the substantially altered acreage and inclusion of new roadless acres would create a more homogeneous primitive or semi-primitive recreation setting.	Least likely to retain a high proportion of acreage in primitive or semi-primitive settings; especially where road construction and tree-cutting, sale or removal is projected to occur.	Same as alternative 2.
Lands-Special Use Authorizations	Special use authorizations issued prior to the effective date of rulemaking would be unaffected. Future special use authorizations in IRAs would generally prohibit road construction. There would be no prohibition on the use of LCZs for future electrical power lines or telecommunication lines, water conveyance structures and oil and gas pipelines from sources outside of IRAs.	Special use authorizations issued prior to the effective date of rulemaking would be unaffected. Future special use authorizations in CRAs would generally prohibit road construction. Limited exceptions for the use of LCZ for future electrical power lines or telecommunication lines, water conveyance structures and oil and gas pipelines from sources outside of CRAs.	Current and future special use authorizations would generally allow for road construction; except where prohibited under forest plans. There would be no prohibition on the use of LCZs for future electrical power lines or telecommunication lines, water conveyance structures or oil and gas pipelines.	Same as alternative 2.

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Invasive Plants	Least risk of spread of invasive plants because this alternative has the least projections of road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Slightly higher risk than alternatives 1 and 4 for the spread of invasive plants because this alternative has a higher projection of road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Greatest risk of the spread of invasive plants because this alternative has the highest projections for road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Slightly higher risk than alternative 1 but less than alternative 2 for the spread of invasive plants because this alternative has a higher projection of road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.
Cultural Resources	Least risk of damage to cultural resources because this alternative has the least projections for tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Slightly higher risk of damage to cultural resources than alternative 1 because this alternative has a high projection of tree-cutting, sale or removal and road construction. Site specific design criteria and mitigation measures are expected to minimize risk.	Highest risk of damage to cultural resources because this alternative has the highest projection of tree-cutting, sale or removal and road construction. Site specific design criteria and mitigation measures are expected to minimize risk.	Less risk than alternative 2 due to more acres in the upper tier. Site specific design criteria and mitigation measures are expected to minimize risk.
Roadless Area Characteristics	Minimal effect to roadless area characteristics because there is little projected activity to occur. No consideration or regulatory protection of roadless area characteristics on 409,500 acres outside of IRA boundaries.	Minimal effect to roadless area characteristics because there is little projected activity to occur. Consideration and protection of roadless area characteristics on 409,500 acres within CRA boundaries.	More effect to roadless area characteristics because there is an increase in projected activities to occur compared to the other alternatives. Some risk of adverse effects to roadless area characteristics because there are no regulatory prohibitions on road construction, use of linear construction zones or tree-cutting, sale or removal on any of the analysis area.	Minimal effect to roadless area characteristics because there is little projected activity to occur. Consideration and protection of roadless area characteristics on 409,500 acres within CRA boundaries.
Air Resources	Differences in effects on air quality do not substantially differ between the alternatives. Atmospheric emissions within the analysis area are not expected to increase to a level that would be likely to exceed State or federal air quality standards.			

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Administratively and Congressionally Designated Areas	There are no differences between the alternatives to administratively or congressionally designated areas because none of the alternatives project tree-cutting, sale or removal or road construction in administratively designated areas and tree-cutting, sale or removal or road construction is prohibited in congressionally designated areas.			
Wilderness	Alternatives 1 and 2 have a low likelihood of affecting wilderness characteristics because tree-cutting, sale or removal and road construction are prohibited in Wilderness areas and projected activities within roadless areas are not expected to occur adjacent to Wilderness area boundaries.		Higher risk of adverse effect to wilderness areas because of the high projections for tree-cutting, sale or removal and road construction and a higher likelihood that these activities could occur adjacent to Wilderness boundaries.	Same as alternatives 1 and 2.

CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

The Forest Service has prepared this environmental impact statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal laws and regulations. This EIS discloses the potential environmental consequences that may result from the proposed action and alternatives.

DOCUMENT STRUCTURE

This EIS document is organized into five chapters followed by appendices and related documentation:

- **Chapter 1 – Purpose of and Need for Action.** Chapter 1 presents the background information about the proposed action, the purpose of and need for the proposed action, and a summary of the proposed action. This chapter also summarizes how the Forest Service informed and involved the public, and presents the issues related to the proposed action.
- **Chapter 2 – Alternatives, Including the Proposed Action.** Chapter 2 provides a detailed description of the proposed rulemaking action and alternatives to the proposal, including the no-action alternative. This chapter ends with two summary tables: one displays the features of alternatives considered in detail, and the other shows the environmental consequences associated with each alternative, based on the detailed descriptions in chapter 3.
- **Chapter 3 – Affected Environment and Environmental Consequences.** Chapter 3 describes the resources that may be affected by the proposed action or alternatives, followed by the potential environmental consequences that could result from each alternative. It is organized by biological, physical, social, and economic topics.
- **Chapter 4 – Preparers and EIS Distribution.** Chapter 4 provides a list of preparers and a list of agencies, organizations, and persons to whom copies of the statement are sent.
- **Chapter 5 - References Cited.** References Cited contains an alphabetized list of references used in the preparation of this EIS.
- **Appendices.** The appendices provide additional detailed information to support the analyses presented in this EIS.
- **Index.** The index provides page numbers for finding key topics in the EIS.

Supporting documents for this EIS may be found in the EIS record, located at the Forest Service's Rocky Mountain Regional Office, 740 Simms Street, Lakewood, CO. Some supporting documents, including Colorado Roadless Area profiles and national forest maps showing roadless area locations, are available on the Web at www.roadless.fs.fed.us/colorado.

BACKGROUND

The Forest Service administers approximately 14,520,000 acres of publicly owned lands in Colorado, which are distributed among eight national forests and two national grasslands. These national forests and grasslands are characterized by a diverse array of landscapes, ecosystems, natural resources, and land use activities. Management of each national forest and grassland is directed by a Forest plan, along with numerous land management laws, regulations, policies, and agency directives. Laws and regulations take precedence over management direction in the forest plans, if conflicts in management direction exist.

In January 2001, a Roadless Area Conservation Rule (2001 Roadless Rule) was adopted into regulations at 36 CFR §294. The 2001 Roadless Rule identified approximately 4.43 million acres, or about 31 percent, of the National Forest System (NFS) lands in Colorado, as "inventoried roadless areas" (IRAs), based on the existing inventories of roadless areas (Maps are available on the Web at www.roadless.fs.fed.us/colorado). At the time the IRAs were inventoried (for dates of the inventories, see Table 2-3) they were generally undeveloped areas and typically 5,000 acres or greater in size, but could be smaller if adjacent to congressionally designated wilderness. As shown on the table, the inventories were conducted in 1979 on four forests (at present, over 30 years ago). The other four forest inventories were finalized in 1996, 1997, 1998 and 2002, when those forests completed their forest plan revision and closer to the promulgation of the 2001 Rule. The 2001 Roadless Rule applied to national forests nationwide. It provided specific protections for 58.5 million acres[10] of IRAs (about 30 percent of NFS lands in the country), by prohibiting road construction and reconstruction and timber harvest in IRAs except under certain exceptions. The intent of the 2001 Roadless Rule was "to provide lasting protection for IRAs within the context of multiple-use management" (Fed.Reg.Vol.66, No.9, 3243-3273).

Since its promulgation, the 2001 Roadless Rule has continued to be the subject of litigation. In response to a court ruling the State Petitions Rule was promulgated in May, 2005; wherein governors had until November 13, 2006 to petition the Secretary of Agriculture to propose changes to management requirements for IRAs within their states. Ongoing uncertainty about the future of the 2001 Roadless Rule was a key factor that influenced Colorado Governor Bill Owens in 2005 to initiate an effort to develop a state-specific petition to conserve roadless areas in Colorado. To this end, in May 2005, Colorado enacted Senate Bill 05-243 (C.R.S. § 36-7-302), which directed formation of a 13-person bipartisan taskforce to make recommendations to the Governor regarding the appropriate management of roadless areas on the national forests in Colorado.

The State's roadless taskforce conducted a comprehensive public participation process, which included holding nine public meetings; one in the State Capitol and others in eight locations across Colorado. The taskforce received and evaluated more than 40,000 public comments for development of a petition to the Secretary of Agriculture for rulemaking on management of IRAs in Colorado.

On September 20, 2006 the United States District Court for the Northern District of California set aside the 2005 State Petition Rule and reinstated the 2001 Roadless Rule. In November 2006,

[10] *Approximately 9.3 million acres of roadless areas in Alaska's Tongass National Forest were exempted from the 2001 Roadless Rule. Therefore, the 2001 Roadless Rule applied to 49.2 million acres of NFS land.*

Colorado Governor Bill Owens used the taskforce's recommendations as the basis for petitioning 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 in accordance with the Administrative Procedures Act, section 553(e) and the Department of Agriculture's (Department) rulemaking procedures at 7 CFR §1.28.

After Governor Bill Owens submitted the State's petition to the Department, Bill Ritter, Jr. was elected Governor of Colorado. In April 2007, Governor Ritter resubmitted the petition with minor modifications. The State's petition requested the rulemaking process: (1) update roadless area boundaries to include additional roadless areas; (2) exclude congressionally-designated lands and private lands; and (3) exclude roadless acres that have been substantially altered.

In June 2007, the State and the Forest Service presented this petition to the Department's Roadless Area Conservation National Advisory Committee (RACNAC). Based on the advisory committee's review and report (USDA RACNAC 2007a), the Secretary of Agriculture accepted the State's petition in August 2007. The Secretary of Agriculture directed the Forest Service to work in cooperation with the State of Colorado to initiate rulemaking . The Forest Service published a proposed rule and Draft Environmental Impact Statement (DEIS) to establish direction for conserving roadless areas on NFS land in Colorado on July 25, 2008 (73 FR 43544).

In response to the proposed rule and DEIS, the United States Department of Agriculture (Department), State, and Forest Service repeatedly heard public comment requesting a reduction in the scope of the proposed exceptions for tree-cutting, sale or removal and road construction/reconstruction. Based on the public comments, the State asked the USDA to postpone further rulemaking efforts until the State considered revision of its petition.

The State revised the proposed rule, posted the rule on the internet, and held a comment period from August 3 to October 3, 2009. The State received approximately 22,000 comments, most being form letters. The result was a revised petition submitted to the Secretary of Agriculture on April 6, 2010. Based on the April 6, 2010 petition, the State and the Forest Service developed regulatory language for a proposed Colorado Roadless Rule (the proposed Rule) that would govern management of roadless areas on NFS lands in Colorado. Because of the changes in the boundaries of the Colorado Roadless Areas (CRAs) and the number of changes in the proposed rule, the Secretary of Agriculture has initiated another public comment period on the revised proposed rule and this EIS.

Roadless Area Characteristics

Nine roadless area characteristics were identified in the 2001 Roadless Rule preamble (66 FR 3245). They are resources or features that are often present in or characterize roadless areas. These nine roadless area characteristics are described for Colorado as follows:

- **High quality or undisturbed soil, water, or air**. These three key resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; help maintain abundant and healthy fish and wildlife populations; and are the basis for many forms of outdoor recreation.

- **Sources of public drinking water**. National forests contain watersheds that are important sources of public drinking water. Careful management of these watersheds is crucial in maintaining the flow of clean water to a growing population.
- **Diversity of plant and animal communities**. Roadless areas are more likely than roaded areas to support greater ecosystem health, including a diversity of native and desired non-native plant and animal communities due to the absence of disturbances caused by roads and accompanying activities. Roadless areas also may conserve native biodiversity by serving as a bulwark against the spread of nonnative invasive species.
- **Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land**. Roadless areas function as biological strongholds and refuges for many species, including terrestrial and aquatic plant and animal species. Many of the nation's species currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act, and those listed by the Forest Service as sensitive, have habitat within roadless areas.
- **Primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation**. These recreation classes of dispersed recreation opportunities often provide outstanding opportunities for hiking, camping, wildlife viewing, hunting, fishing, and cross-country skiing. Although areas with these recreation opportunities may have many wilderness-like attributes, they often allow the use of mountain bikes and other mechanized and motorized means of travel, in contrast to designated wilderness areas. Primitive, semi-primitive non-motorized, and semi-primitive motorized areas can also take pressure off heavily used wilderness areas by providing additional solitude and quiet, and dispersed recreation opportunities.
- **Reference landscapes**. The body of knowledge about the effects of management activities over long periods of time and on large landscapes is very limited. Reference landscapes can provide comparison areas for evaluation and monitoring. These areas provide a natural setting that may be useful as a comparison to study the effects of more intensely managed areas.
- **Natural-appearing landscapes with high scenic quality**. High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. Quality scenery contributes directly to real estate values in neighboring communities and residential areas.
- **Traditional cultural properties and sacred sites**. Roadless areas may contain traditional cultural properties and sacred sites. Traditional cultural properties are places, sites, structures, districts, or objects that are historically significant in the beliefs, customs, and practices of a community. Sacred sites are places that are determined sacred by virtue of their established religious significance to or ceremonial use by a Native American religion. Federal agencies are to accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners, and are to avoid adversely affecting traditional cultural properties and sacred sites when practicable.
- **Other locally identified unique characteristics**. Roadless areas may offer unique characteristics that are not covered by the other categories. Examples include uncommon geological formations, which are valued for their scientific and scenic qualities, or unique wetland complexes. Unique social, cultural, or historical

characteristics may also be dependent on the roadless character of the landscape. Examples include places for local events, areas prized for collection of non-timber forest products, exceptional hunting and fishing opportunities.

CHANGES BETWEEN THE DEIS AND THE REVISED DEIS

Since the release of the initial DEIS in July 2008, court actions, changes to the State's petition, and updated inventories have led to revisions of the alternatives, language of the proposed Rule, and changes in the RDEIS. These changes are described below.

The No Action Alternative has changed from Alternative 1 to Alternative 3

In the DEIS, the Forest Service considered "no action" to mean that the 2001 Roadless Rule would remain in effect for IRAs in Colorado. In August 2008, after the DEIS was released, the Wyoming District Court set aside and enjoined the 2001 Roadless Rule. Colorado is under the Wyoming Court's ruling, thus the consequences of taking no action has changed. In the revised DEIS the "no action" means that IRAs in Colorado would be managed according to direction set forth in the applicable forest plan (alternative 3).

Effective Date of Alternative 1

Because the 2001 Roadless Rule was set aside and enjoined, if this alternative is selected, it would become Colorado's state-specific roadless rule. Therefore the provisions would take effect when the Colorado's rule becomes effective and it would not revoke, suspend, or modify any permit, contract, or other legal instrument authorizing the occupancy and use of NFS land issued prior to the Colorado rule's effective date.

Alternative 2 (Proposed Action)

Between the DEIS and the revised DEIS, the State of Colorado revised their petition for rulemaking. This has resulted in changes to the language of the proposed Rule.

- Total area of roadless has increased. There is a net increase of approximately 155,000 acres to be managed as CRAs under alternative 2. The increase resulted from work with the Colorado Division of Wildlife as well as public comments received on the DEIS. In 2009, the Omnibus Public Lands Act was signed into law and enlarged the Indian Peaks Wilderness by 1,000 acres; thus removing 1,000 acres from the Indian Peaks Adjacent Area Roadless Area.
- This proposed Rule has identified Colorado Roadless upper tier and provides maps and management direction for these acres. This proposed Rule identifies "Colorado Roadless Areas upper tier acres" which are specific portions of or entire CRAs. In the upper tier acres, tree-cutting, sale or removal is prohibited unless it is needed incidental to the implementation of a management activity not otherwise prohibited by the rule; or is needed and appropriate for personal or administrative use. Road construction or road reconstruction is prohibited in upper tier acres unless it is needed pursuant to reserved or outstanding rights or as provided for by statute or treaty. Alternative 2 identifies 562,200 upper tier acres, and alternative 4 identifies 2,614,200 acres.
- Alternative 4 has been added. Alternative 4 has the same prohibitions and exceptions as alternative 2. The difference between alternative 2 and 4 is the number of upper tier

acres identified within the CRAs. This alternative proposes 2,614,200 acres as upper tier, based on areas recommended by the public. The Department specifically asks for public comment on these acres.

- The proposed rule restricts temporary roads for fuels treatment to within ½ mile from a community boundary and changes tree-cutting requirements. The proposed rule uses the term Community Protection Zone (CPZ) instead of Wildland Urban Interface (WUI). A CPZ is based on the definition of a WUI in the Healthy Forest Restoration Act (HFRA), but is specifically defined in this proposed rule as an area one-half mile from the boundary of an at-risk community or an area within one and one-half miles from the boundary of an at-risk community where any land has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; or has a geographic feature that aids in creating an effective fire break, such as a river or a ridge top; or where the trees are in condition class 3.
- Within the CPZ, tree-cutting, sale or removal is allowed to reduce the wildfire hazard to an at-risk community or municipal water supply system. Tree-cutting outside of the CPZ is allowed to reduce the wildfire threat to a municipal water supply system only. In both instances, projects would focus on small-diameter trees to create strategic fuel breaks while retaining large trees to the maximum extent practicable as appropriate to the forest type. In the initial proposed rule, a temporary road could be constructed in the full area of the CPZ, a maximum of 1.5 miles from the community boundary. In this proposed rule, a temporary road can only be constructed within the first ½ mile of the CPZ to facilitate the projects.
- The proposed rule elevates two of the tree-cutting exceptions to a determination by the Regional Forester. The two exceptions are: tree-cutting to reduce the wildfire hazard to an at-risk community or municipal water supply system within a community protection zone, and tree-cutting outside the community protection zone where there is a significant risk that a wildland fire disturbance event could adversely affect a municipal water supply system or the maintenance of that system. The July 2008 proposed Rule did not elevate the determination for tree-cutting, sale, or removal to the Regional Forester for any exception.
- Tree-cutting, sale or removal in Colorado Roadless Areas must maintain or improve, over the long-term, one or more roadless area characteristics. The July 2008 proposed Rule did not require that tree-cutting, sale, or removal maintain or improve roadless area characteristics except when the tree-cutting was for the management or improvement of wildlife or plant species habitat. This proposed Rule expands the requirements to maintain or improve roadless area characteristics for all but two of the tree-cutting exceptions. This finding is not required in these two exceptions: (1) where tree-cutting, sale or removal is incidental to the implementation of a management activity not otherwise prohibited; or (2) where tree-cutting is needed or appropriate for personal or administrative use.
- Tree-cutting and road construction exceptions have been added for maintenance and restoration characteristics of ecosystem composition, structure and processes. Temporary road construction for this purpose is only allowed within ½ mile of at risk communities, and requires Regional Forester determination. In the upper tier, no tree-cutting or road construction for these purposes is allowed. Included in this exception is

the ability to treat insect and disease outbreaks to maintain and restore characteristics of ecosystem composition, structure and processes. The specific exception for prevention and suppression of insect and disease outbreaks has been removed.

- Linear Construction Zones (LCZs) and linear facilities have been defined and addressed. The July 2008 proposed Rule did not address linear facilities or LCZs. A linear facility includes pipelines, electrical power lines, telecommunications lines, ditches and canals. An LCZ is a temporary linear area of surface disturbance over 50-inches wide that is used for motorized transport by vehicles or construction equipment to install a linear facility. It is not used as a motor vehicle route and is not engineered to road specifications. The proposed Rule generally prohibits the construction of LCZs. There are three exceptions to the prohibition requiring Regional Forester determination: 1) to allow for the construction, reconstruction, or maintenance of an authorized water conveyance structure which is operated pursuant to a pre-existing water court decree; 2) to allow for the construction, reconstruction, or maintenance of existing or future authorized electrical power lines or telecommunication lines only if there is no opportunity for the project to be implemented outside of a CRA without causing substantially greater environmental damage; and 3) to allow the construction or reconstruction of an oil and gas pipeline that originates outside a CRA and connects to infrastructure within a CRA and the Regional Forester determines such a connection would cause substantially less environmental damage than alternative routes.
- Road construction in support of water conveyance structures, including reservoirs, is limited. The July 2008 proposed Rule allowed for road construction for any existing or future authorized water conveyance structure. The proposed Rule limits road construction to only those water conveyance structures that have a pre-existing water court decree as of the effective date of the rule.
- The area covered by the North Fork coal mining exception has been reduced. The North Fork coal mining area previously included approximately 9,000 acres of the Currant Creek CRA. Current Creek remains in the CRA acreage but not in the North Fork coal mining area.
- Any road construction or LCZ construction must not diminish, over the long-term, existing native cutthroat trout habitat. The July 2008 proposed Rule did not specifically address native cutthroat trout. This proposed Rule prohibits road or LCZ construction unless the responsible official determines that within a native cutthroat trout catchment or identified recovery watershed, road construction or an LCZ would not diminish, over the long-term, conditions in the water influence zone and in the native cutthroat habitat.
- The term "long-term temporary road" has been eliminated from the Colorado Roadless Rule. Roads constructed pursuant to existing oil and gas leases that allow road construction and roads constructed pursuant to existing coal leases and future coal leases within the North Fork coal mining area would be temporary roads.

PURPOSE OF AND NEED FOR ACTION

The Department, the Forest Service, and the State of Colorado agree there is a need to provide management direction for the conservation of roadless area values and characteristics within

roadless areas in Colorado. In the petition, the State of Colorado has indicated that there is a need to develop state-specific regulations for the management of Colorado's roadless areas for the following reasons:

1. Roadless areas are important because they are, among other things, sources of drinking water, important fish and wildlife habitat, semi-primitive or primitive recreation areas, and naturally appearing landscapes. There is a need to provide for the preservation of roadless area characteristics.
2. As recognized in the 2001 Roadless Rule, tree-cutting, sale or removal and road construction/reconstruction have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate, long-term loss of roadless area values and characteristics and there is a need to generally prohibit these activities in roadless areas. Since the 2001 Roadless Rule was promulgated, some have argued that linear construction zones also need to be restricted.
3. In addition to the concerns articulated in the 2001 Rule, there is a need to accommodate state-specific situations and concerns in Colorado's roadless areas. These include the following:
    a. reducing the risk of wildfire to communities and municipal water supply systems;
    b. permitting exploration and development of coal resources in the North Fork Coal Mining Area;
    c. permitting of construction and maintenance of water conveyance structures;
    d. permitting access to current and future electrical power lines; and
    e. accommodating existing permitted or allocated ski areas.
4. There is a need to ensure that Colorado roadless areas are accurately mapped.

PROPOSED ACTION

The Department, in cooperation with the State of Colorado, proposes to promulgate a state-specific rule to manage roadless areas and conserve roadless area characteristics on NFS lands in Colorado.

The Colorado Roadless Rule would establish a system of Colorado Roadless Areas (CRAs) with protections for management of these areas replacing the Inventoried Roadless Areas (IRAs) for national forest land in Colorado. CRAs would be identified on a set of maps maintained at the Forest Service national headquarters office, including records of adjustments to such maps pursuant to the final Colorado Roadless Rule. The CRAs upper tier acres would be identified on the same set of maps.

The proposed Rule would use the most accurate mapping information and adjust roadless area boundaries by:

- correcting mapping errors that primarily resulted from improvements in inventory data and mapping technology;
- excluding private land;

- excluding land substantially altered by roads and timber harvest activities;
- excluding ski areas under permit or allocated in forest plans to ski area development;
- excluding congressionally designated lands such as wilderness and other designations that take legal precedence over roadless area regulations; and
- including unroaded areas outside IRAs that contain roadless area characteristics.

The CRAs would encompass approximately 4.19 million acres of NFS land in Colorado, distributed among 363 separate roadless areas (Appendix A). The proposed Rule provides for future adjustments to be made to CRA boundaries (Map Packet, Map 3), subject to a public review and comment, and applicable NEPA or rulemaking requirements. The Forest Service national headquarters office would maintain the official map of CRAs, which would be readily available to the public.

The Colorado Roadless Rule includes a management strategy for activities and land uses within CRAs that are tailored to meet the unique circumstances present in Colorado. Road construction and reconstruction, tree-cutting, sale or removal and linear construction zones are prohibited within the CRAs with limited exceptions. Chapter 2 describes the proposed rule in greater detail, along with other alternatives considered in this analysis.

Scope and Applicability

Scope of the EIS

The scope of this EIS consists of the range of actions, alternatives, and impacts that are considered relevant to the proposed action. The proposed action is geographically limited to proposed CRAs and existing IRAs (referred to as the analysis area) within the State of Colorado. See chapter 3 for a further discussion of the analysis area. The proposed action is primarily focused on the prohibitions and exceptions for road construction and reconstruction, the use of linear construction zones and tree-cutting, sale or removal activities within roadless areas. The proposed Rule would not suspend, revoke, or modify land use permits, contracts, or other legal instruments issued prior to the effective date of the rule.

The Colorado Roadless Rule is programmatic and is intended to guide future development of site specific actions within CRAs. The Colorado Roadless Rule would not authorize the implementation of any ground-disturbing activities, but rather it describes exceptions under which certain activities may be allowed or restricted within roadless areas. Before authorizing a land use activity in roadless areas, the Forest Service must complete a more detailed and site-specific environmental analysis pursuant to the NEPA and its implementing regulations. When a specific project or activity is proposed on NFS land, site-specific effects are analyzed and after considering that analysis, decisions are made regarding if, how, where, and when the specific activities may occur.

Applicability

The lands subject to this rulemaking are NFS lands in Colorado that contain roadless areas under any of the alternatives. There are eight national forest administrative units in Colorado that are subject to this rulemaking EIS. Table 1-1 lists the eight national forests in Colorado to

which this EIS applies. The table provides information about each national forest administrative unit and the date of its last approved forest plan.

Table 1-1. National forest administrative units in Colorado and associated forest plan approval date

National forests in Colorado	Date of approved forest plan
Arapaho-Roosevelt National Forests	1997
Grand Mesa, Uncompahgre, and Gunnison National Forests	1983
Manti-La Sal National Forest	1986
Routt National Forest	1998
Pike-San Isabel National Forests	1984
Rio Grande National Forest	1996
San Juan National Forest	1983 (Revision in progress; draft revised plan 2007)
White River National Forest	2002

The proposed Rule, like other regulations, would work in conjunction with forest plan direction. Thus, road or LCZ construction, reconstruction and/or tree-cutting, sale or removal would be prohibited in roadless areas unless they meet specific exceptions described in the Colorado Roadless Rule. However, for the exception to apply, the activities must still comply with applicable standards identified in forest land management plans.

DECISION FRAMEWORK

The Secretary of Agriculture or a delegated designee will decide whether to promulgate the Colorado Roadless Rule as proposed or one of the other alternatives analyzed in this EIS. Promulgation of a rule involves establishing regulations, which would be issued under Title 36 of the Code of Federal Regulations (CFR) Part 294. The decision to be made involves a choice among the four alternatives analyzed in detail in this EIS, which means determining whether to:

1. Promulgate a state-specific rule to manage IRAs in Colorado pursuant to the provisions contained in the 2001 Roadless Rule (alternative 1); or
2. Promulgate a state-specific rule to manage Colorado's CRAs based on the State's petition (alternative 2) with portions of the CRAs identified as CRA upper tier acres; or
3. Take no action. No state-specific roadless rule would be promulgated. IRAs in Colorado would be managed in accordance with the forest plans in the eight national forests (alternative 3); or
4. Promulgate a state-specific rule to manage Colorado's CRAs based on the State's petition with portions of or entire CRAs identified as CRA upper tier acres different from those identified under alternative 2 (alternative 4); or
5. Some combination of the provisions and inventories in the above four alternatives.

PUBLIC INVOLVEMENT

The Forest Service and the State of Colorado have solicited public involvement and comments on the development of a Colorado Roadless Rule. Below is a description of the public involvement efforts of the Forest Service and the State of Colorado.

Forest Service Public Involvement

The Forest Service, to date, has solicited public involvement in the following ways:

- On December 27, 2007, the Forest Service published a notice of intent in the Federal Register to prepare an EIS on roadless area conservation on NFS lands in Colorado (Fed. Reg. Vol. 72 No. 246, 72982). The Forest Service also solicited comments from interested parties on the notice of intent from December 27, 2007 through February 25, 2008. Approximately 88,000 comments were received.
- On July 25, 2008, the Forest Service published a proposed rule to establish state-specific management direction for conserving roadless areas in Colorado (73 FR 43544). A notice of availability for the DEIS was published in the *Federal Register* (73 FR 44991) and legal notice in the newspaper of record on August 1, 2008. The availability of the regulatory risk assessment for the proposed rule was published in the *Federal Register* on September 18, 2008 (73 FR 54125). All comment periods closed on October 23, 2008. In total, approximately 106,000 comments were received.
- The RACNAC held open public meetings in Washington, DC in June of 2007 and January, July and November of 2008. In addition a meeting was held in Salt Lake City, Utah in October of 2008. Public comments were accepted at these meetings, which helped the RACNAC develop their December 5, 2009 recommendations to the Secretary of Agriculture.
- The Forest Service consulted with all potentially affected tribes regarding the proposed rule from October 2007 through October 2008. Tribal consultation on this proposed Colorado Roadless Rule is ongoing.

State of Colorado Public Involvement

In their petition process, the State of Colorado has, to date, solicited public involvement in the following ways:

- Senate Bill 05–243, signed into Colorado law on June 8, 2005, created and identified a 13-member bipartisan task force to make recommendations to the Governor regarding inventoried roadless areas on NFS lands in Colorado. The task force held nine public meetings throughout the State, held six deliberative meetings that were open to the public, and reviewed and considered over 40,000 public comments.
- The State of Colorado held a comment period from August 3 to October 3, 2009 on a State modified version of the July 2008 proposed Rule.

TRIBAL CONSULTATION

There are two resident tribes in Colorado – Ute Mountain Ute and Southern Ute – who retain some of their traditional land base as reservations. These two tribes retain specific hunting rights and other aboriginal rights throughout their traditional territory including portions of the roadless areas in Colorado. Over a dozen other tribes located outside Colorado maintain tribal interests, including aboriginal and ceded territories, and inherent aboriginal rights within Colorado. In 1874, Congress approved an agreement between the United States and certain Ute Indians in Colorado, known as the "Brunot Agreement". Under this agreement, the Utes ceded certain land to the United States but reserved a right to hunt on those lands. These lands are predominately on the San Juan National Forest.

The Forest Service has ongoing consultation with all the potentially-affected tribes. Tribal consultation was initiated in October 2007 and no reply letters were received during the scoping period. However, tribal concerns that surfaced during other consultations are discussed in the EIS. Consultation with interested or affected tribes will continue throughout the analysis and decision-making process.

ISSUES

The NEPA implementing regulations at 40 CFR §1501.2 requires federal agencies to develop and evaluate alternatives to recommended courses of action in any proposal that involves unresolved conflict concerning alternative uses of available resources. Public involvement was used to identify points of disagreement about the proposed Rule and to identify issues to use as a basis for developing and evaluating alternatives.

Comments that support the purpose of and need for the proposed action are not listed here as issues but are evaluated in this EIS as to how well each alternative addresses the purpose and need (refer to Purpose and Need section for details). For example, the alternatives are evaluated for the degree to which they meet the stated purpose and the need to conserve roadless area characteristics within the context of Colorado specific situations and concerns.

NEPA regulations require the agency to identify and eliminate from detailed study those issues that are not significant or that have been covered by prior environmental review, to narrow the scope of the analysis. Reasons for eliminating issues from detailed study include when the issues are:

- General opinions or position statements not specific to the proposed action
- Addressed by other laws, regulations, or policies
- Not relevant to the potential effects of the proposed action, or otherwise outside the scope of this analysis.

The following issues were eliminated from detailed study in this EIS because they are outside the scope of the decision to be made by the Secretary of Agriculture on the proposed Rule relative to other alternatives analyzed in this EIS (refer to sections on Decision Framework and Scope and Applicability of the Rule):

- National Park Service management issues

- General conditions of public lands
- Conditions of roads and facilities on national forests
- Political motivations or integrity of government officials
- Public participation processes or procedures
- Funding priorities and government expenditures
- Alternative energy on national forests
- Wilderness protection or recommendations for wilderness designation
- Motorized vehicle use and routes or other travel management topics
- Access associated with livestock grazing permits and allotment management
- How the proposed Colorado Rule may set a precedent for management of roadless areas in other states.

The following issues were carried through the analysis process to evaluate differences in the consequences among the alternatives.

Issue—Potential effects to opportunities for community wildfire protection. Prohibiting road construction or reconstruction and tree-cutting, sale or removal can influence the effectiveness of efforts to reduce wildfire impacts to communities and water supply systems.

Issue – Potential loss of roadless area characteristics. The exceptions, in which road construction or reconstruction, use of LCZs, tree-cutting, sale or removal, and some other activities may occur in roadless areas under the proposed Rule, may result in a loss of roadless area characteristics.

Issue – Potential loss of opportunities to explore for and develop oil and gas resources. Prohibiting road construction or reconstruction to access oil and gas basins in roadless areas that have not been leased prior to the effective date of rulemaking may result in a loss of opportunities to explore for and develop oil and gas resources in those areas.

Issue – Potential reduction in native species diversity. The exceptions, under which road construction or reconstruction, use of LCZs, tree-cutting, sale or removal, and some other activities may occur in roadless areas under the Colorado Roadless Rule, may affect populations of wildlife, fish, and plants, including the potential for:

- An increase in the prevalence of invasive plants, animals, and other organisms that can out-compete and dominate diverse native plant and animal communities.
- A loss or reduction of wildlife or fish habitat or population viability, resulting from reductions in unfragmented interior habitat, migration corridor connections, and security and quality of habitat for some "at risk" species or important game species.
- A loss or reduction of threatened, endangered, or sensitive plant species habitat or populations.

Issue – Potential loss of opportunities to explore for and develop coal resources outside the North Fork coal area. Prohibiting construction/reconstruction of roads to access coal reserves in areas that have not been leased (prior to the effective date of rulemaking) and/or are located outside the North Fork coal mining area may result in a loss of opportunities to explore for and

develop coal resources in those areas.

Issue - Potential reduction in soil and water quality. Wildfire effects can also reduce soil and water quality. The effects of wildlife could potentially be reduced by fuels treatments. On the other hand, the exceptions in which road construction or reconstruction, the use of LCZs, and tree-cutting, sale or removal may occur in roadless areas under the proposed rule may result in a decline in soil or water quality, including the potential for:

- Accelerated soil erosion or other soil impacts that can affect long-term productivity.
- Increases in stream sedimentation that can affect water quality and water uses off-site and downstream from the roadless areas.

Issue - Potential reduction in semi-primitive recreation and related values. The exceptions in which road construction or reconstruction, use of LCZs, tree-cutting, sale or removal, and some other activities may occur in roadless areas under the proposed Rule may result in a reduction in semi-primitive recreation opportunities away from the sights and sounds of human activities and built environments, including the potential for:

- A reduction in opportunities for solitude.
- A reduction in scenic quality.
- Reductions in scientific and heritage benefits that might be derived from preserving the undeveloped nature of roadless areas for future generations.

Issue – Potential loss of opportunity to feasibly transport oil and gas resources using pipelines. Prohibiting oil and gas pipelines from going through roadless areas from lands outside roadless areas may result in a loss of opportunity to feasibly extract and transport oil and gas resources.

CHAPTER 2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter provides a description of the four alternatives considered in detail in this RDEIS. Maps associated with each alternative are located in the map packet. This chapter also describes the alternatives comparatively and describes alternatives dismissed from detailed study. The range of alternatives is designed to address the purpose and need and issues described in chapter 1.

Each alternative offers a different approach to conservation of roadless area characteristics, by providing a different mix of prohibitions on land use activities, different exceptions to prohibitions, and different requirements for the exceptions. The differences primarily are related to road construction or reconstruction; linear construction zones (LCZs); and tree-cutting, sale or removal in roadless areas. Alternative comparison tables at the end of this chapter summarize the differences in the design of each alternative as well as the differences in the environmental consequences or effects of each alternative based on the detailed analysis of environmental consequences contained in chapter 3.

The four alternatives analyzed in detail are:

- **Alternative 1: Provisions of the 2001 Roadless Area Conservation Rule (2001 Roadless Rule)**[11]. This alternative establishes a state-specific roadless rule for Colorado that retains IRA boundaries[12] and roadless area management provisions for management of roadless areas on NFS land in Colorado contained in the 2001 Roadless Rule. If a decision is made to select this alternative, it would not revoke, suspend, or modify any permit, contract or other legal instrument authorizing the occupancy and use of NFS lands issued before the effective date of the final Rule.
- **Alternative 2: Proposed Action, Colorado Roadless Rule**. This alternative establishes a state-specific roadless rule for Colorado. It modifies alternative 2 from the DEIS based on public comments and the revised petition submitted by the State of Colorado. It is based on the provisions of the 2001 Roadless Rule, but provides prohibitions and specific exceptions relevant to the State of Colorado. There are 562,200 acres identified as CRA upper tier under this alternative. Upper tier acres have fewer exceptions to the prohibitions than the other CRA acres. If a decision is made to select this alternative, it would not revoke, suspend, or modify any permit, contract or other legal instrument authorizing the occupancy and use of NFS lands issued before the date of the final Rule.
- **Alternative 3: No Action, Forest Plan Direction.** This alternative does not establish a state-specific roadless rule for Colorado and all lands in the IRAs and CRAs would be

[11] *"2001 Roadless Rule" is described in the Federal Register, January 12, 2001, Vol. 66, No 9, pages 3244 - 3273*
[12] *Congressionally designated acres as well as mapping errors associated with private lands and Wilderness have been eliminated from the IRA boundaries.*

managed according to forest plan direction. The boundaries of the roadless areas shown in this alternative for information purposes are those in the most recent forest plans and are the same IRAs as those in alternative 1.

- **Alternative 4: Colorado Roadless Rule with Public Proposed Upper Tier**. This alternative establishes a state-specific roadless rule for Colorado. This alternative provides the same prohibitions and exceptions as alternative 2. The difference is that 2,614,200 acres are identified as CRAs upper tier acres in this alternative (over 2 million more acres in upper tier than alternative 2). If a decision is made to select this alternative, it would not revoke, suspend, or modify any permit, contract or other legal instrument authorizing the occupancy and use of NFS lands issued before the date of the final Rule.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA regulations to explore and evaluate all reasonable alternatives to a proposed action and to briefly discuss the reasons for eliminating alternatives from detailed study (40 CFR §1502.14).

The following three alternatives were submitted in response to information from scoping and comments on the DEIS and were considered and eliminated from detailed study. Below is a description of the alternatives and the reasons why these alternatives were eliminated from detailed study.

- An alternative that provides the roadless area conservation provisions from alternative 1, together with the CRA boundaries from alternative 2.

This alternative is similar to alternative 1. The provisions of the 2001 Roadless Rule do allow for updating of the Inventoried Roadless Area maps[13]. This alternative is within the range of the alternatives and could be selected as alternative 1 modified because it falls within the range of the alternatives analyzed in this EIS and to eliminate redundancy in the analysis.

- An alternative that allows for more commercial use such as increased timber harvesting.

Alternative 3 allows for increased levels of commercial use. Another alternative that allows for more commercial use than alternative 2, but less than alternative 3, while meeting the purpose and need of protecting roadless area characteristics would not result in differences that can be meaningfully analyzed.

- An alternative that offers reduced road densities, creation of new roadless areas, and more protective management than any of the alternatives analyzed in the DEIS.

Reducing road densities is outside the scope of this rule-making and decision framework and is best decided during travel management analysis. In addition, all alternatives allow additions to roadless areas, if needed. Alternative 2 and 4, in response to public comments, have identified

[13] *In §294.11 Definitions for Inventoried Roadless Area is: "Areas identified in a set of inventoried roadless area maps, contained in Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps."*

CRAs or portions of CRAs that are proposed to be managed as upper tier acres. Upper tier acres have limited exceptions to the tree-cutting and road construction prohibitions. Additional protections would not meet the purpose and need to accommodate state-specific situations and concerns.

Features Common to All Alternatives

This section describes the features that are common to all alternatives analyzed in detail in this EIS. Features common to all alternatives are summarized in Table 2-2.

Federal and State Requirements

Management of NFS lands in Colorado are governed by a variety of federal statutes, regulations, executive orders, and the Forest Service Directive System (manuals and handbooks). In addition, some State and local laws and regulations apply on NFS lands within the State. The selection of any of the alternatives in this EIS would not affect the applicability of any federal or State requirements.

Forest Plans

The National Forest Management Act (NFMA) and its implementing regulations at 36 CFR, part 219, obligate the Forest Service to develop, amend, or revise plans for each National Forest unit. Forest plans provide guidance for management activities on a national forest; including establishing forest-wide management requirements and direction applicable to the entire forest or to specific management areas. When guidance in a forest plan is more restrictive than direction described under the proposed rule alternatives, actions must be consistent with the more restrictive direction. For example, if a forest plan standard prohibits road construction where it is allowed under a roadless rule, road construction cannot occur.

None of the alternatives compel the Forest Service to amend or revise any forest plan. In addition, none of the alternatives limit the authority of a responsible official to amend or revise a forest plan.

Project Specific Environmental Analysis

None of the alternatives allow any specific project to occur. Any specific proposals for road construction and reconstruction, LCZs, tree-cutting, sale or removal, or other activities that are permissible under any alternative, must undergo site specific environmental analysis required by NEPA.

Reserved and Outstanding Rights

Under all alternatives, the reasonable exercise of reserved or outstanding rights for access, occupancy, and use of NFS lands within roadless areas would not be affected. The rights include those that exist by law, treaty or other authority. They include but are not limited to the right to construct roads or provide other reasonable access across NFS lands for the purpose of access to: private property, mining claims for locatable minerals under the 1872 Mining Law, and land uses protected by American Indian treaty rights.

In 1874, Congress approved an agreement between the United States and certain Ute Indians in

Colorado, known as the "Brunot Agreement". Under this agreement, the Utes ceded certain land to the United States but reserved a right to hunt on those lands. The lands are predominately on the San Juan National Forest.

Existing Land Use Authorizations

"Authorizations" refer to land uses allowed under a special use permit, contract, or similar legal instrument. There are numerous types of lands and recreation-related authorizations issued for occupancy and use of NFS lands. Oil, gas and coal leases on NFS lands are a type of authorization issued by the Bureau of Land Management. All of the alternatives allow for the continuation, transfer, or renewal of valid and existing land use authorizations for activities in roadless areas. "Existing authorizations" are those that are issued prior to the effective date of the final Rule.

Examples of land use authorizations not specifically prohibited or restricted under any alternative include, but are not limited to, the following:

- Use of existing roads and trails, including motorized travel on roads and trails
- Livestock grazing
- Recreational activities, including but limited to hunting, fishing, hiking, camping, mountain biking, and skiing.

Definitions of Roads and Linear Construction Zones

For this EIS, Table 2-1 displays the specific definitions used for these terms.

Table 2-1. Definitions of road and linear construction zone terms.

Term	Definition
forest road	Generally refers to a road determined to be necessary for the long term protection, administration, and utilization of national forest system land or resources, and is managed as part of the national forest transportation system. Previously called "system" or permanent, roads.
temporary road	A road necessary for emergency operations or authorized by contract, permit, or other authorization that is not a forest road and that is not included on the forest transportation atlas.
linear construction zone	A temporary linear area of surface disturbance over 50-inches wide that is used for motorized transport by vehicles or construction equipment to install a linear facility. It is not used as a motor vehicle route and is not engineered to road specifications. Linear facilities include pipelines, electrical power lines, telecommunication lines, ditches, and canals.

Table 2-2. Features Common to All Alternatives

Features Common to All Alternatives	
Affected national forests in Colorado	Arapaho-Roosevelt Grand Mesa, Uncompahgre, and Gunnison Pike-San Isabel Rio Grande Routt San Juan White River Manti-La Sal – the 27,000 acres of the Manti-La Sal National Forest where it occurs in Colorado.
Congressional designations	Nine congressionally designated areas overlap portions of IRAs, totaling about 185,000 acres. These areas are excluded from the roadless areas analyzed in this EIS. Those areas are not subject to state-specific rulemaking because statutory provisions supersede rule (regulatory) provisions.
Federal and State authorities	Numerous federal and state laws, regulations, executive orders, and Forest Service directives would continue to govern management of roadless areas on NFS lands in Colorado but would not allow for more activity than allowed by the final rule.
Forest plans	The analysis of alternatives in this EIS is predicated on forest plan direction at the time of the analysis, recognizing that forest plans are subject to change over time, and that several plans are currently undergoing revision. Rulemaking does not alter forest plans nor the ability to update forest plans through an amendment or revision process. Activities in roadless areas must adhere to forest plan direction where it is more restrictive than a roadless rule for specific areas and situations.
Project Specific Environmental Analysis	Although the alternatives establish specific prohibitions with exceptions for certain activities within roadless areas, alternatives do not compel or authorize implementation of any ground-disturbing actions in the roadless areas. Should such actions be proposed in the future, they must undergo environmental analysis, public involvement, and decision making processes pursuant to NEPA.
Reserved and outstanding rights, statutes or treaties	Alternatives allow road construction or reconstruction, use of LCZs tree-cutting, sale or removal and other activities in roadless areas that are associated with rights allowed by existing laws or treaties. Rights include those for road access, surface occupancy, and use of NFS land in roadless areas for purposes of: Accessing private lands within or adjacent to NFS land, as authorized under Alaska National Interest Land Conservation Act (ANILCA). Accessing NFS lands for exploration and development of locatable minerals (e.g., gold, silver, copper, lead, zinc, uranium, and tungsten), as authorized under the General Mining Law of 1872, as amended. Accessing NFS lands for American Indian land uses, as authorized under various American Indian treaties. Accessing NFS lands to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), including a natural resource restoration action under CERCLA, Section 311 of the Clean Water Act, or the Oil Pollution Act. Accessing NFS lands for a Federal Aid Highway project, as authorized under Title 23 of the U.S. Code (23 USC).
Existing authorizations	Alternatives allow road construction / reconstruction, LCZs, tree-cutting, sale or removal, and other activities in roadless areas that are associated with valid authorizations issued by the Secretary of Agriculture or designated Forest Service official as of the effective date of the rule. These include authorizations granted by permits, contracts, or leases.

Features Common to All Alternatives	
	No alternative affects decisions related to renewal, continuation, or transfer of existing authorizations.
	Road construction/reconstruction, tree-cutting, sale or removal, motor vehicle uses, and other activities are not prohibited in roadless areas where they have been authorized under an existing land use authorization. Such instances include, but are not limited to, activities authorized for:
	Livestock grazing operations
	Utility operations
	Ski area operations
	Mineral resource extraction operations, pursuant to 36 CFR part 228 regulations
	Other activities under lands or recreation special use permits, contracts, or leases.
Other Land Uses	Activities that are otherwise not prohibited under the alternatives are permissible in roadless areas. The activities include, but are not limited to:
	Prescribed burning
	Trail construction or maintenance (motorized and non-motorized)
	Public hunting, fishing, camping, or other dispersed recreation uses
	Livestock grazing.

ROADLESS INVENTORY AND ACRES IN ALTERNATIVES

Alternatives 1, 2, and 4 each provide for a state-specific roadless rule; however, the provisions of each alternative apply to different roadless inventories. Alternatives 1 and 3 use the inventory of the 2001 Roadless Rule IRAs. For alternatives 2 and 4, the Forest Service re-examined the boundaries and acreage of the 2001 Roadless Rule and other Forest Service lands in Colorado for roadless area management, as requested in the State's revised petition. From this effort, the Forest Service identified portions of the 2001 Roadless Rule inventory that were substantially altered and did not possess sufficient roadless area characteristics. In addition, the Forest Service identified areas outside the 2001 Roadless Rule inventory that did possess sufficient roadless area characteristics. Taken together, the exclusion of the substantially altered lands and inclusion of additional areas became the CRAs.

Table 2-3 displays the comparisons between the IRA inventory in alternatives 1 and 3 and the CRA inventory in alternatives 2 and 4. Overall, the CRAs have a net loss of 57,600 acres in roadless from the IRA acres.

Table 2-3. Net change in roadless acreage by forest—from inventoried roadless area acres to Colorado roadless area acres

	2001 Rule Total IRA Acres [1]	Corrected Colorado IRA Acres[2] (Alternatives 1 and 3)	Corrected IRA acres not included within CRAs	Roadless acres added to CRAs	Total CRA Acres (Alternatives 2 and 4)	Proposed Net Change
Region 2 Colorado						
Arapaho-Roosevelt	391,000 (1997)	352,500	10,800	5,400	347,100	(5,400)
GMUG	1,127,000 (1979)	1,058,300	280,800	124,200	901,900	(156,500)
Pike San Isabel	688,000 (1979)	667,300	63,000	170,300	774,600	107,300
Rio Grande	530,000 (1996)	529,000	14,300	3,800	518,500	(10,500)
Routt	442,000 (1998)	442,300	10,300	1,700	433,700	(8,600)
San Juan	604,000 (1979)	543,600	76,600	98,900	565,900	22,300
White River	640,000 (2002)	639,500	7,500	4,700	636,700	(2,800)
Region 4 Colorado						
Manti La Sal	11,000 (1979)	11,000	3,800	500	7,700	(3,300)
Total, State of Colorado	4,433,000	4,243,600	467,100	409,500	4,186,000	(57,600)

Column 1 acres rounded to nearest 1,000 acres; others rounded to nearest 100 acres. Acres do not add due to rounding

[1] The 2001 Roadless Rule used the inventoried roadless areas from the forest plans that were in effect at the time the 2001 Rule was developed, or a roadless inventory that had undergone public involvement. The date of each Forest's inventory used for the 2001 Rule is shown here. Acreages are from the 2001 Roadless Rule FEIS.

[2] The acres to be used for the rulemaking analysis differ from the acres reported in the RACR FEIS because some Wilderness, private, and Special Areas were included in the 2001 roadless inventory. These acres will not be included in this rulemaking analysis as acres to be managed under a Colorado Rule because Congress has already set out specific management for those acres. Excluded acres are private and wilderness acres that have been found as mapping errors in the 2001 Rule IRA acres as well as those acres in the James Peak and Spanish Peak Wildernesses, the Indian Peaks Wilderness, Bowen Gulch and James Peak Protection Areas, Roubideau and Tabeguache Special Areas, Fossil Ridge Recreation Management Area, and the Piedra Special Management Unit all designated by Congress but were not excluded from the 2001 RACR inventory.

ALTERNATIVE 1: PROVISIONS OF THE 2001 ROADLESS RULE

This alternative reflects management under the provisions of the 2001 Roadless Rule. This alternative establishes general prohibitions on road construction/reconstruction and tree-cutting, sale and removal within IRAs, while permitting those activities in all parts of all IRAs under certain exceptions. This alternative does not include any prohibitions on LCZs.

Inventoried Roadless Areas

Under this alternative, the roadless areas consist of IRAs identified in the 2001 Roadless Rule; encompassing approximately 4.24 million acres of NFS lands in Colorado. The IRAs are based on the roadless inventories from forest plans that either were in effect or had undergone public comment at the time the 2001 Rule was developed. For the Grand Mesa, Uncompahgre, and Gunnison (GMUG), Manti-La Sal (within Colorado), Pike-San Isabel, and San Juan National Forests, the IRAs are composed of roadless area inventories completed (and manually mapped) in the 1970s, as part of the Roadless Area Review and Evaluation processes (commonly referred to as RARE II). For other national forests—the Rio Grande, Arapaho-Roosevelt, Routt, and White River National Forests—the IRAs adopted in the 2001 Roadless Rule consisted of the roadless area inventories completed during those forest plan revision processes (approximately 1996 to 2002). Congressionally Designated Areas, private land and Wilderness were removed from IRAs for this analysis.

The IRAs under this alternative do not include additional acres with roadless area characteristics identified under alternatives 2 and 4 that are located outside the IRAs. Under this alternative, those acres would be managed according to their respective forest plans.

Management of Inventoried Roadless Areas

With certain exceptions, this alternative prohibits two main types of activities within IRAs: (1) road construction and reconstruction, and (2) tree-cutting, sale, or removal (called timber harvest in the 2001 Roadless Rule). These exceptions are described in detail below.

Tree-cutting, Sale, or Removal

This alternative generally prohibits timber harvest. The alternative specifies exceptions to the general prohibition where one of five exceptions is met. Table 2-4 displays the exceptions in which timber harvest would be allowed in IRAs under this alternative.

Table 2-4. Alternative 1, exceptions in which tree-cutting, sale, or removal is allowed in Inventoried Roadless Areas

Description of Exceptions
The cutting, sale, or removal of generally small-diameter timber may occur in IRAs where needed to maintain or improve threatened, endangered, proposed, or sensitive species habitat, consistent with maintaining or improving roadless area characteristics defined in the definitions section of the rule
The cutting, sale, or removal of generally small-diameter timber may occur in IRAs where needed to maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildland fire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period, consistent with maintaining or improving roadless area characteristics defined in the definitions section of the rule
The cutting, sale, or removal of timber may occur in IRAs where it is incidental to the implementation of a management activity not otherwise prohibited.

Description of Exceptions
The cutting, sale, or removal of timber may occur in IRAs where needed for personal or administrative uses provided for in 36 CFR part 223.
The cutting, sale, or removal of timber may occur within portions of IRAs where roadless area characteristics have been substantially altered by the construction of a NFS road and subsequent timber harvest. Both the road construction and timber harvest must have occurred after the IRAs were designated and prior to effective date of rulemaking.

Road Construction and Reconstruction

This alternative generally prohibits road construction or reconstruction. However, this alternative does provide exceptions to the general prohibition. This alternative does not distinguish between forest (permanent) or temporary roads allowed under each exception.

Table 2-5 describes the exceptions under which road construction or reconstruction would be allowed in IRAs under alternative 1.

Table 2-5. Alternative 1, exceptions in which road construction and reconstruction may occur in Inventoried Roadless Areas

Description of Exceptions
Where a road is needed to protect public health and safety in cases of imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property.
Where a road is needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or to conduct a natural resource restoration action under CERCLA, Section 311 of the Clean Water Act, or the Oil Pollution Act.
Where a road is needed pursuant to reserved or outstanding rights, or as provided by statute or treaty.
Where road realignment is needed to prevent irreparable resource damage that arises from the design, location, use, or deterioration of a NFS road that cannot be mitigated by road maintenance.
Where road reconstruction is needed to implement a road safety improvement project on a forest road determined to be hazardous on the basis of accident experience or accident potential on that road.
Where the Secretary of Agriculture determines that a Federal Aid Highway project, authorized pursuant to Title 23 of the United States Code, is in the public interest or is consistent with the purposes for which the land was reserved or acquired and no other reasonable and prudent alternative exists.
Where a road is needed in conjunction with the continuation, extension, or renewal of a mineral lease issued prior to the effective date of rulemaking, and includes any new lease issued immediately upon expiration of an existing lease. Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable forest plan direction, regulations, and laws. These roads must be obliterated when no longer needed for the purposes of the lease or upon termination or expiration of the lease, whichever is sooner.
Road maintenance is permissible within IRAs. Road maintenance refers to the ongoing upkeep of a road necessary to retain or restore the road to the approved road management objectives (see Forest Service Manual 7705).

Linear Construction Zones (LCZs)

Alternative 1 has no specific restriction on the use of LCZs, the construction of oil and gas pipelines, or the location of electrical power lines or telecommunication lines in IRAs.

Effective Date and Additional Information

Alternative 1 would implement the provisions of the 2001 Roadless Rule beginning when signed as the Colorado Rule, and not as a retroactive continuation of the national 2001 Roadless Rule. Therefore, if selected, this alternative would not revoke, suspend, or modify any permit, contract, or other legal instrument or project or activity decision authorized prior to the promulgation date of the final Colorado Rule.

ALTERNATIVE 2: COLORADO ROADLESS RULE, PROPOSED ACTION

Alternative 2 is the proposed action, also called the Colorado Roadless Rule. The Colorado Roadless Rule is based on the petition submitted by the State of Colorado to the Secretary of Agriculture. The Colorado Roadless Rule establishes general prohibitions on road construction/reconstruction, LCZs, and tree-cutting, sale or removal within CRAs, while permitting those activities under certain exceptions to address State and local land management needs. Under this alternative, substantially altered acres within the IRAs have been removed from the CRA inventory and would be managed following forest plan direction.

Colorado Roadless Areas

Under this alternative, approximately 4.19 million acres of NFS lands in Colorado would be identified as CRAs[14]. The CRAs in this alternative exclude the congressionally designated areas that overlap portions of the original 2001 Roadless Rule IRAs. Further, this alternative incorporates updated roadless area evaluations from the four national forests that are or will be working on land management plan revisions (GMUG; Manti-La Sal; Pike-San Isabel; and San Juan National Forests). This alternative updates the inventory by eliminating mapping errors on the four national forests in Colorado that completed roadless inventories from 1996 – 2002 as part of their revised land management plans (Arapaho-Roosevelt; Rio Grande; Routt, and White River). The CRAs are based on the most updated land ownership boundaries, roads inventories, and mapping technologies available.

The inventory was reviewed by the Colorado Department of Natural Resources, Division of Wildlife, as well as the public during the initial draft EIS public comment period. Changes to the Colorado Roadless Areas were identified during this process.

The CRAs in this alternative do not include 467,100 acres identified in the 2001 Roadless Rule. This includes 458,800 acres of substantially altered land and 8,300 acres within existing ski permits or ski area development allocations in the forest plans. The 458,800 acres of substantially altered lands are those that do not have roadless area characteristics, primarily because of road construction and timber harvest activities that have occurred in the area. The 8,300 acres of ski area terrain not included in CRAs include 6,600 acres in ski areas under existing permits[15] and 1,700 acres outside permit boundaries but within forest plan allocations for future ski area development (see Developed Ski Areas section in chapter 3). Under this alternative, all of the acres eliminated from the CRAs would be managed according to their respective forest plans.

The CRAs under this alternative include approximately 409,500 acres of unroaded NFS lands that were not identified in the 2001 Roadless Rule. These areas contain roadless area characteristics and were recommended by the State to be included within the CRA inventory.

This alternative also specifically identifies 20,000 acres in CRAs on the GMUG National Forests as the North Fork coal mining area. In this area, temporary road construction and reconstruction exceptions would apply (Map 13 in map packet).

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[14] *Colorado Roadless Areas refer to areas identified in a set of maps maintained at the national headquarters office of the Forest Service, including records regarding any adjustments or modifications to such maps.*

[15] *For the 6,600 acres under permit, development can occur under any alternative after environmental analysis is complete.*

This alternative designates a total of 562,200 acres as CRA upper tier acres[16]. The CRA upper tier acres in this alternative are generally unroaded and do not contain any existing oil and gas leases. The Arapaho-Roosevelt, Rio Grande, Routt, and White River National Forests contain 257,400 acres. These CRA upper tier acres prohibit or tightly restrict management activities related to road construction and tree-cutting under their current forest plans; forest plans that have gone through public comment periods during planning efforts. Details on the upper tier acres are found in Appendix B, Table B-8.

Approximately 304,900 upper tier acres occur on the GMUG National Forests and the San Juan National Forest. Based on public involvement during previous and current revision processes, these acres were identified for management that prohibits or tightly restricts road construction and tree-cutting. Further detail on these upper tier acres are found in Appendix B, tables B-9 and B-10. All 562,200 upper tier acres are analyzed in alternative 2.

Table 2-6. CRA Upper Tier Acres and CRA Optional Upper Tier Acres by Forest

Forest	Upper Tier Acres Revision Completed	% of Forest CRA Acres	Upper Tier Acres Revision Not Completed	% of Forest CRA Acres	Total of Upper Tier Acres
Arapaho-Roosevelt	149,700	43%	-	-	149,700
GMUG	-	-	182,700	20%	182,700
Manti-La Sal	-	-	-	-	-
Pike-San Isabel	-	-	-	-	-
Rio Grande	100	<1%	-	-	100
Routt	24,600	6%	-		24,600
San Juan	-		122,200	22%	122,200
White River	83,000	13%			83,000
Total, Colorado	257,400	6%	304,900	7%	562,200

Numbers may not add due to rounding.

In summary, the Colorado Roadless Rule identifies approximately 4.19 million acres of NFS land in Colorado to be managed as CRAs. CRAs include 409,500 acres not identified as IRAs and exclude 467,100 acres that are within ski areas or substantially altered. Alternative 2 identifies 562,200 acres for upper tier protections.

Administrative Corrections or Modifications of Colorado Roadless Areas

This alternative allows the Chief of the Forest Service to make administrative corrections to the boundaries of CRAs after a public notice and 30-day comment period. Administrative corrections include clerical, typographical, and mapping errors or improvement in mapping technology based on improved field data from updated imagery, global positioning system data, or other collected field data. The Chief of the Forest Service may make modifications to the CRA boundaries based on changed circumstances after public notice and 90-day comment period. The construction of temporary roads or tree-cutting, sale or removal within CRAs

[16] *Colorado Roadless Areas upper tier acres refer to areas identified in a set of maps maintained at the national headquarters office of the Forest Service, including records regarding any adjustments or modifications to such maps. Further detail on the upper tier acres are found in Appendix Tables B-8, B-9, B-10 and on Map 4 in the map packet.*

cannot be the cause for a boundary modification.

Management of Colorado Roadless Areas

With certain exceptions, the Colorado Roadless Rule prohibits three main types of activities within CRAs: (1) tree-cutting, sale or removal; (2) road construction and reconstruction; and (3) development of LCZs. Some exceptions also apply to the upper tier acres and are specifically noted below.

Tree-cutting, Sale, or Removal

This alternative generally prohibits tree-cutting, sale or removal within CRAs, but it does provide for limited exceptions to this general prohibition. The exceptions under which tree-cutting, sale or removal would be allowed are described in Table 2-7.

The responsible official may only authorize tree-cutting, sale, or removal for these exceptions where the Responsible Official determines the activity is consistent with the applicable forest plan, and one or more of the roadless area characteristics will be maintained or improved over the long-term (except for the last two exceptions in the following table—where it is incidental or for personal or administrative uses). Whether the exception applies or does not apply to upper tier acres is noted.

Table 2-7. Alternative 2, exceptions in which tree-cutting, sale, or removal would be allowed in Colorado Roadless Areas (also applies to Alternative 4)[17]

Description of Exceptions
Where the Regional Forester determines tree-cutting is needed to reduce the wildfire hazard to an at-risk community or municipal water supply system within the first ½ mile of the community protection zone or within the next one-mile of the community protection zone where proposed projects are within an area identified in a Community Wildfire Protection Plan (CWPP). For the CPZ to extend beyond the first ½ mile and up to an additional one-mile, the land must exhibit one of the following characteristics: a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; has a geographic feature that aids in creating an effective fire break, such as a road or a ridge top; or is in condition class 3 as defined by Healthy Forest Restoration Act (Pub. L. 108–148). If no CWPP exists, no project would be proposed beyond the first ½ mile. Projects would focus on small diameter trees to create strategic fuel breaks that modify fire behavior while retaining large trees to the maximum extent practical as appropriate to the forest type. Does not apply to upper tier acres.
Where needed outside of the community protection zone if the Regional Forester has determined there is a significant risk that a wildland fire disturbance event could adversely affect a municipal water supply system or the maintenance of the system. A significant risk exists where the history of fire occurrence and fire hazard indicate a serious likelihood that a wildland fire event would have adverse effects to a municipal water supply system. Does not apply to upper tier acres.
Where needed to maintain or restore the characteristics of ecosystem composition, structure and function. Does not apply to upper tier acres.
Where needed to improve threatened, endangered, proposed, or sensitive species habitat in coordination with the Colorado Department of Natural Resources including the Colorado Division of Wildlife. Does not apply to upper tier acres.
Where it is incidental to the implementation of a management activity not otherwise prohibited by this subpart. This is applicable to all CRA acres, including upper tier.
Where needed and appropriate for personal or administrative use, as provided for in 36 CFR 223. This is applicable to all CRA acres, including upper tier.

[17] *Further details about the exceptions listed in table 2-7 are in the rule §294.42*

Roads and Linear Construction Zones

All of the road construction exceptions in the Colorado Roadless Rule dictate the type of road (forest road or temporary road) or LCZ allowed (see Table 2-1). In all of the exceptions, the decision as to the type of road constructed or the use of an LCZ will be that which meets the purpose and has the shortest duration on the land. For example, a temporary road would be constructed if it could provide reasonable access even if exceptions allow construction of a forest road. Except as allowed in the Colorado Roadless Rule, a temporary road shall not change designation to a forest road. Road maintenance would be allowed within CRAs.

Road Construction and Reconstruction

Alternative 2 generally prohibits road construction/reconstruction within CRAs, but it does provide for limited exceptions to this general prohibition. There are required findings prior to road construction, reconstruction detailed in a following section.

The exceptions under which forest (permanent) road construction or reconstruction would be allowed are described in Table 2-8 under this alternative. The descriptions include some minor paraphrasing from the Colorado Roadless Rule for readability in this EIS. Readers may refer to the published rule language for additional detail. Whether the exception applies or does not apply to upper tier acres is noted.

Table 2-8. Alternative 2, exceptions in which forest (permanent) road construction and reconstruction would be allowed in Colorado Roadless Areas (also applies to Alternative 4)[18]

Description of Exceptions
Where a road is needed pursuant to reserved or outstanding rights, or as provided for by statutes or treaties. This is applicable to all CRA acres, including upper tier.
Where road realignment is needed to prevent irreparable resource damage that arises from the design, location, use, or deterioration of a NFS road that cannot be mitigated by road maintenance. Road realignment may occur only if the road is deemed essential for administrative or public access, public health and safety, or other authorized use. Does not apply to upper tier acres.
Where road reconstruction is needed to implement a road safety improvement project on a forest road determined to be hazardous on the basis of accident experience or accident potential on that road. Does not apply to upper tier acres.
Where the Regional Forester determines a road is needed to allow for the construction, reconstruction, or maintenance of water conveyance structures operated pursuant to a pre-existing water court decree issued by the Colorado Water Courts prior to [final rule effective date] adjudicating as the point of a diversion or the place of use a location within a CRA. Does not apply to upper tier acres.

Table 2-9 summarizes the exceptions for only temporary road construction that could be allowed within CRAs and none of these exceptions are allowed in the upper tier acres in alternative 2. None of these exceptions could be upgraded to a forest road.

[18] *Further details about the exceptions listed in table 2-8 are in the rule §294.43.*

Table 2-9. Alternative 2, exceptions in which only temporary road construction and reconstruction would be allowed in Colorado Roadless Areas (also applies to Alternative 4)[19]

Descriptions of Exceptions
Where a temporary road is needed for public health and safety in cases of threat of flood, fire, or other potential catastrophic event that without intervention, would cause the loss of life or property. Does not apply to upper tier acres.
Where the Regional Forester determines a temporary road is needed to facilitate tree-cutting, sale or removal to reduce the wildfire hazard to an at-risk community or municipal water supply system within the first one-half mile of a community protection zone. Does not apply to upper tier acres.
Where the Regional Forester determines a temporary road is needed to facilitate tree-cutting for maintenance and restoration of the characteristics of ecosystem composition, structure and processes within the first one-half mile of the community protection zone. Does not apply to upper tier acres.
Where a temporary road is needed in conjunction with exploration or development of an existing oil and gas lease that otherwise does not prohibit road construction or reconstruction, including construction of infrastructure necessary to transport the product on NFS lands, under an existing lease as of the effective date of this rule. (Alternative 2 CRA upper tier acres have no existing oil and gas leases.)
Where a temporary road is needed for coal exploration and coal-related activities on CRA lands in the North Fork coal mining area (shown on Map13 in the map packet). Such roads may be used for the purpose of collecting and transporting methane gas from coal mines. Buried infrastructure, including pipelines, needed for the capture, collection, and use of coal mine methane would be located within the rights-of-way of temporary roads that are otherwise necessary for coal-related surface activities including the installation and operation of methane venting wells. Alternative 2 CRA upper tier acres are not located in the North Fork coal mining area).

Linear Construction Zones (LCZs)

Alternative 2 generally prohibits LCZs within CRAs, but it does provide for limited exceptions to this general prohibition. There are required findings prior to the use of an LCZ that are detailed in a following section.

The exceptions under which LCZs would be allowed are described in Table 2-10 under this alternative. The descriptions include some minor paraphrasing from the Colorado Roadless Rule for readability in this EIS. Readers may refer to the published rule language for additional detail. All exceptions are applicable to the CRA upper tier acres.

Table 2-10. Alternative 2, exceptions in which linear construction zones would be allowed in Colorado Roadless Areas (also applies to Alternative 4)[20]

Description of Exceptions
Where the Regional Forester determines a linear construction zone is needed to allow for the construction, reconstruction, or maintenance of water conveyance structures operated pursuant to a pre-existing water court decree issued by the Colorado Water Courts prior to [final rule effective date] adjudicating as the point of a diversion or the place of use a location within a CRA.
Where the Regional Forester determines a linear construction zone is needed to allow for the construction, reconstruction, or maintenance of existing or future authorized electrical power lines or telecommunication lines. Authorize electrical power lines or telecommunication lines within CRAs only if there is no opportunity for the project to be implemented outside of a CRA without causing substantially greater environmental damage.
Where the Regional Forester determines a linear construction zone is needed to allow for the construction or reconstruction of a pipeline associated with an oil and gas lease that allows surface use within a CRA or the construction or reconstruction of a pipeline needed to connect to infrastructure within a CRA from outside a CRA where such a connection would cause substantially less environmental damage than alternative routes. The construction of pipelines for the purposes of transporting oil or natural gas through a CRA where the source(s) and destination(s) of the pipeline are located exclusively outside of a CRA shall not be authorized.

[19] *Further details about the exceptions listed in table 2-9 are in the rule §294.43.*
[20] *Further details about the exceptions listed in table 2-10 are in the rule §294.44.*

Required Findings Prior to Road Construction/Reconstruction or LCZ

Prior to any decision allowing construction or reconstruction of any type of road or development of an LCZ under any of the exceptions in a CRA, the following required findings must be made, through a site-specific project analysis, before the activity is allowed:

- that the action is consistent with forest plan direction; and
- that motorized access for the project without road construction or an LCZ is not technically feasible; and
- that if the action occurs within native cutthroat trout catchments or identified recovery watersheds, conditions within the water influence zone and the native cutthroat trout habitat would not be diminished over the long-term, and
- that for a proposed forest road, a temporary road would not provide reasonable access.

Road Construction/Reconstruction and LCZ Considerations

This alternative would require that specific considerations be incorporated into any road construction, road reconstruction, or LCZ project implemented within CRAs.

- All road construction in a CRA must be conducted in a manner that reduces, to the extent practicable, effects on surface resources and prevents unnecessary or unreasonable surface disturbance.
- All roads constructed in CRAs under all exceptions would prohibit public motor vehicle use (including off-highway vehicles) unless specifically allowed for the purpose for which the road was established (e.g. Federal Highways). Nothing in the rule would prohibit:
    - the use of motor vehicles for administrative use by the Forest Service;
    - motor vehicle use that is specifically authorized under a written authorization issued under Federal law or regulation; or
    - motor vehicle use by any fire, emergency, or law enforcement personnel.

When a road is no longer needed (for the established purpose), or upon termination or expiration of a contract, authorization, or permit, whichever is sooner, all roads shall be decommissioned and the affected landscape restored. A road decommissioning provision shall be required in all such contracts or permits. Decommissioning would be designed to stabilize, restore, and revegetate unneeded roads to a more natural state to protect resources and enhance roadless area characteristics.

When an LCZ is constructed in a CRA, installation of the linear facility would be done in a manner that minimizes ground disturbance, including placement within existing right-of-ways where feasible. When the LCZ is no longer needed for the installation of the linear facility, any ground disturbance associated with the LCZ and the affected landscape would be restored. A restoration provision is required in all LCZ contracts or permits and would not be waived.

Additional Provisions

Table 2-11 describes additional provisions in the Colorado Roadless Rule that may influence management of CRAs.

Table 2-11. Alternative 2, additional provisions for managing land uses within Colorado Roadless Areas (also applies to Alternative 4)[21]

Description of Additional Provisions
Each environmental analysis for oil and gas leasing shall consider eight listed items in determining conditions for inclusion in approved Surface Use Plans of Operation. These considerations apply to both existing oil and gas leases, under which some roads would be allowed and future oil and gas leases under which no roads would be allowed. These eight items are: (1) locate roads, well sites, and facilities on pre-existing areas of surface disturbance and minimize the amount of necessary temporary road construction or reconstruction; (2) include an alternative for proposed operations that addresses directional drilling on multi-well sites on pre-existing disturbance; (3) restrict road construction for leases partially within CRAs to portions of the lease outside of CRAs except when doing so would be substantially more environmentally damaging, compromise safety standards, or is unfeasible due to topography or surface conditions; (4) perform reclamation of surface disturbances incrementally to minimize the total area of disturbance at any given point in time during the exploration or development of a lease; (5) design temporary roads and facilities to blend with the terrain to minimize visual impacts and to facilitate restoration when the road is no longer needed; (6) co-locate power lines, flow lines and pipelines within the right-of-way of roads to minimize the area of surface disturbance; (7) consider new and developing low impact techniques and technologies and either dismiss or apply with justification; and (8) utilize the best available technology, to the extent possible, to minimize noise and air emissions. Environmental documentation would be prepared for any proposed action in a CRA, pursuant to the National Environmental Policy Act (NEPA) and its implementing regulations at 40 CFR §1500-1508.

ALTERNATIVE 3: NO ACTION – FOREST PLAN DIRECTION

Alternative 3 would manage IRAs and the remainder of the acres within the analysis area based on direction in the forest plans for the eight national forests. Forest plan direction is applied to the IRAs as well as to the 409,500 newly identified roadless acres included in the CRAs.

Forest plan direction that applies to the management of roadless areas includes forest plan goals (desired conditions), objectives, forest-wide standards and guidelines, management area standards and guidelines, and descriptions of suitable uses. In each forest plan, roadless areas overlap a number of different land management allocations. Therefore, roadless areas would be managed under this alternative according to a mix of forest plan direction.

As previously described in Features Common to All Alternatives, forest plans may be updated through an amendment or revision process to reflect changed conditions or specific public or management needs. The National Forest Management Act (NFMA) requires forest plans to be revised at least every 15 years. Project-level amendments to forest plans may be made to make the forest plan consistent with a specific project if warranted. Subsequent forest plan amendments and revisions may result in changes to roadless area management direction. These acres could be subject to or affected by subsequent reinstatement, reconsideration, revision, or revocation of the 2001 Roadless Rule because this alternative does not establish a roadless rule.

Roadless Areas

There is no specific direction for roadless areas in alternative 3. This RDEIS analyzes the effects of alternative 3 by looking at the IRAs of alternative 1 (4.24 million acres) as well as the

[21] *Further details about the provisions listed in table 2-11 are in the rule §294.45 and §294.46.*

remainder of the analysis area for a total of 4.65 million acres.

During a forest plan revision potential wilderness areas are inventoried following the Forest Service Handbook 1909.12 Chapter 70. The forest plan revision process includes a requirement to review each administrative unit for potential wilderness areas and evaluation of those areas as recommended wilderness. The process includes meeting requirements under NEPA and requirements for public participation. An inventory of unroaded areas is the first step toward identification of potential wilderness areas during forest plan revisions.

Management of Inventoried Roadless Areas

The Arapaho-Roosevelt, Rio Grande, Routt, and White River National Forests have completed forest plan revisions. The GMUG, Manti-La Sal, and Pike-San Isabel National Forests are expected to revise their forest plans in the next five years. The San Juan National Forest is currently undergoing forest plan revision. In the past few years, the trend has been to allocate more roadless areas to management prescriptions that protect roadless area characteristics.

In general, alternative 3 potentially allows for more road construction/reconstruction and tree-cutting, sale or removal in roadless areas compared to the other three alternatives. Generally there is no specific forest plan language restricting the use of LCZs. Appendix B contains a summary of current forest plan management direction for road construction and reconstruction and tree-cutting, sale or removal activities in roadless areas. Map 5 in the map packet shows alternative 3 with management direction for road construction, reconstruction, and tree-cutting activities.

Tree-cutting, Sale, or Removal

Under alternative 3, there is no general prohibition on tree-cutting, sale, or removal within the IRAs. Therefore, tree-cutting, sale, or removal would be allowed in IRAs anywhere those activities are not specifically prohibited or limited by forest-wide or management area direction in the applicable forest plan.

Forest plan direction for tree-cutting, sale or removal generally falls into one of four categories:

- **Tree-cutting, sale, or removal is generally prohibited** except where needed for reserved and outstanding rights, or for other exemptions mandated by law, regulation, or policy. Examples of exemptions mandated by law, regulation, or policy include: tree-cutting to maintain roads or trails for safety purposes; removal of hazard trees; fire line construction for wildland fire suppression or control of prescribed fire; tree-cutting allowed under existing authorizations such as for developing ski runs or utility corridors; and others.
- **Tree-cutting, sale, or removal is generally restricted** based on desired conditions or guidelines; not based on mandatory direction.
- **Tree-cutting, sale, or removal is generally not restricted** except under some specific exceptions based on the purpose and need of the project or for the protection of specific resources. Examples include situations in which tree-cutting is limited to certain locations or conditions, such as to reduce wildland fire hazard or improve wildlife habitat.
- **Tree-cutting, sale, or removal is generally allowed** as needed to meet multiple-use

management purposes.

Although management direction in the forest plans regarding tree-cutting differs by national forest, some direction is common among plans. Common to all forest plans, tree-cutting for hazardous fuel reduction or wildlife habitat improvement may occur on NFS lands that are considered unsuitable for timber production. Also common to all forest plans, tree-cutting for primarily timber production purposes is limited to NFS land identified as suitable for timber production.

Road Construction and Reconstruction

Alternative 3 follows forest plan direction and Forest Service directives and regulations for road construction and reconstruction. The directives discourage construction of new forest (permanent) roads and require responsible officials to minimize the miles of forest roads to those determined to be necessary. Furthermore, the directives encourage use of temporary roads when permanent forest roads are not necessary. The responsible official may consider temporary road construction only after reviewing other access options, and such roads must be constructed in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbances, and complies with all applicable forest plan direction, regulations and laws. When temporary roads are no longer needed, or upon termination or expiration of the lease, contract, or permit, whichever is sooner, those roads must be decommissioned and the affected landscape restored to a more natural state. These road construction and decommissioning policies associated with alternative 3 are generally the same as those described for the other alternatives.

In addition to those road system management requirements just described, forest plan direction for road construction and reconstruction generally falls into one of four categories:

- **Road construction/reconstruction is generally prohibited** except where needed for reserved and outstanding rights or other exemptions mandated by law, regulation, or policy.
- **Road construction/reconstruction is generally restricted** based on a desired condition or guideline; not a mandatory restriction.
- **Road construction/reconstruction is generally not restricted** except under some specific exceptions based on the purpose of and need for the road, or road density limitations, or protection of natural resource values.
- **Road construction/reconstruction is generally allowed** for any multiple-use management need, where consistent with law, regulation, or policy.

Alternative 3 differs from the other three alternatives in that it does not include a general prohibition on road construction or reconstruction or the construction of LCZs. Road construction in these roadless areas would be prohibited or limited only where there is specific forest plan direction. Map 5 in the map packet shows alternative 3 with management direction for road construction, reconstruction, and tree-cutting activities.

Linear Construction Zones (LCZs)

Forest plans are usually silent on LCZs but certain management areas may limit the placement of linear features or provide direction to follow to protect resource values when proposing a

linear feature and corresponding LCZ.

ALTERNATIVE 4: COLORADO ROADLESS RULE WITH PUBLIC PROPOSED UPPER TIER

Alternative 4 has the same general prohibitions as alternative 2 on tree-cutting, sale or removal, road construction/reconstruction, and LCZs within CRAs, while permitting those activities under certain exceptions to address State and local land management needs (see Tables 2-6 through 2-11). Identical to alternative 2, substantially altered acres within the IRAs have been removed from the CRA inventory and would be managed following forest plan direction. Identical to alternative 2, road construction and tree-cutting, sale or removal would be restricted within CRAs.

The only difference between alternative 4 and alternative 2 is that alternative 4 designates 2,614,200 acres as CRA upper tier acres.[22] Some, but not all of the alternative 2 upper tier acres are upper tier acres in alternative 4. Under this alternative, a portion of the CRA upper tier acres contain existing oil and gas leases that allow roads. The eight items listed in Table 2-11 for inclusion in Surface Use Plans of Operation in the development of oil and gas leases would also apply to this alternative.

[22] *Further details on the CRA upper tier acres in alternative 4 are found in Appendix C and Map 6 in the map packet.*

Table 2-12. Upper Tier CRAs by Forest designated under Alternative 4

Forest	Total Upper Tier Acres	Upper Tier Acres Overlap with 562,200 in Alternative 2	% of Forest CRA Acres
Arapaho-Roosevelt	198,500	84,000	57%
GMUG	544,900	81,800	60%
Manti-La Sal	7,700	-	100%
Pike-San Isabel	312,900	-	40%
Rio Grande	323,500	-	62%
Routt	362,000	14,600	83%
San Juan	482,000	118,200	85%
White River	382,700	36,000	60%
Colorado	2,614,200	334,700	62%

Numbers may not add due to rounding.

COMPARISON OF ALTERNATIVES

This section provides a comparative summary of each alternative from two perspectives. Table 2-13 compares each alternative by key elements of the proposed rule. Because the management direction in alternative 2 and 4 are the same, the table refers to both in the same column. Management direction relating to tree-cutting and road construction is more restrictive within Colorado Roadless Areas upper tier acres in alternatives 2 and 4 and the differences are noted within the column. Table 2-14 compares the estimated consequences of each alternative, summarized from the environmental consequences described in detail in chapter 3. The comparison tables focus on the key differences between the alternatives and their most likely consequences. Because the proposed rulemaking and its alternatives are broad and programmatic, and do not involve any proposed site-specific actions, the consequences are appropriately broad and qualitative rather than quantitative. In the few places where the alternatives differ, it is noted. All other management direction in these two alternatives is the same in the Colorado Roadless Areas, whether in the upper tier acres or not.

Table 2-13. Comparison of alternatives

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Overview and Where Alternative Applies			
Roadless area management direction	The management of roadless areas on NFS lands in Colorado would be governed by provisions of the 2001 Roadless Rule and by any additional limitations imposed by forest plans.	Management of roadless areas on NFS lands in Colorado would be governed by provisions of the Colorado Roadless Rule and by any additional limitations imposed by forest plans.	Management of roadless areas on NFS lands in Colorado would be governed exclusively by the applicable management direction in forest plans.
Roadless areas	4.24 million acres of IRAs established by the 2001 Roadless Rule, excluding 185,000 acres of wilderness and other congressionally designated acres as well as correcting mapping errors to remove areas identified as wilderness or private land from the inventory.	4.19 million acres of CRAs that stem from the IRAs established by the 2001 Roadless Rule, excluding 185,000 acres of wilderness and other congressionally designated acres, and modified by correcting map errors and updating NFS land boundaries. Removing 8,300 acres of allocated ski areas and 458,800 substantially altered areas. Adding 409,500 acres of unroaded lands meeting roadless area criteria. Designating portions of or entire CRAs as upper tier acres. Designating 562,200 acres as upper tier in alternative 2. Asking for comment on CRA upper tier in alternatives 2 and 4.	IRAs and CRAs are managed according to forest plan direction.
Changes to roadless area boundaries	Currently there is no process for changing IRA boundaries.	Provides a process for the Forest Service to make changes to CRA boundaries. Changes are subject to public review and comment.	Roadless inventories completed during forest plan revision process, subject to public review and comment, and other NFMA and NEPA regulations.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Comparison of Tree-cutting, Sale, or Removal by Alternative			
General tree-cutting, sale, and removal provisions	Tree-cutting, sale, or removal, is generally prohibited in roadless areas, with some exceptions (see below). In some IRAs forest plans add more restrictions related to conducting this activity, to protect other resource values. Tree-cutting for all exceptions is expected to be infrequent.	Similar to the general prohibition in alternative 1, although there are more exceptions under this alternative (see below). An additional limitation is that the Responsible Official must determine the activity is consistent with the forest plan and one or more of the roadless area characteristics would be maintained or improved over the long-term except when tree-cutting is for incidental, personal or administrative uses. In some CRAs, forest plans add more restrictions related to conducting this activity to protect other resource values.	In some IRAs tree-cutting is prohibited or limited to protect resource values. Forest plans in Colorado generally allow tree-cutting for non-timber purposes on any NFS lands, subject to specific resource management direction. Forest plans identify lands suitable for timber harvest for timber production purposes.
Tree-cutting, sale, or removal for incidental, personal, administrative uses	This activity is allowed in IRAs: Where incidental to other management activities (e.g., road or trail construction or maintenance, minerals operations, and other authorized uses). For personal or administrative uses, as provided for in 36 CFR part 223 (e.g., firewood, Christmas trees).	Same as alternative 1 within CRAs including upper tier acres.	Same as alternative 1.
Tree-cutting, sale, or removal in substantially altered areas	This activity is not rule-limited in substantially altered areas in IRAs and is only limited by applicable management direction in forest plans.	Substantially altered acres have been removed from CRAs and are only limited by applicable management direction in forest plans.	This activity is only limited by applicable management direction in forest plans.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Tree-cutting to maintain or restore ecosystem composition and structure within the range of variability expected to occur under natural disturbance regimes of the current climatic period	An example of this activity given in the rule is to reduce the risk of wildfire effects but could have other purposes. Generally small-diameter trees and would maintain or improve one or more roadless area characteristics. This exception can also include treatments for prevention or suppression of insect and diseases in order to maintain or restore ecosystem characteristics.	Not allowed within CRA upper tier acres Language simplified and updated to take into account climate change: "to maintain or restore characteristics of ecosystem composition, structure and processes". These are infrequent. This exception can also include treatments for prevention or suppression of insect and diseases in order to maintain or restore ecosystem characteristics.	Tree-cutting is only limited by applicable management direction in forest plans.
Tree-cutting, sale, or removal for habitat improvement	This activity is allowed in IRAs to improve habitat for threatened, endangered, proposed, or sensitive species, and to maintain or improve roadless area characteristics. Limited to generally small-diameter trees and would maintain or improve one or more roadless area characteristics	Not allowed within CRA upper tier acres. This activity is allowed in CRAs to improve habitat for threatened, endangered, proposed, or Regionally designated sensitive species in coordination with the Colorado Department of Natural Resources including the Colorado Division of Wildlife. Not limited to generally small diameter trees.	Forest plans generally allow tree-cutting in IRAs to improve habitat for all species including threatened, endangered, proposed, Regionally designated sensitive species or other species.
Tree-cutting, sale, or removal to reduce wildland fire hazard	This activity is allowed in IRAs, to maintain or restore ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildland fire effects, within the range of variability expected to occur under natural disturbance regimes of the current climatic period, and would maintain or improve roadless area characteristics. Limited to generally small-diameter trees and prohibits associated road construction/reconstruction.	This activity is not allowed on upper tier acres within CRAs On acres within CRAs that are not upper tier, this activity is allowed where the Regional Forester determines it is needed to reduce wildland fire hazard to an at-risk community or municipal water supply system Within the first ½ mile of the CPZ; Within the next one-mile of the CPZ where projects would be within the area of a Community Wildfire Protection Plan. If no CWPP exists, no projects would be proposed in this next one-mile. For the CPZ to extend beyond the first ½ mile	Forest plans allow tree-cutting in most IRAs for purposes described in alternatives 1 or 2, with exceptions in some specific management areas. Not limited to generally small-diameter trees, and does not preclude associated road construction/reconstruction except as precluded by specific forest plan direction.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
		and up to an additional one-mile, the land must exhibit one of the following characteristics: a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; has a geographic feature that aids in creating an effective fire break, such as a road or a ridge top; or is in condition class 3 as defined by Healthy Forest Restoration Act (Pub. L. 108–148). On acres within CRAs outside of the CPZ this activity is allowed where the Regional Forester has determined there is a significant risk that a wildland fire disturbance event could affect a municipal water supply system or the maintenance of the system. A significant risk exists where the history of fire occurrence and fire hazard indicate a serious likelihood that a wildland fire disturbance event would have adverse effects to a municipal water supply system. Such projects would focus on small diameter trees to create strategic fuel breaks that modify fire behavior while large trees would be retained to the extent practical, as appropriate to the forest type, Projects outside of the CPZ are expected to be infrequent.	
Tree-cutting, sale or removal within newly designated roadless areas	These acres are not within the IRA inventory. No regulatory limitation on tree-cutting, sale or removal	These acres are within the CRA inventory Tree-cutting, sale or removal is subject to the prohibitions in the Colorado Roadless Rule	These acres are not within the IRA inventory These acres remain subject to forest plan direction

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Comparison of Road Construction and Reconstruction and Linear Construction Zones by Alternative			
General road construction provisions	Generally prohibits road construction or reconstruction in IRAs. Exceptions do not distinguish between forest roads and temporary roads. Rule language does not include additional requirements for environmental analysis or NEPA documentation. Does not include specific provisions about decommissioning and closing roads. Does not include provisions about closing roads to public motorized use.	Generally prohibits road construction or reconstruction in CRAs, distinguishing between forest roads and temporary roads. Includes additional environmental analysis and determination requirements for road construction determining that: motorized access without road construction is not technically feasible; within a native cutthroat trout catchment or identified recovery watershed, road construction would not diminish conditions in the water influence zone and in the native cutthroat habitat over the long-term; road construction is consistent with the applicable forest plan; when proposing to build a forest road, a temporary road would not provide reasonable access. Includes specific provisions about decommissioning and closing roads. Roads are closed to public motorized use.	Forest plans include some IRAs where roads are generally prohibited. Some forest plan direction distinguishes between temporary and forest roads, and provides other direction to follow to protect resource values when proposing road construction. Does not include additional environmental analysis requirements for road construction. Includes some specific direction about road decommissioning. Some plans include some direction about road closures to public use for protection of resource values in specific areas.
Road construction in ski areas	Road construction or reconstruction is limited to within ski area permit boundaries established prior to [the effective date of this rule] (~6,600 acres). The 8,300 acres of permitted and allocated to ski areas within IRAs remain within IRAs.	No rule-related limitations on road construction or reconstruction in permitted or forest plan-allocated ski areas (~8,300 acres). Ski areas remain subject to forest plan direction. Ski areas are excluded from CRAs.	Road construction allowed in these management areas.
Roads construction in substantially altered lands (~458,800 acres)	Road construction or reconstruction on substantially altered lands in IRAs is prohibited. Substantially altered acres remain in the IRAs.	These acres are excluded from CRAs. No rule-related limitations on road construction or reconstruction on the substantially altered lands; remain subject to forest plan direction.	Generally road construction is allowed in these management areas.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Road construction in newly identified roadless acres (~409,500 acres)	These acres are not within the IRAs. No rule-related limitations on road construction or reconstruction on the newly identified roadless acres; remain subject to forest plan direction.	These acres are within the CRAs. Road construction or reconstruction on newly identified roadless acres subject to provisions within the rule.	These areas are not within the IRAs. Road construction direction varies based on management designations within these areas.
Road construction pursuant to reserved or outstanding rights or as provided by statute or treaty	Support actions covered by laws or treaties, including those for purposes of CERCLA, Federal Highway Projects (23 USC), and locatable mineral operations (General Mining Law of 1872, as amended).	Same as alternative 1 within CRAs and upper tier acres.	Same as alternative 1.
Road construction for public health & safety and resource protections	Road construction or reconstruction is allowed in IRAs where needed to: Prevent irreparable resource damage. Address road safety hazards Protect public safety from imminent threat of flood, fire, and other catastrophic events that may threaten loss of life or property.	Not allowed in upper tier. Same as alternative 1 within standard tier and additionally: Only temporary roads may be constructed or reconstructed as needed for public health and safety in cases of threat of flood, fire, and catastrophic events that without intervention may cause loss of life or property. Additional environmental analysis and implementation requirements as noted above in general road provisions.	Same as alternative 1, per agency regulations and policy directives.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Road construction for leasable minerals operations, specifically oil and gas	Road construction or reconstruction in IRAs related to oil and gas exploration and development is limited to roads needed pursuant to rights granted under an existing lease (issued prior to the effective date of the Colorado Rule) where lease stipulations and other regulations allow. Forest or temporary roads could be constructed. Road construction is prohibited on leases within IRAs issued after (the effective date of the Colorado Rule)	Road construction or reconstruction in CRAs related to oil and gas exploration and development is limited to roads needed pursuant to rights granted under an existing lease (issued prior to the effective date of the Colorado Rule) where lease stipulations and other regulations allow. Roads are temporary roads. Road construction is prohibited on leases within CRAs issued after (the effective date of the Colorado Rule) Eight conditions are to be considered for inclusion in approved Surface Use Plans of Operation. Alternative 2 has no oil and gas leases within the upper tier acres. Alternative 4 upper tier acres include current oil and gas leases where road construction could occur if allowed by lease terms and considering eight conditions for inclusion in approved Surface Use Plans of Operation.	Leasing stipulations from oil and gas leasing decisions may constrain surface occupancy and use in IRAs to protect resources, and include reclamation requirements and other resource protection measures. Future leases are possible based on forest plans or oil and gas leasing decisions.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Roads for leasable coal operations	Road construction or reconstruction in IRAs for coal exploration and development are limited to areas under an existing lease (issued prior to the effective date of the Colorado Rule). This includes 5,900 acres within IRAs. No rule related language on location of buried infrastructure needed for capture, collection, and use of coal mine methane. No regulatory prohibition on the use of roads constructed or reconstructed for purpose of collecting and transporting coal mine methane	Road construction or reconstruction in CRAs is allowed for coal exploration and development in existing lease areas, and in future lease areas within the North Fork coal mining area (20,000 acres). This includes 4,000 acres currently leased in the North Fork coal mining area. Roads constructed or reconstructed for coal exploration or coal related surface activities may also be used for the purpose of collecting and transporting coal mine methane in the North Fork coal mining area when authorized under a gas lease. Roads are temporary roads. Buried infrastructure needed for capture, collection, and use of coal mine methane would be located within road rights-of-way. No CRA upper tier acres in either alternative are located in the North Fork coal mining area.	Current forest plan direction does not limit road-building in areas where coal resources exist. Forest plans include management direction for areas where coal resources exist to protect sensitive surface resources. Current forest plan direction does not limit location of buried infrastructure.
Road construction for water conveyance facilities	Road construction or reconstruction related to water conveyances is limited in IRAs to areas under an existing permit (issued prior to effective date of Colorado Rule). Road construction or reconstruction is not allowed for future water conveyance structures.	The Regional Forester determines road construction or reconstruction is needed related to authorized water conveyance structures operated pursuant to a pre-existing water court decree (issued prior to effective date of Colorado Rule). Water conveyances are defined as facilities associated with the transmission, storage, impoundment, and diversion of water on and across NFS lands. Not allowed within CRA upper tier acres.	Road construction/reconstruction activities in IRAs would be governed by forest plan direction. Forest plan direction includes areas where road construction is prohibited, limited, discouraged, or unrestricted.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Road construction for reducing wildland fire hazards	Construction or reconstruction of a road is not allowed in IRAs to reduce wildland fire hazard to at-risk communities.	Construction or reconstruction of a temporary road is allowed with Regional Forester determination to facilitate tree-cutting, sale or removal within the first one-half mile of the CPZ to reduce the wildfire hazard to an at-risk community or municipal water supply. Not allowed within CRA upper tier acres.	Road construction/reconstruction activities would be governed by forest plan direction, which varies by management area.
Road construction to facilitate maintenance and restoration of ecosystem characteristics.	Construction or reconstruction of a road is not allowed in IRAs for maintenance and restoration of ecosystem characteristics.	Construction or reconstruction of a temporary road is allowed with Regional Forester determination to facilitate tree-cutting, sale or removal within the first one-half mile of the CPZ to maintain or restore ecosystem characteristics. Not allowed within CRA upper tier acres.	Road construction/reconstruction activities would be governed by forest plan direction, which varies by management area.
General linear construction zone provisions (LCZs)	Does not include any prohibition on LCZs Does not include additional environmental analysis requirements for LCZs. Does not include specific provisions about decommissioning and closing LCZs.	Generally prohibits LCZs in CRAs. Includes additional environmental analysis and determination requirements for LCZs determining that: motorized access without LCZs is not technically feasible; within a native cutthroat trout catchment or identified recovery watershed, an LCZ would not diminish conditions in the water influence zone and in the native cutthroat habitat over the long-term; an LCZ is consistent with the applicable forest plan; Includes specific provisions about decommissioning and closing LCZs. Standard and upper tier provisions the same.	Some Forest plans provide direction to follow to protect resource values when proposing the use of an LCZ. Does not include additional environmental analysis requirements for LCZs. Does not include specific provisions about decommissioning and closing LCZs.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
LCZs for water conveyance structures	No rule-related prohibition on LCZs.	The Regional Forester determines an LCZ is needed related to an authorized water conveyance structure operated pursuant to a pre-existing water court decree (issued prior to effective date of Colorado Rule). Water conveyances are defined as facilities associated with the transmission, storage, impoundment, and diversion of water on and across NFS lands.	Generally forest plan direction does not limit the use of LCZs.
LCZs for electrical power lines and telecommunication lines	No rule-related prohibition on LCZs or location of electrical power lines or telecommunication lines.	Construction or an LCZ, with Regional Forester determination, based on a site-specific NEPA analysis, is allowed for the construction, reconstruction, or maintenance of existing or future authorized electrical power lines and telecommunication lines where it has been determined such utility lines cannot be located outside of a CRA without causing substantially greater environmental damage.	Generally forest plan direction does not limit the use of LCZs or the location of electrical power lines or telecommunication lines.
Use of an LCZs for construction or reconstruction of an oil and gas pipeline	There is no rule-related language prohibiting the use of an LCZ for this purpose.	Where the Regional Forester determines a linear construction zone is needed to allow for the construction or reconstruction of a pipeline associated with an oil and gas lease that allows surface use within a CRA or the construction or reconstruction of a pipeline needed to connect to infrastructure within a CRA from outside a CRA where such a connection would cause substantially less environmental damage than alternative routes.	Generally forest plan direction does not limit the use of LCZs.

Descriptor	Alternative 1 – Provisions of the 2001 Roadless Rule	Alternative 2 – Proposed Action Colorado Roadless Rule; Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier	Alternative 3 – No Action Forest Plans
Other Requirements for Management of Roadless Areas in Colorado			
Oil and gas pipelines where the source(s) and destination(s) of the oil and natural gas is not within the roadless area	No prohibition on oil or gas pipelines through IRAs from sources outside IRAs.	The construction of pipelines for the purposes of transporting oil or natural gas through a CRA where the source(s) and destination(s) of the pipeline are located exclusively outside of a CRA shall not be authorized.	Forest plans generally allow oil or gas pipelines through IRAs from sources outside IRAs

Table 2-14. Comparison of alternatives by environmental consequences (refer to chapter 3 for details)[23]

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Fire and Fuels	1,800 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year (900 acres within IRAs). Least flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems.	5,900 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year (5,300 acres within CRAs). Medium flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems. Unable to conduct hazardous fuels reduction on 12% of 0.5 mile CPZ and 13% of 1.5 mile CPZ due to upper tier acre prohibitions.	13,100 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year. Greatest flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems.	2,200 acres in the analysis area have projected tree-cutting activities to reduce hazardous fuels each year (1,600 acres within CRAs). Within the CRAs that are not upper tier acres, the flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems is identical to alternative 2. Unable to conduct hazardous fuels reduction on 48% of 0.5 mile CPZ and 52% of 1.5 mile CPZ due to upper tier acre prohibitions;
Ecosystem Composition, Structure and Processes	500 acres per year in the analysis area have projected tree-cutting activities for forest health purposes (300 acres within IRAs). Fewest opportunities to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors.	1,000 acres per year in the analysis area have projected tree-cutting activities for forest health purpose (400 acres within CRAs). More opportunities than alternatives 1 and 4, but fewer opportunities than alternative 3 to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors.. Unable to treat upper tier acres.	3,500 acres per year within the analysis area have projected tree-cutting activities for forest health purposes. Greatest opportunities to to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors.	800 acres per year in the analysis area have projected tree-cutting activities for forest health purposes (200 acres within CRAs). More opportunities to maintain and restore ecosystem characteristics, including resilience to insect and disease outbreaks and climate induced stressors than alternative 1 but less than alternative 3 and alternative 2 due to upper tier acres.
Aquatic Species and Habitat	Least risk for adverse impacts on aquatic species.	More risk than alternatives 1 and 4, less than alternative 3 for adverse impacts on	Greatest risk of adverse impacts on aquatic species.	Less risk for adverse impacts on aquatic species than alternatives 2 and 3; greater

[23] *The analysis area is all acres within either the IRAs or the CRAs, or acres that are common between the two and are within both the IRAs and the CRAs. This totals 4,653,100 acres. Table 3-1 explains this in more detail.*

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
	Site specific design criteria and mitigation measures are expected to minimize risk.	aquatic species. Site specific design criteria and mitigation measures are expected to minimize risk.	Site specific design criteria and mitigation measures are expected to minimize risk.	risk than alternative 1. Site specific design criteria and mitigation measures are expected to minimize risk.
Threatened Endangered or Sensitive Plants	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. Least risk to adverse impacts to sensitive plants Site specific design criteria and mitigation measures are expected to minimize risk.	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. More risk of adverse impacts to sensitive plants than alternatives 1 or 4; less than alternative 3. Site specific design criteria and mitigation measures are expected to minimize risk.	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. Greatest risk of adverse impacts to sensitive plants. Site specific design criteria and mitigation measures are expected to minimize risk.	No adverse impacts to threatened or endangered plants because no road construction or tree-cutting, sale or removal is projected to occur where threatened or endangered plants exist. More risk of adverse impacts to sensitive plants than alternative 1; less than alternatives 2 or 3. Site specific design criteria and mitigation measures are expected to minimize risk.
Economics	Average annual jobs associated with – Oil/gas drilling = 489 jobs Oil/gas production = 360 jobs Coal production = 1,033 jobs Average annual labor income associated with – Oil/gas drilling = $25.3 million Oil/gas production =$ 24.6 million Coal production = $75.2 million Average annual value of production associated w/ – Oil/gas drilling = $156.9 million Oil/gas production = $269.4 million Coal production = $305.9	Average annual jobs associated with – Oil/gas drilling = 489 jobs Oil/gas production = 360 jobs Coal production = 1,912 jobs Average annual labor income associated with – Oil/gas drilling = $25.3 million Oil/gas production =$ 24.6 million Coal production = $139.1 million Average annual value of production associated w/ – Oil/gas drilling = $156.9 million Oil/gas production = $269.4 million Coal production = $566.2	Average annual jobs associated with – Oil/gas drilling = 553 jobs Oil/gas production = 406 jobs Coal production = 1,912 jobs Average annual labor income associated with – Oil/gas drilling = $28.6 million Oil/gas production =$ 27.8 million Coal production = $139.1 million Average annual value of production associated w/ – Oil/gas drilling = $177.6 million Oil/gas production = $303.9 million Coal production = $566.2	Average annual jobs associated with – Oil/gas drilling = 489 jobs Oil/gas production = 360 jobs Coal production = 1,912 jobs Average annual labor income associated with – Oil/gas drilling = $25.3 million Oil/gas production =$ 24.6 million Coal production = $139.1 million Average annual value of production associated w/ – Oil/gas drilling = $156.9 million Oil/gas production = $269.4 million Coal production = $566.2 million

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
	million	million	million	
	No difference expected between alternatives at the State level in recreation, tourism, or wood products due to the lack of project specific data needed for analysis, and the ability to substitute sites and resources at the larger, State-wide scale.			
Soils	No major difference among alternatives related to the risk of soil impacts. Alternatives 1 and 4 would have the least risk of adverse effects, and alternative 2 would have a slightly higher risk, followed by alternative 3. However, these differences are insignificant because they would be small in magnitude and spread over a wide geographic area. Most of the potential effects would be mitigated by site-specific mitigation measures. The risk of post-fire soil erosion may be higher under alternative 1 and lowest under alternative 3 as a result of projected levels of fuel treatments.			
Developed Ski Areas	Least opportunities for ski area development and expansion. 6,600 acres within the IRA boundaries and under permit prior to the effective date of rulemaking would allow for road construction and tree-cutting, sale or removal. Forest Plan allocations for ski areas outside of existing permit areas (1,700 acres) would prohibit road construction.	Greater opportunity for ski area development and expansion. Forest Plan allocations for ski areas outside of existing permit areas (1,700 acres) would allow road construction and tree-cutting more than alternative 1.	Forest plans can be amended or revised to expand ski area allocations beyond the current allocation.	Same as alternative 2.
Scenic Quality	Least risk to scenic resources.	More risk to scenic resources than alternatives 1 and 4. Upper tier acres same as alternative 1.	Greatest risk to scenic resources.	Same as alternative 2 within CRA boundaries that are not upper tier; upper tier areas same as alternative 1.
Social Values	No disproportionate negative impact on minority or low-income groups as defined in the Bureau of the Census' Current Population Reports. Preference towards preservation of non-development social values.	No disproportionate negative impact on minority or low-income groups as defined in the Bureau of the Census' Current Population Reports. Slightly less than alternative 1 preference towards non-development social values.	No disproportionate negative impact on minority or low-income groups as defined in the Bureau of the Census' Current Population Reports. Less preference towards non-development social values than alternatives 1, 2, and 4.	Same as alternative 2.
Terrestrial Species and Habitat	Least risk to terrestrial species and habitat. Site specific design criteria	More risk than alternative 1 and 4 to terrestrial species and habitat.	Greatest risk to terrestrial species and habitat. Site specific design criteria and	More risk than alternative 1 and less risk than alternatiave 2 to terrestrial species and

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
	and mitigation measures are expected to minimize risk.	Tree-cutting to improve habitat for TEPS species prohibited in upper tier acres. Site specific design criteria and mitigation measures are expected to minimize risk.	mitigation measures are expected to minimize risk.	habitat. Tree-cutting to improve habitat for TEPS species prohibited in upper tier acres. Site specific design criteria and mitigation measures are expected to minimize risk.
Recreation Settings	Likely to retain the greatest proportion of acreage in primitive or semi-primitive settings The substantially altered portion of the IRA inventory would continue to be inconsistent with primitive or semi-primitive settings. The newly identified roadless acres (409,500 acres) where road construction and tree-cutting, sale or removal is projected to occur that are not within the IRAs could shift to less primitive settings.	Likely to retain a high proportion of acreage in primitive or semi-primitive settings. However, some areas where road construction and tree-cutting, sale or removal is projected to occur could shift to less primitive settings. The exclusion of the substantially altered acreage and inclusion of new roadless acres would create a more homogeneous primitive or semi-primitive recreation setting.	Least likely to retain a high proportion of acreage in primitive or semi-primitive settings; especially where road construction and tree-cutting, sale or removal is projected to occur.	More likely than alternatives 2 and 3 to retain a high proportion of acreage in primitive or semi-primitive settings.
Lands-Special Use Authorizations	Special use authorizations issued prior to the effective date of rulemaking would be unaffected. Future special use authorizations in IRAs would generally prohibit road construction. There would be no prohibition on the use of LCZs for future electrical power lines or telecommunication lines, water conveyance structures and oil and gas pipelines from sources outside of IRAs.	Special use authorizations issued prior to the effective date of rulemaking would be unaffected. Future special use authorizations in CRAs would generally prohibit road construction. Limited exceptions for the use of LCZ for future electrical power lines or telecommunication lines, water conveyance structures and oil and gas pipelines from sources outside of CRAs.	Current and future special use authorizations would generally allow for road construction; except where prohibited under forest plans. There would be no prohibition on the use of LCZs for future electrical power lines or telecommunication lines, water conveyance structures or oil and gas pipelines.	More restrictions than alternative 2, due to the greater proportion of upper tier acres, and fewer restrictions than alternative 1.

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Invasive Plants	Least risk of spread of invasive plants because this alternative has the least projections of road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Slightly higher risk than alternatives 1 and 4 for the spread of invasive plants because this alternative has a higher projection of road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Greatest risk of the spread of invasive plants because this alternative has the highest projections for road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Slightly higher risk than alternative 1 but less than alternative 2 for the spread of invasive plants because this alternative has a higher projection of road construction or tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.
Cultural Resources	Least risk of damage to cultural resources because this alternative has the least projections for tree-cutting, sale or removal. Site specific design criteria and mitigation measures are expected to minimize risk.	Slightly higher risk of damage to cultural resources than alternative 1 because this alternative has a high projection of tree-cutting, sale or removal and road construction. Site specific design criteria and mitigation measures are expected to minimize risk.	Highest risk of damage to cultural resources because this alternative has the highest projection of tree-cutting, sale or removal and road construction. Site specific design criteria and mitigation measures are expected to minimize risk.	Less risk than alternative 2 due to more acres in the upper tier.. Site specific design criteria and mitigation measures are expected to minimize risk.
Roadless Area Characteristics	Minimal effect to roadless area characteristics because there is little projected activity to occur. No consideration or regulatory protection of roadless area characteristics on 409,500 acres outside of IRA boundaries.	Minimal effect to roadless area characteristics because there is little projected activity to occur. Consideration and protection of roadless area characteristics on 409,500 acres within CRA boundaries.	More effect to roadless area characteristics because there is an increase in projected activities to occur compared to the other alternatives. Some risk of adverse effects to roadless area characteristics because there are no regulatory prohibitions on road construction, use of linear construction zones or tree-cutting, sale or removal on any of the analysis area.	Minimal effect to roadless area characteristics because there is little projected activity to occur. Consideration and protection of roadless area characteristics on 409,500 acres within CRA boundaries.
Air Resources	Differences in effects on air quality do not substantially differ between the alternatives. Atmospheric emissions within the analysis area are not expected to increase to a level that would be likely to exceed state or federal air quality standards.			
Administratively and Congressionally Designated	There are no differences between the alternatives to administratively or congressionally designated areas because none of the alternatives project tree-cutting, sale or removal or road construction in administratively designated areas and tree-cutting, sale or			

Issue or Affected Resource	Alternative 1 Provisions of the 2001 Roadless Rule	Alternative 2 Proposed Action Colorado Roadless Rule	Alternative 3 No Action Forest Plans	Alternative 4 Colorado Roadless Rule
Areas	removal or road construction is prohibited in congressionally designated areas.			
Wilderness	Alternatives 1 and 2 have a low likelihood of affecting wilderness characteristics because tree-cutting, sale or removal and road construction are prohibited in Wilderness areas and projected activities within roadless areas are not expected to occur adjacent to Wilderness area boundaries.		Higher risk of adverse effect to wilderness areas because of the high projections for tree-cutting, sale or removal and road construction and a higher likelihood that these activities could occur adjacent to Wilderness boundaries.	Same as alternatives 1 and 2.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter summarizes the physical, biological, social, and economic environment of the project area and the potential effects of implementing each alternative on the environment. It also presents the programmatic analysis and comparison of alternatives presented in the previous chapter.

This analysis is structured around four alternatives that were described in detail in chapter 2:

- Alternative 1 – Provisions of the 2001 Roadless Rule
- Alternative 2 – Colorado Roadless Rule (Proposed Action)
- Alternative 3 – Forest Plans (No Action)
- Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

The description of the affected environment (current conditions and trends), followed by the environmental consequences (impacts or effects) associated with each alternative are presented for comparison.

Analysis Area

The area of analysis for determining effects is limited to National Forest System (NFS) lands determined to be roadless areas within the State of Colorado. Roadless areas in Colorado are generally undeveloped areas, typically exceeding 5,000 acres and meet the minimum criteria for inclusion in the National Wilderness Preservation System. These areas were identified through a variety of assessments and inventories including, the Forest Service's Roadless Area Review and Evaluation (RARE II) processes, and forest planning.

While the areas and acreages for each alternative are different, the analysis area for all of the alternatives is the same in order to compare the environmental effects of each alternative (see Map Packet, Map 1). The area of analysis is NFS lands within: (1) the CRAs; and (2) the 2001 IRAs, excluding proclaimed Wilderness and other congressionally designated areas. The alternatives differ in terms of which acres would be managed according to a roadless rule and forest plans, and which acres would be managed according to direction in the forest plan only. Table 3-1 displays the number of acres of the analysis area that would be managed according to a roadless rule and forest plans and how many acres would be managed according to the forest plans only under each alternative.

Table 3-1. Provisions that Apply to each Portion of the Analysis Area by Alternative.

Alternative	Portion of the Analysis Area for Alternatives (Total analysis area = 4,653,100 acres)		
	Roadless Acres in Common IRAs and CRAs 3,776,500 acres	**Substantially Altered and Ski Area Acres, IRAs only 467,100 acres**	**New Roadless Acres CRAs only 409,500 acres**
Alternative 1 – provisions of the 2001 Roadless Rule	IRAs – Forest Plan & 2001 Rule	IRAs – Forest Plan & 2001 Rule	Forest Plan
Alternative 2 – Colorado Roadless Rule (Proposed Action)	CRAs – Forest Plan & CO Rule	Forest Plan	CRAs – Forest Plan & CO Rule
Alternative 3 – Forest Plans (No Action)	Forest Plan	Forest Plan	Forest Plan
Alternative 4 - Colorado Roadless Rule with Public Proposed Upper Tier	CRAs – Forest Plan & CO Rule	Forest Plan	CRAs- Forest Plan & CO Rule

Alternative 1 identifies 4.24 million acres that would be managed according to the provisions of forest plans and the 2001 Roadless Rule. The additional 409,500 acres within the analysis area not covered by the 2001 Roadless Rule that were found to contain roadless area characteristics would be managed according to the respective forest plan.

Alternative 2 identifies 4.19 million acres (3,776,500 acres of the 2001 Roadless Rule IRAs and an additional 409,500 acres that were found to have roadless area characteristics) that would be managed according to forest plans and the Colorado Roadless Rule. The 467,100 acres not within the CRAs would be managed according to the respective forest plan and includes acres that have been substantially altered; acres permitted for ski areas; or acres that forest plans have currently allocated to ski areas. This alternative designates a total of 562,200 upper tier acres.

Alternative 3 would require that all of the acres within the analysis area be managed according to the respective forest plan.

Alternative 4 identifies 4.19 million acres (3,776,500 acres of the 2001 Roadless Rule IRAs and an additional 409,500 acres that were found to have roadless area characteristics) that would be managed according to the Colorado Roadless Rule and forest plans. The 467,100 acres that includes permitted or forest plan allocated ski area acres and those that have been substantially altered would be managed according to the respective forest plan. This alternative has the same provisions as alternative 2 and differs by the amount of acres designated to upper tier. This alternative designates 2,614,200 acres as CRA upper tier acres.

Further details on the roadless inventory for each alternative are found in chapter 2.

Analysis Framework

The scope of this analysis is programmatic in nature. The actions to be analyzed consist of establishing regulatory prohibitions with specific exceptions. There are no ground disturbing activities proposed or authorized by any of the alternatives. All subsequent proposals for activities would require the preparation of a separate site-specific analysis and decision pursuant to the National Environmental Policy Act (NEPA). The potential environmental consequences are based on projected probable actions and are primarily described in qualitative and comparative terms.

Prohibitions and exceptions apply to road construction or reconstruction and tree-cutting, sale, or removal in roadless areas and, in some alternatives, certain other activities such as linear construction zones (LCZs), construction of oil and gas pipelines, electrical power lines, telecommunication lines, and water conveyances. In order to display the differences in environmental consequences between the alternatives, this analysis uses assumptions and probable levels of three activities because they have the greatest likelihood of altering landscapes resulting in the loss of roadless area characteristics:

- tree-cutting, sale or removal
- road construction or reconstruction
- linear construction zones.

In order to compare the alternatives, it was necessary to project what was likely to occur under each of the alternatives. To make the forecast, project planners looked at past and projected needs on the ground to provide information regarding the likelihood that tree-cutting, sale, or removal; road construction or reconstruction and linear construction zones would occur within the full analysis area over the next 15 years under the management direction contained in each alternative. This information was used to make projections on the number of acres of tree-cutting, sale or removal; the number of miles of road construction or reconstruction and the number of miles of linear construction zones that may occur under each alternative. The projections are only estimates and are not proposals for action.

Analysis Assumptions and Projections

Tree-cutting, Sale, or Removal

Assumptions

The following assumptions were made for tree-cutting, sale, or removal activities that are projected to occur within the analysis area under the alternatives:

- Budgets would continue to be flat. The primary focus for tree-cutting, sale or removal for the foreseeable future is fuels reduction adjacent to communities.
- Under alternative 1, tree-cutting to maintain or restore the characteristics of ecosystem composition and structure would be utilized primarily in the ponderosa pine/Douglas-fir and pinyon-juniper forest cover types. Lodgepole pine cover types rarely fit this exception. This exception is not specifically associated with at-risk communities or municipal water supply systems, but its use would likely be associated with these. With no corresponding road construction exception, tree-cutting under this exception is limited for alternative 1.

- Under alternatives 2 and 4, tree-cutting to maintain or restore ecosystem characteristics includes potential projects to reduce tree mortality from spread of insects and diseases that would change ecosystem composition and structure. These projects would be infrequent.
- Under alternatives 2 and 4, the majority of tree-cutting, sale, or removal would occur for hazardous fuel reduction within ½ mile of communities where temporary roads can be utilized to remove the fuels. Activities are projected to occur in lodgepole pine, ponderosa pine/Douglas-fir, and pinyon-juniper forest cover. Tree-cutting is prohibited in the upper tier acres under the hazardous fuel reduction exception.
- Even if allowed for in an alternative, it would be rare to cut and remove trees for hazardous fuel reduction where the average log skidding distances to an existing or newly constructed temporary road exceed 1,000 feet. However, in some instances log-forwarding equipment could be utilized to cut and remove trees when the average skid distance exceeds 1,000 feet without the need for additional temporary roads. In other cases, machinery such as a masticator could be utilized without additional road access to cut and treat trees and undergrowth on-site. Finally in some instances, crews may be utilized to cut trees and treat the resulting slash on site by hand.
- Tree-cutting would occur at historic levels in all alternatives when incidental to an otherwise permitted purpose; such as, removal of hazard trees adjacent to roads or trails for public health and safety reasons; fire line construction for wildland fire suppression or control of prescribed fire; survey and maintenance of property boundaries; mining operations, maintenance of power or water lines, or trail maintenance or construction.
- Tree-cutting and removal for personal or administrative use would occur at historic levels under all alternatives. Personal use includes activities such as Christmas tree and firewood cutting. Administrative use includes such activities as construction of fences or footbridges.

Projections

Projections are based on the exceptions under each alternative that allow tree-cutting, sale and removal in roadless areas and on the assumptions described above. All projections for tree-cutting, sale or removal are annual averages and can be expected to vary from year to year. For every alternative, projected probable activities are those that would occur in the analysis area for the next 15 years. Table 3-2 displays the purpose for and number of acres where tree-cutting, sale, or removal is projected to occur under the alternatives over the next 15 years. Alternative 3 has the greatest number of acres where tree-cutting, sale or removal is projected to occur followed by alternatives 2, 4 and 1 respectively. More information about the likelihood of tree-cutting, sale or removal activities, including projected acreages is contained in Appendix D.

Table 3-2. Distribution of average annual tree-cutting, sale or removal projections in analysis area by alternative, by purpose.

Purpose for projected tree-cutting, sale or removal	Average annual tree-cutting, sale or removal*						
	Alternative 1		Alternative 2		Alternative 3	Alternative 4	
	IRA roadless	Other acres Forest Plan	CRA roadless	Other acres Forest Plan	All acres, Forest Plan	CRA roadless	Other acres Forest Plan
	- - - - - - - - - - - - - - average annual acres – to nearest 100 acres - - - - - - - - - - - - -						
Hazardous fuels reduction treatments	900	900	5,300	600	13,100	1,600	600
Restore and maintain ecosystem	300	200	400	600	3,500	200	600
TEPS habitat improvement	<5	0	<100	0	<100	<5	0
Other**	40	40	100	<100	300	<100	<100
Total tree-cutting, sale or removal	1,200	1,100	5,800	1,200	16,900	1,800	1,200

Data source: Forest Service Region 2, August, 2010.
**Totals may not add due to rounding. **Other includes tree-cutting that is incidental to the implementation of a management activity and tree-cutting for personal or administrative use.*

Road Construction and Reconstruction

According to the Forest Service Region 2 INFRA-GIS roads databases (April 2008), approximately 1,260 miles of National Forest System and other authorized roads occur within IRAs. Other authorized road miles include state, county, local, and private roads. About 8.5 miles of the authorized roads occur in CRAs, and approximately 1,250 miles are in the substantially altered portions of the IRAs, which are not included in the roadless inventory for the Colorado Roadless Rule due to the presence of these roads. The 8.5 miles within CRAs occur exclusively on the White River (8.3 miles) and Arapaho-Roosevelt (.2 miles) National Forests and all but 0.5 miles on the White River NF are proposed to be decommissioned. Unauthorized or non-system roads are not included in the mileage. Inventories indicate that there are at least 35 to 45 miles of unauthorized roads in the IRAs and CRAs. It is suspected that additional unauthorized roads exist in roadless areas but have not been identified. It is anticipated that, in most cases, the unauthorized roads as well as some of the authorized roads within the analysis area would be decommissioned as budgets allow. Table 3-3 displays the miles of NFS roads and other authorized roads on NFS lands in roadless areas by alternative.

Table 3-3. Miles of existing authorized roads in roadless areas

Type of Road	Roads in IRAs Alternatives 1 and 3	Roads in CRAs Alternatives 2 and 4
	- - - - - - total miles of road- - - - - - -	
National Forest system roads	1,234	8
Other authorized roads	26	0.5
Total existing roads	1,260	8.5
Roads to be decommissioned	24	8

Data source: Forest Service Region 2 INFRA-GIS roads databases, April 2008.

Assumptions

The following assumptions were made for road construction or reconstruction that could occur within the analysis area under the alternatives:

- Road construction or reconstruction would not likely see an increase in the foreseeable future because the appropriated budget is flat or declining, and long term funding expectations are a main determinate in identifying the minimum road system. In addition, there is a backlog of road maintenance; therefore, there is no emphasis on constructing new roads that need to be maintained.
- All road construction/reconstruction would be conducted in accordance with road engineering design standards found in Forest Service Handbook 7709.59.
- In all alternatives, road construction and the level of road that is constructed would be the minimum necessary to accommodate access. Where a project, such as vegetative treatment, can be completed without road construction, this is usually the chosen option. If road construction is needed for the project, a temporary road is the first option while a permanent road is usually the last option if allowed by the alternative.
- If roads are constructed in roadless areas, under alternatives 2 and 4, they are required to be temporary, closed to public vehicle travel, and decommissioned after their intended use. This is likely but not required to occur in the other alternatives.
- The roads projected in all of the alternatives for the existing oil and gas leases that allow road construction are associated with reasonable foreseeable development of the leases over the next 15 years. It is understood that future energy policies, prices, and development are highly uncertain.
- The roads projected in all alternatives for coal development are over the next 15 years (yearly projections are utilized in the effects analyses). It is understood that future energy policies, prices, and development are highly uncertain.

Projections

All projections for road construction or reconstruction are annual averages and can be expected to vary from year to year. The purpose for and number of miles of road construction or reconstruction projected under the alternatives for the analysis area are identified in Appendix D. The projections are based on the exceptions for road construction or reconstruction that are allowed in roadless areas under each alternative along with the assumptions described above.

The projections do not identify roads that may be needed in response to emergencies. The greatest number of road miles for all activities is projected to occur under alternative 3 followed by alternatives 2, 4 and 1 respectively. The majority of road construction or reconstruction would take place in areas previously leased for oil and gas development, in the North Fork coal mining area, and adjacent to communities for hazardous fuels reduction. Details are outlined below.

Table 3-4. Distribution of average annual road construction and reconstruction projections in analysis area for each alternative, by general purpose roads

Projected road construction or reconstruction for general purpose	Average annual road construction and reconstruction						
	Alternative 1		Alternative 2		Alternative 3	Alternative 4	
	IRA roadless	Other acres Forest Plan	CRA roadless	Other acres Forest Plan	All acres, Forest Plan	CRA roadless	Other acres Forest Plan
	- annual average miles -						
Hazardous fuels reduction treatments	0.0	0.8	2.1*	0.8	7.1	0.8*	0.8
Maintain and restore ecosystem	0.0	0.1	0.7*	1.2	2.7	0.3*	1.2
Recreation special uses (ski areas, recreation residences, etc.)	0.2	0.0	0.1	0.5	0.6	0.0	0.5
Water conveyances	0.8	0.0	0.3	0.5	1.0	0.2	0.5
Utility special uses (power lines, etc)	0.3	0.0	0.1	0.3	0.6	0.0	0.3
Hard rock minerals	0.3	0.0	0.3	0.0	0.3	0.3	0.0
Other roads (health and safety, Federal Highway, CERCLA)	0.2	0.0	0.1	0.2	0.4	0.1	0.2
Total general purpose road construction/ reconstruction projected (nearest mile)	2	1	4	3	13	2	3

Data source: Forest Service Region 2, August 2010.
Totals may not add due to rounding.
**can only be temporary roads under alternatives 2 and 4 and would be restored after use*

Coal Road Construction/Reconstruction Projections

Table 3-5 displays by alternative the projections for road construction and reconstruction that could occur for coal development in the coal analysis area (39,600 acres).

The majority of projected coal-related temporary roads are for exploration or methane drainage purposes, and these would be on the landscape for 2-5 years. A small number of coal roads access ventilation shafts and monitoring facilities that are expected to be on the landscape for 30 years or more. The projections for roads associated with coal lease, exploration and development were based on a 39,600 acre area, the only place on NFS lands in Colorado where economically viable coal resources are presently being developed. There are 7,100 acres currently leased within the 39,600 acre area. Of the 7,100 acres leased, 5,900 acres are within IRAs and 4,000 acres are within CRAs. No additional coal could be leased within the IRAs under alternative 1. Alternatives 2 and 4 allow additional coal leasing in the CRAs only within the 20,000 acre North Fork coal mining area; where approximately 15,630 acres are not currently leased. Alternative 3 allows coal leasing within the entire 39,600 acre area.

Table 3-5. Projected Road Construction/Reconstruction in Coal Analysis Area by Alternative, 15-years.

	Alternative 1	Alternative 2 & 4	Alternative 3
	Road construction and reconstruction would be allowed in IRAs on coal leases in effect prior to effective date of rule; and in CRAs that are not within IRAs according to forest plan management direction	**Road construction and reconstruction could occur in CRAs within the North Fork Coal Mining Area; and in the IRAs that are not within the CRAs according to forest plan management direction**	**Road construction and reconstruction could occur in IRA and CRA according to forest plan management direction**
IRA only	2 miles temporary roads	2 miles temporary roads	2 miles temporary roads
IRA/CRA in common	5 miles temporary roads	44 miles temporary road	38 miles forest road 24 miles temporary road
CRA only	9 miles temporary or forest road	6 miles temp road	9 miles temporary or forest road
Total by alternative for 15 year	7 within IRAs; 16 total miles	50 within CRAs; 52 total miles	64 within IRAs; 73 total miles
Total by alternative annually	1 mile	3 miles	5 miles

All of the roads constructed for coal exploration and development under alternatives 2 and 4 would be temporary and must be decommissioned. Under alternatives 1 and 3, roads constructed could be converted to permanent roads, if determined to be appropriate according to the forest plan.

Oil and Gas Road Construction/Reconstruction Projections

Road construction and reconstruction for oil and gas development would occur almost exclusively on the GMUG and White River National Forests.

Overall, alternative 3 projects the greatest number of miles of road construction or reconstruction for oil and gas development because under the other alternatives all future oil and gas leases as of the date of the Colorado Rule would not allow road construction. Under alternatives 2 and 4, roads allowed by existing oil and gas leases are only temporary and would not become forest or permanent roads. Under alternatives 1 and 3, oil and gas roads are considered forest or administrative roads and could be made into permanent roads if determined to be appropriate according to the forest plan.

Table 3-6 displays the annual average projections for road construction or reconstruction for oil and gas development.

Table 3-6. Distribution of average annual road construction and reconstruction projections in analysis area for each alternative, for oil and gas development

	Average annual road construction and reconstruction						
	Alternative 1		Alternative 2		Alternative 3	Alternative 4	
	IRA roadless	Other acres Forest Plan	CRA roadless	Other acres Forest Plan	All acres, Forest Plan	CRA roadless	Other acres Forest Plan
	---------- miles ----------						
Projected road construction or reconstruction for oil or gas development	9	1	9	0.3	11	9	0.3

Data source: Forest Service Region 2, August, 2010.
Generally numbers rounded to nearest mile.

Summary Road Construction/Reconstruction Projections

Table 3-7 displays a summary of the total average annual miles of road projected to be constructed or reconstructed for all activities under each alternative. Table 3-7 also displays the type of road (temporary or forest) that is projected to be constructed or reconstructed.

Table 3-7. Average annual road construction and reconstruction miles projected by alternative

	Average annual road construction and reconstruction						
	Alternative 1		Alternative 2		Alternative 3	Alternative 4	
Type of projected road construction or reconstruction	IRA roadless	Other acres Forest Plan	CRA roadless	Other acres Forest Plan	All acres, Forest Plan	CRA roadless	Other acres Forest Plan
	---------- miles ----------						
Temporary	1.7	1.6	6.6	2.7	11.0	4.8	2.7
Forest *	9.3	1.3	9.6	1.1	17.4	9.5	1.1
Total Construction / Reconstruction (nearest mile)	11	3	16	4	28	14	4

Data source: Forest Service Region 2, August, 2010.
Totals may not add due to rounding and may not add to the totals in Tables 3-4; 3-5; and 3-6 due to rounding
** These represent the highest level of road development, in some cases temporary roads may be used rather than a Forest road.*

Linear Construction Zones

Assumptions

- An LCZ is a short-term construction area and equipment staging and movement area for constructing a linear feature when continued roaded facility operation and maintenance access is not needed.
- Under alternative 3, while forest plans are usually silent on the use of LCZs, a forest plan may restrict the construction of linear features within a particular management area, depending on management area direction.

Projections

Table 3-8 displays a summary of the average annual miles of LCZs projected to be constructed for all three of the above listed activities under each of the alternatives. Overall, alternative 3 projects the greatest number of miles of LCZs with the other three alternatives projecting identical miles.

Table 3-8. Average annual LCZ miles projected by alternative

	Average annual LCZ miles						
	Alternative 1*		Alternative 2		Alternative 3	Alternative 4	
	IRA roadless	Other acres Forest Plan	CRA roadless	Other acres Forest Plan	All acres, Forest Plan	CRA roadless	Other acres Forest Plan
Type of projected LCZ	---------- miles ----------						
Water conveyance	0.5	0	0.5	0	0.5	0.5	0
Electrical power line or telecommunication line	2.0	0	2.0	0	2.0	2.0	0
Oil and gas pipeline	0.7	0	0.7	0	1.1	0.7	0
Total LCZ (nearest mile)	3	0	3	0	4	3	0

** Alternative 1 is silent on the use of LCZs within IRAs.*

VEGETATION AND FOREST HEALTH

Introduction

Roadless areas contain a diverse array of forest vegetation, ranging from warm, dry pinyon-juniper woodlands to cold, moist sub-alpine forests. Species composition is generally correlated with elevation and aspect. Forest vegetation cover types in Colorado's roadless areas are based on information in the R2Veg database, which is primarily developed from aerial photography. The cover type refers to the most dominant species in the overstory canopy and does not include the wide variation in understory trees and other vegetation. The non-forest cover types within the roadless areas include grasslands and meadows, shrublands, areas devoid of vegetation such as exposed bedrock, and a minor amount of surface water.

The roadless areas in the State are predominantly coniferous forest types occupying mountainous terrain. Forested land covers approximately 3,330,000 acres or 72 percent of the NFS lands within the analysis area (a total of 4,653,100 acres). Table 3-9 displays the cover type distribution within the analysis area that includes all IRAs and CRAs.

Table 3-9. Forest cover type distribution in the Colorado Roadless Rule analysis area*

Vegetation Cover Types	Acres	Portion of total
Rock and Water	212,400	14%
Grass and Forbs	672,600	5%
Shrubs	437,800	9%
Pinyon-Juniper	105,700	2%
Ponderosa Pine	183,200	4%
Douglas-fir	366,000	8%
Lodgepole Pine	556,100	12%
Spruce/Fir	1,068,800	23%
Aspen	957,400	21%
Other Tree Species	93,000	2%

** Information from R2Veg database for the analysis area (area is approximate and rounded to nearest 100 acres).*

Forest species composition has changed somewhat from pre-European settlement conditions as a result of human and natural disturbances as well as successional processes. The amount of change varies based on the types and frequency of disturbances and the response of the vegetation types. Roadless areas by their very nature have limited access and therefore have had little timber management. Forest vegetation changes in roadless areas have primarily been influenced by natural processes in concert with management such as fire suppression and grazing that have affected fire frequency in some areas.

The disturbance processes provide insights into current and likely future forest conditions. Grasses, shrubs, ponderosa pine, and Douglas-fir have higher natural fire frequencies than lodgepole pine and spruce-fir cover types and therefore generally have higher departures from historic conditions due to fire suppression. Tree species composition in southwest Colorado has changed in many places from ponderosa pine dominated stands with relatively few medium and large diameter trees to many smaller diameter Douglas-fir and white fir trees (Covington and Moore 1994; Fulé et al. 1997). The Colorado Front Range had a mixed-severity fire regime that provided a complex forest structure of openings, patches of pure ponderosa pine and

patches of mixed ponderosa pine and Douglas-fir (Kaufman et al. 2001). Fire suppression in the 20th century reduced tree mortality and resulted in forests with much higher tree density than existed historically (Kaufman et al. 2000, Veblen et al. 2000). The forest structure in more mesic upper montane ponderosa pine – Douglas-fir forests, particularly in the northern Front Range may not have been as severely altered (Baker et al. 2007). An on-going study is finding fire frequency and intensity were variable based on elevation and through time in the mixed conifer zone and in the foothills in Northern Colorado. There appear to be ecological break points, where species composition and fire regimes change. Those break points have moved up and down the elevational gradient in the last 1,000 years. Localized surface fires were the norm, with occasional, climate-driven mixed severity fires that burned larger areas the last 500 years (Huckaby 2009).

The departure from historic conditions is smaller in the infrequent, high intensity fire regimes of spruce-fir and lodgepole pine forests. Although the departure from historic conditions is less than in lower elevation forest types, dramatic changes can and have occurred with high-intensity fires and beetle epidemics such as the on-going mountain pine beetle and spruce beetle epidemics.

The current distribution of forest composition and structure has resulted from the type of disturbances and time since disturbance. In addition to the cover types, the size of the trees is an important metric for wildlife habitat, aesthetics, forest health, and timber management. Tree size is estimated from the R2Veg database and displayed below in Table 3-10.

Table 3-10. Tree size distribution*

Size Class Description	Size (DBH)	IRA (portion of total)
Seedling and Sapling	< 5”	4%
Young Forest	5-9”	35%
Mature Forest	9-16”	54%
Old Forest	>16”	7%

** Information from R2Veg database for the analysis area*

Forest Management

The National Forests in Colorado sold approximately 200 million board feet (MMBF) of timber annually from the 1950s through the 1980s. The level decreased to approximately 50 MMBF annually between 1995 and 2005. Timber sales then increased to approximately 100 MMBF annually since 2006 in response to the current mountain pine beetle epidemic.

Within the analysis area there are approximately 2,700,000 acres (58 percent) available for tree-cutting to achieve multiple use objectives and provide a sustainable supply of timber (determined to be suitable through the forest plans). Most of the area available for tree-cutting in the roadless areas is not associated with timber production. Tree-cutting and harvest are primarily permitted to achieve multiple resource management objectives, including improving forest health and reducing hazardous fuels where timber volume is a secondary objective or a by-product. Roads are used where timber is removed and to increase economic feasibility. Removal of trees to reduce hazardous fuels or reduce the spread of forest diseases or insects is often economically feasible only if a road system is present.

Reducing hazardous fuels has been an important objective in forest vegetation management in

recent years. The emphasis on hazardous fuel reduction has focused on commercial and non-commercial thinning in the pinyon-juniper, ponderosa pine, and Douglas-fir cover types. Lodgepole pine and aspen are early successional species. These species are typically regenerated using even-aged methods; thinning is not generally an option as they are susceptible to wind throw. Forest vegetation management in spruce-fir forests primarily relies on uneven-aged methods with limited thinning.

Forest Health - Insects and Diseases: Affected Environment

Forest health describes the forest condition associated with its age, composition, structure, function, vigor, insects and disease, and resilience to disturbances (Helms 1998). Forest health is framed by the individual or societal perspective, including the land management objectives and spatial and temporal scales. Trees growing in dense stands are often weakened by the competition for light, nutrients and moisture. Stand conditions can be used to estimate the risk of mortality from damaging insects and disease organisms. Landscapes with high levels of stressed, dying, or dead trees are considered unhealthy for purposes of this analysis.

Stressed, dead, and dying trees may become more prevalent in Western landscapes from impacts associated with climate change, such as warming temperatures and changes in precipitation patterns. Climate change may compromise the ability to achieve desired structure and composition for forest vegetation at landscape scales, especially with regard to wildfire severity and damage from forest insects and diseases. The effects of wildfire, insects, and disease are expected to be greatest within roadless areas that have large contiguous areas where management responses are restricted or prohibited.

Forest health conditions in the roadless areas are variable, with some areas considered healthier than others. Roadless areas are experiencing similar health concerns comparable to those in other parts of Colorado. Recent outbreaks have been larger than most historical outbreaks, although a spruce beetle outbreak affected hundreds of thousands of acres on the White River Plateau in the 1940s and 1950's. In addition, outbreaks affecting different forest types have been more synchronized than in the past. Recent outbreaks are attributable to stand conditions with high portions of susceptible, mature trees and warmer winter temperatures. Lower montane forests, primarily ponderosa pine and Douglas-fir, are generally considered outside their historic range of variation. These forests are at risk of uncharacteristic, high-intensity fire as well as forest health concerns.

Forest types are susceptible to a suite of insects and diseases. The acres given below are for the full analysis area (acres within both the IRAs and the CRAs). The forest pests of highest concern are as follows:

- Mountain pine beetle (*Dendroctonus ponderosae*) activity was detected on over 200,000 acres within the analysis area in 2009. The mountain pine beetle is considered the most destructive bark beetle in the West (Furniss and Carolin 1977). All western pines are susceptible to mountain pine beetle, but the majority of the mortality is in lodgepole pine and ponderosa pine. Studies in lodgepole pine show trees exceeding 8 inches in diameter, 80 years old and growing in a suitable climate for beetle development are most susceptible (Amman et al. 1977). Studies in ponderosa pine stands indicate stand density contributes to stand susceptibility (Schmid and Mata 1992, Negron and Popp 2004) and there is evidence that this is true in lodgepole pine stands as well (McGregor et al. 1987). Much of the 556,000 acres of lodgepole pine has already been infested or is

likely to be infested. The current mountain pine beetle epidemic threatens to kill most mature lodgepole pine in Colorado. The epidemic also affects ponderosa pine and other pines, but the extent of its impact cannot be predicted with much certainty at this time.

- Spruce beetle (*Dendroctonus rufipennis*) activity was detected on approximately 27,000 acres in 2009. Engelmann spruce and Colorado blue spruce (*Picea pungens*) are susceptible to spruce beetle. Outbreaks generally occur following widespread blowdown of spruce trees. Areas most susceptible are dense stands with high portions of large spruce greater than 16 inches in diameter (Schmid and Frye 1977). Within a large spruce beetle epidemic area, spruce trees as small as four inches in diameter are killed.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*) activity was detected on approximately 8,000 acres in 2009. Douglas-fir beetle is often a secondary agent that attacks low vigor or damaged trees. Outbreaks usually occur in areas of wind-thrown trees, at sites damaged by fire or during periods of extreme drought (Furniss and Carolin 1977). The beetle often attacks Douglas-fir trees that are infected with root disease or that have been defoliated by western spruce budworm (*Choristoneura occidentalis*) or Douglas-fir tussock moth (*Orgyia pseudotsugata*).
- Subalpine fir succumbs to a combination of western spruce budworm, western balsam bark beetle (*Dryocoetes confusus*), and Armillaria root disease (*Armillaria ostoyae*). Combined, these forest pests result in subalpine fir decline and have affected approximately 53,000 acres of subalpine fir in 2009.
- Aspen throughout much of Colorado has been recently affected by sudden aspen decline (SAD). The recent sudden aspen mortality has not been attributed to agents that typically kill mature aspen. Severe drought combined with high temperatures during the growing season appears to be responsible (Worrall et al. 2008). SAD is estimated to occur on over 70,000 acres of aspen in 2009.
- White pine blister rust (*Cronartium ribicola*) is an exotic fungus that kills bristlecone pine (*Pinus aristata*) and limber pine (*Pinus flexilis*). Native five-needle pines have little resistance to this invasive disease. A small percentage of five-needle pines have been shown to have genetic resistance to white pine blister rust. Preserving genetic diversity in these stands is important for the species. Mountain pine beetles also kill the five-needle pines and could threaten genetic diversity. Protection of trees carrying genetic resistance using insecticide sprays or antiaggregation pheromones is an effective tool during mountain pine beetle outbreaks. Affected acres are not available, but are relatively small since little of the roadless area contains five-needle pines.
- White fir (*Abies concolor*) is primarily attacked by western spruce budworm and fir engraver bark beetle (*Scolytus ventralis*). Affected acres are not available, but are relatively small since little of the roadless area contains white fir.

Table 3-11 displays the forest acres infested by damaging organisms in the analysis area based on aerial detection flights since 2003. The aerial surveys typically under-estimate actual acres of tree mortality because the flights do not cover all areas every year; observers miss some mortality; and some damage is not detectable from the air.

Table 3-11. Principal insect and disease damaging agents within the analysis area.

Damage agent	Acres (thousands) affected by year [1, 2]						
	2003	2004	2005	2006	2007	2008	2009
Mountain Pine Beetle	54.6	119.5	131.2	174.0	187.5	236.6	208.5
Spruce Beetle	18.7	14.2	23.9	16.1	22.8	12.2	27.0
Douglas-Fir Beetle	9.9	13.8	8.7	6.1	14.8	8.7	7.6
Subalpine Fir Decline	165.3	91.8	127.1	99.0	86.5	91.4	53.4
Sudden Aspen Decline [3]	1.5	2.8	6.3	25.6	91.8	121.8	69.9

[1] *Based on annual aerial detection surveys within the analysis area. Not all areas are surveyed every year resulting in underestimates of areas affected.*
[2] *Acres are not additive across years - some areas are affected for multiple years.*
[3] *Aspen was not extensively sampled in 2003-2005. The aerial survey does not differentiate sudden aspen decline, frost damage and tent caterpillar damage.*

Forest Health - Insects and Diseases: Environmental Consequences

Silvicultural Practices – General Effects

Forest health prevention and treatment options vary by forest type, pest species and other factors. Treatment methods may include, but are not limited to: pesticide spraying, pheromones, biological controls, trap trees, thinning, salvage and sanitation harvests, prescribed burning, and/or reforestation of non-host tree species.

A combination of tree-cutting, removal, and prescribed burning are used to reduce the occurrence or spread of damaging insects and diseases, address other forest health concerns, and provide desirable forest conditions to reduce fire hazard. Management practices vary by management objectives and habitat type.

Specific forest health treatments involving tree-cutting can include the following:

- Thinning to improve stand health – reducing competition between trees can provide long lasting resilience to western bark beetles and can also reduce risk associated with wildfire. Results can be variable and thinning may not be as effective in preventing spread of certain species in certain forest conditions, but thinning also can be an important long-term strategy for fuels reduction (see Fire and Fuels).
- Sanitation – Removal of infested trees can greatly reduce attacks on adjacent trees and can help protect trees on adjacent lands. These treatments are very effective in small isolated infestations, but may not be effective in outbreak conditions. Removal of windthrown trees is an important management tool for spruce beetle.
- Felling and treatment on site – There is evidence that felling, burning, chipping, spraying or solar insolation can be effective in reducing attacks on adjacent trees. These treatments can be very effective in small isolated infestations, but may not be effective in outbreak situations.
- Trap trees – Trees that are intended to be sacrificed can be baited with aggregation pheromones to attract large numbers of beetles; trees are either treated with insecticides or are felled and removed before the brood matures and emerges.

Management in the lower montane forests of ponderosa pine and Douglas-fir typically includes thinning out smaller trees and prescribed burning to reduce hazardous fuels, improve forest health, and restore ecological processes. Mastication is often used in the lower montane zone.

Mesic forests, primarily lodgepole pine and spruce-fir, generally have too much biomass to use

mastication to achieve management objectives. The current mountain pine beetle epidemic has exceeded any possible control capabilities. Management in the general forest is limited to salvaging dead and dying trees to reduce hazardous fuels to recover economic value where feasible and along roads and trails to provide for public safety. Some spruce beetle outbreaks can be prevented by removing large spruce trees within two years of being wind thrown.

All Alternatives

Tree-cutting within roadless areas is anticipated to be relatively modest under any alternative. Almost all of the forest vegetation would remain unmanaged over the next 15 years. Unmanaged areas, particularly in the ponderosa pine and Douglas-fir cover types, would likely continue to depart from historic conditions and would likely experience uncharacteristic fire behavior.

Tree-cutting and road construction restrictions indirectly affect tree mortality associated with insect and disease agents and would result in some landscapes being less resilient to large-scale insect and disease outbreaks because of high stocking levels.

These outbreaks could worsen with projected climate change impacts. Climate change projections do not currently have the accuracy at fine resolutions to anticipate site-specific outcomes and responses. Therefore, alternatives that offer the most management flexibility would be more likely to achieve healthy forest stands, more resilient to climate change and other stressors.

Assisted migration through reforestation of species or genetics that are better adapted to future climates could potentially increase the resiliency of forests to increased temperatures and variable precipitation. Alternatives that would treat more acres would create more opportunities to respond proactively to climate change.

Larger areas of stands with forest health concerns may conflict with land management objectives including a potential increased wildfire hazard and effects on adjacent lands. Standing and down dead trees add to the hazardous fuel load, which can result in wildfire impacts on forest and adjacent lands.

Alternative 1- 2001 Roadless Rule

Under this alternative, tree-cutting would be limited to the following: 1) small diameter timber needed to restore ecosystem composition and structure or improve threatened, endangered, proposed or sensitive species habitat; 2) incidental cutting associated with permitted activities; 3) for personal or administrative use; or 4) within areas that have already been substantially altered that do not require road construction.

There is no associated road construction exception to facilitate the tree-cutting. Costs often increase substantially with the distance of a project from a road. Lands within one-quarter to one-half mile of existing roads would be the most likely to have some trees cut and/or removed consistent with the above tree-cutting limitations.

Under this alternative, based on forest projections, annually approximately 1,200 acres in IRAs and 1,100 acres in CRAs that are not in IRAs would have tree-cutting activities to contribute to hazardous fuels reduction and other forest vegetation management. Tree-cutting and road construction have more restrictions on the majority of the IRA acres. The restrictions on forest management activities under alternative 1 are more restrictive than any of the other

alternatives, except for the upper tier of alternatives 2 and 4. There would be some limited opportunities to reduce hazardous fuels near communities but in many cases, the forest conditions, technical and economic conditions may not fit the exceptions in this alternative. This alternative would not substantially improve forest health and hazardous fuel conditions.

Alternative 2 –Colorado Roadless Rule (Proposed Action)

This alternative provides greater opportunities to improve forest health to meet desired vegetation conditions compared to alternatives 1 or 4. This alternative has three exceptions to the prohibition on tree-cutting, sale or removal for forest health purposes. The exceptions would not be allowed within the 562,200 upper tier acres.

Tree-cutting to reduce the wildfire hazard to an at-risk community is restricted to the CPZ. The CPZ within one-half mile of communities is approximately 285,000 acres; 29,000 are upper tier acres. Where the CPZ meets the requirements of the rule and extends an additional mile, there are an additional 750,000 CPZ acres; 108,000 of these are upper tier acres.

Tree-cutting to reduce the wildfire hazard to a municipal supply system can extend beyond the CPZ if warranted. Tree-cutting to maintain or restore characteristics of ecosystem composition, structure and processes, including the possibility of treatments for insect and disease prevention, are not limited to a specific area of the CRAs. Neither is allowed within the upper tier acres; 425,000 upper tier acres are outside of the CPZs.

Temporary roads can be constructed to facilitate the tree-cutting only within the first one-half mile of the CPZ which would greatly restrict what tree-cutting would be accomplished for restoration and maintenance of ecosystem characteristics, including prevention of disease and insect spread.

Under this alternative, based on forest projections, annually approximately 5,800 acres in CRAs and 1,200 acres in the substantially altered acres (that are within the IRAs but are not within the CRAs) would be treated by tree-cutting practices, for hazardous fuels reduction and/or for maintenance or restoration of ecosystem characteristics.

Although this alternative is unlikely to substantially improve forest health and hazardous fuel conditions overall, the increased flexibility compared to alternatives 1 and 4 would increase the likelihood of achieving management objectives in critical areas, especially in the CPZs. Like alternative 1, the feasibility of tree-cutting without temporary road access would limit the extent of forest health treatments in large portions of roadless areas. The upper tier CRA acres would preclude forest health treatments involving tree-cutting and may thereby lead to larger areas of dead trees, and potentially larger and more damaging wildfires.

Alternative 3 – Forest Plans (No Action)

Compared to the other three alternatives, this alternative provides the greatest opportunities to achieve resource management objectives that include improving forest health and reducing hazardous fuels. While forest plan direction may limit tree-cutting, sale or removal and road construction in some of the analysis acres, generally forest management to improve forest health would be allowed on most acres. Economics would limit the extent of forest management in portions of roadless areas that would continue to be unroaded.

Under this alternative, based on forest projections, annually approximately 16,600 acres within the analysis area would be treated by tree-cutting practices, for hazardous fuels management

and/or other purposes. Although this alternative provides the most flexibility for management, accessibility and other resource requirements would result in most of the roadless area remaining unmanaged and at high risk of mortality over the next 15 years.

Alternative 3 would not improve forest health or reduce hazardous fuels on most of the area within roadless areas but it provides more flexibility than the other three alternatives to address concerns that arise and increases the likelihood of achieving management objectives in critical areas, especially in the wildland urban interface.

Alternative 4 –Colorado Roadless Rule with Public Proposed Upper Tier

This alternative provides greater opportunities to conduct forest health treatments for maintenance and restoration of ecosystem composition and structure than alternative 1 but less than alternatives 3 or 2. This alternative has the same three exceptions to the prohibition on tree-cutting, sale or removal for forest health purposes as alternative 2. Like alternative 2, these exceptions would not be allowed within the upper tier acres. The upper tier acres under this alternative are 2,614,200, over 2 million acres more than alternative 2.

Tree-cutting to reduce the wildfire hazard to an at-risk community is restricted to the CPZ. The CPZ within one-half mile of communities is approximately 285,000 acres; 43% or 122,000 are upper tier acres proposed under this alternative. Where the CPZ meets the requirements of the rule and extends an additional mile, there are an additional 750,000 CPZ acres; 415,000 of these are upper tier acres, or 55% of the additional CPZ acres under this alternative. Where the CPZ has the conditions to extend to 1.5 miles, slightly over half are upper tier acres where no forest health tree-cutting is allowed.

Tree-cutting to reduce the wildfire hazard to a municipal supply system can extend beyond the CPZ if warranted and tree-cutting to maintain or restore ecosystem characteristics, including current composition and structure, is not limited to a specific area of the CRAs. Neither is allowed within the upper tier acres; over 2 million upper tier acres are outside of the CPZs.

Temporary roads can be constructed to facilitate the tree-cutting only within the first one-half mile of the CPZ which would greatly restrict what tree-cutting would be accomplished for the forest health activities designed to maintain or restore ecosystem characteristics.

Under this alternative, based on forest projections, annually approximately 1,800 acres in CRAs and 1,200 acres in the substantially altered acres that are within the IRAs but are not within the CRAs would be treated by tree-cutting practices, for hazardous fuels reduction and/or forest health purposes.

This alternative is unlikely to substantially improve forest health and hazardous fuel conditions overall. There is some increased flexibility compared to alternative 1 to achieve management objectives in critical areas, especially in the community protection zones but much less than alternative 3 and less than alternative 2 because of the large amount of upper tier acres. Like alternatives 1 and 2, the feasibility of tree-cutting without temporary road access would limit the extent of forest health treatments designed to maintain or restore ecosystem characteristics in large portions of roadless areas.

Forest Health – Insects and Diseases: Cumulative Effects

Cumulative effects to forest health were considered in terms of forested lands in Colorado. Table 3-11 displays the level of insect and disease outbreaks within the analysis area. Similar

forest health concerns exist outside of roadless areas with the potential to spread into adjacent roadless areas. Conversely, forest health concerns within roadless areas have potential to expand to adjacent areas.

Congressionally designated areas such as wilderness areas and wild and scenic rivers have restricted management in some areas near roadless areas. Forest plan management area allocations allow, restrict, or prohibit forest vegetation management activities in various ways. The Southern Rockies Lynx Amendment placed additional restrictions on some vegetation methods and timing within the spruce-fir habitat type.

Roaded areas would continue to be more intensively managed than roadless areas. Forest management permitted under each alternative would cumulatively provide for meeting forest health and other management objectives across the landscape; however, cumulative restrictions would reduce the ability to achieve some desired conditions of healthy forests and fire hazard reduction. Restrictions would reduce forest growth rates and would slightly reduce the long-term sustained yield of timber.

Forest health treatments and other forest management projects are limited to some degree in roadless areas under any of the alternatives. Tree-cutting and road construction restrictions and economic limitations would add to existing treatment constraints in Wilderness and other special area designations. Alternatives 1, 2, and 4 would result in a cumulative reduction of opportunities to improve forest health conditions and achieve other management objectives on NFS lands in Colorado.

Forest Health – Invasive Species: Affected Environment

Invasive species include non-indigenous plant species that have adverse economic, environmental and/or ecological effects on the habitats they invade. It is recognized that other invasive taxa besides non-indigenous plants (e.g. New Zealand mudsnails, exotic fish and others) are a threat in Colorado ecosystems. However, with such species, the outcomes associated with disturbance and changes in roadless area management are poorly understood. Non-plant invasives are perceived to be much less predictable, and because much less is known about their dispersal mechanisms, this section will deal only with invasive plants. Although there are differences in definitions between the terms “invasive plants” and “noxious weeds”, the two will be used interchangeably.

Invasive plants become established after seed or other plant parts have been imported to an area, and where suitable environments exist. Often ground disturbance creates ideal conditions for invasive plant establishment. Once established, invasive plants often become detrimental to resource values, and these detrimental effects may persist for decades or perhaps indefinitely (Olson 1997). Sources of soil disturbance which create opportunity for invasive plant invasion include wildfire and prescribed fire, mechanical vegetation treatments, livestock grazing, road construction, LCZ construction, recreation activities including hiking, horseback riding, off-road vehicle use, and a variety of other activities. Areas such as road cuts and fills, mines, sites where mechanical vegetation treatment has occurred, and gravel pits can aid the spread of noxious weeds (Baker 1986). The spread of invasive species may be exacerbated by projected impacts of climate change if native plants become stressed and less competitive.

Currently, there are seventy-one invasive plant species which are classified as “noxious weeds” by the Colorado Department of Agriculture (2001). Aside from their effects on production

agriculture, the effects of noxious weeds can also degrade wild lands such as national forests, state parks, county open space lands, and other natural areas. Such degradation may be manifested in one or more of the following ways:

- Reduction of biological diversity; degrading ecosystem health, recreation values and scenic beauty, all of which can negatively impact resource values generally associated with uninfested areas
- Declines in terrestrial habitat for wildlife
- Increase in overland water flows, resulting in soil erosion and stream sedimentation, causing a decline in water quality (Lacey et al. 1989)
- Alteration of ecosystem functions such as nutrient cycling, watershed stability, and others.

Approximately three percent of all lands in Colorado were estimated to be occupied by invasive plants at some density (Colorado Department of Agriculture 2001). Within Colorado, important invasive plants are identified as "noxious weeds" under State agricultural laws, and listed as either A, B, or C list species according to their potential threat to agricultural or wildland values within the State. (The A list includes the newer invaders, generally less abundant with more potential for eradication and control; the B and C list species include less important, and generally more abundant species, which tend to be more widely established.) In Colorado there are 18 plant species on the "A list"; 39 on the B list; and 14 species on the C list.

Each of the Colorado National Forests has identified "priority" invasive species. Priority Species as defined in the Rocky Mountain Region Invasive Species Management Strategy, are species which are low in abundance, have the ability to establish dominance in plant communities, and invade a variety of relatively healthy ecosystems. Priority invasive plants by Forest are identified in the Forest's Invasive Species Action Plans, located on the internet at http://www.fs.fed.us/r2/resources/.

Current noxious weed management programs on Colorado national forests are preventing substantial increases in total acres of invasive plant populations. Substantial increases in noxious weeds on a broad scale are likely to have a measurable effect on long term health of forest and rangelands on all forests. Where populations of invasives currently exist, population expansion as a result of existing avenues would continue at the current estimated rate of 8-12% annually, depending on species, site characteristics, and other variables (Hiebert and Stubbendieck 1993). Indirect effects could result from the gradual steady encroachment of newly established invasive plant populations over the long term, particularly if resources are not available to conduct ongoing detection and treatment of new populations.

Forest Health – Invasive Species: Environmental Consequences

All Alternatives

In all alternatives, the placement of acres in roadless areas could over the long run have a lower risk of invasive plant invasion and/or spread. The prohibitions on management activities limit ground disturbing activities, and thereby reduce the likelihood of the spread of invasive species.

The Invasive Species Executive Order 13112 (1999) directs federal agencies to use relevant

programs and authorities to: (1) prevent the introduction of invasive species; (2) detect and respond rapidly to and control invasive populations efficiently and safely; (3) accurately monitor invasive populations; (4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; and (5) promote public education on invasive species.

In all alternatives, best management practices are implemented for all disturbance activities, which are designed to minimize or prevent the spread of invasive species. These practices are summarized as follows:

1. Use of certified weed free straw or mulch if re-seeding or other restoration practices are used post-project.
2. Where gravel is imported for road surfacing, acquire from gravel pits which are inspected and known to be weed free.
3. Inspection of seed by a seed lab, to ensure the absence of noxious weeds.
4. Washing of vehicles used in off-road operations such as skid trail construction, skidding, or other equipment prior to entry into the Forest.

A complete listing of Best Management Practices for Invasive Plant prevention can be found at http://www.fs.fed.us/r2/resources/ and these practices should be applied to all ground-disturbing activities.

Vehicular travel is widely accepted to be a major source of transport of exotic plant seed throughout the western United States (Sheley et al. 1995, USDA Forest Service, 2003a). Other mechanisms that spread noxious weeds include heavy equipment, humans, and livestock. Linear construction zones are a short-term use for motorized transport to install linear facilities. Because of the short-term use there is less likelihood of elevating the risk of invasive plant import, establishment and spread than from road construction and use. When vegetative manipulation (harvest, prescribed burning, etc.) opens the tree canopy and allows more sunlight to reach the soil, site conditions are often created which are more favorable to invasion. Transported seed in camping equipment, clothing and equipment unloaded from vehicles by National Forest users is often inadvertently deposited, allowing new invasive plant populations to become established. Under all alternatives, numerous natural mechanisms also spread weeds including wildlife (birds, rodents, and big game), livestock, wind, and flowing water. After seed is imported into an area, invasive plants are often able to successfully establish in certain habitats even without ground disturbance, due to their aggressive nature and adaptability. Once new populations are established by wind, wildlife, etc, any subsequent increases of human activity and ground disturbance would likely accelerate the spread.

In all alternatives, road decommissioning may cause a gradual reduction in the likelihood of imported seed. Cleaning of equipment prior to use and routine roadside monitoring for new populations can minimize the likelihood of roadside populations spreading from the roadway and/or harvest areas into native habitats. While roads can be a contributing factor to the import of seed, they may also improve the ease with which invasive plant populations can be managed due to improved access to the site. The traditional cost of chemical or mechanical treatment in Colorado's forests on an acre of weeds is approximately $50-75 where vehicle access is easy due to the presence of roads or motorized trails. Comparatively, remote infestations cost 5-8 times that amount, when treatment must occur through the use of horses, hiking, or other primitive access.

Under each alternative there are projected or foreseeable activities which would likely result in ground disturbance, increased vehicle activity, construction and other activities. All activities generally elevate the risk of invasive plant import, establishment, and spread. Comparisons of alternatives disclose the estimated relative degree of elevated risk which could occur as a result of the range of activities. In all alternatives, potential increases in the introduction or spread of invasive plants would be minimized by implementing standard or required mitigation measures.

Alternative 1- 2001 Roadless Rule

Under alternative 1, ground disturbance in the roadless areas resulting from potential future road construction and other management activities is projected to be the lowest of the four alternatives under consideration. By maintaining a high level of limitation on future road construction or reconstruction and tree-cutting activities within roadless areas, the introduction or spread of invasive plants would remain limited to the current rate of invasive species spread resulting primarily from the natural mechanisms mentioned in the introductory part of this section. The use of linear construction zones is not limited in this alternative. Although linear construction zones are used for only a short duration of time, they do provide opportunities for invasive species to become established. For those areas not included in roadless area classification under this alternative or IRAs that have been substantially altered, new invasive populations could more readily become established due to vehicular transport of seed, and higher levels of human activity, thus the rate of spread would likely be expected to be higher.

Alternative 2- Colorado Roadless Rule (Proposed Action)

Under alternative 2, potential future ground disturbance resulting from management activities is intermediate among the alternatives under consideration. Invasive plant expansion due to vehicles and human activity, including foreseeable management activities, would likely be somewhat higher than alternatives 1 and 4 and less than alternative 3.

Foreseeable activities that are increased from alternatives 1 and 4 include road construction and tree-cutting for maintenance and restoration of ecosystem characteristics and community protection purposes. Coal development is higher under this alternative than under alternative 1. Although most roads constructed in this alternative are temporary, there is a moderate risk of import of noxious weed seed for the length of the project. The use of linear construction zones is limited in this alternative. Increased risks of invasive plant establishment and spread are only expected in the small percentage of the CRA acreage where these activities would occur. For the majority of the CRA acres, including the newly identified roadless acres within the CRAs and the upper tier acres, there is a minimized risk of future plant establishment and spread. The acres that have been removed from the CRAs would likely have some increased management activities and may see elevated levels of invasive plant establishment and spread.

Alternative 3 – Forest Plans (No Action)

Alternative 3 has the highest amounts of potential ground disturbance due to projected road construction/reconstruction, tree-cutting, fuels management, future oil and gas activities, and coal activities outside the North Fork coal mining area in roadless areas. The use of linear construction zones is not limited in this alternative. Although linear construction zones are used for only a short duration of time, invasive plants could be introduced. This alternative would therefore result in a substantially higher risk scenario for invasive plant establishment, as compared to the other three alternatives.

Under alternative 3, forest plans include allowances for temporary or permanent forest road construction, and tree-cutting, sale or removal for a variety of purposes on many of the acres. In these cases, there would be a moderately higher risk of import of noxious weed seed, and therefore a higher risk of establishing and spreading new populations. Indirect effects could result from the gradual steady encroachment of newly established invasive plant populations over the long term.

Alternative 4- Colorado Roadless Rule with Public Proposed Upper Tier

Under alternative 4, invasive plant expansion due to vehicles and human activity, including foreseeable management activities, would likely be somewhat higher than alternative 1 but less than alternatives 2 and 3 based on the projections of future activities.

Foreseeable activities include road construction and tree-cutting for hazardous fuel treatments around communities and coal development in the North Fork coal mining area. The use of linear construction zones is limited in this alternative. Although most roads constructed in this alternative are temporary, there is a moderate risk of import of noxious weed seed for the length of the project. Increased risks of invasive plant establishment and spread are only expected in the small percentage of the CRA acreage where these activities would occur. For the majority of the CRA acres, including the newly identified roadless acres within the CRAs and the upper tier acres, there is a minimized risk of future plant establishment and spread compared to alternatives 1 and 2. A much greater percentage of CRA acres are identified as upper tier, where little to no activity would occur. The acres that have been removed from the CRAs would likely have some increased management activities and may see elevated levels of invasive plant establishment and spread.

Forest Health – Invasive Species: Cumulative Effects

Roads are often the primary vectors for noxious weed establishment and spread. When there is an increase in the numbers of vehicles using NFS roads and roads adjacent to NFS lands, there is an elevated risk of seed transport. Taken cumulatively, an increase in roads and road use combined are likely to represent a measurable, if not quantifiable adverse effect to the extent and distribution of invasive plant populations in and around National Forests in Colorado in the future.

Current State and Federal activities and authorities (such as the Rocky Mountain Region's Invasive Species Management Strategy [http://www.fs.fed.us/r2/resources/] and the National Strategy and Implementation Plan for Invasive Species Management address some invasive species and their prevention and spread (USDA Forest Service 2004a). Other programmatic policy and management direction can also indirectly influence the ability to construct roads. The Travel Management Policy[24] can provide information on what roads are needed and unneeded, and which roads would remain open or closed. As roads are decommissioned, fewer roads are constructed and with additional emphasis on invasive species management and prevention, there would be little cumulative effects from any of the alternatives.

[24] *Federal Register / Vol. 70, No. 216 / Wednesday, November 9, 2005 / Rules and Regulations pages 68264 – 68291; http://www.fs.fed.us/recreation/programs/ohv/final.pdf*

FIRE AND FUELS

This analysis evaluates the relative ability to treat hazardous fuels primarily within the wildland urban interface because this is a major focus area of the National Fire Plan, Healthy Forest Restoration Act (HFRA), Healthy Forest Initiative and congressional budget direction. The prohibitions and exceptions for tree-cutting, sale or removal and road construction or reconstruction contained in the four alternatives influence the ability to treat hazardous fuels which can affect the amount of hazardous fuels, frequency and intensity of wildfire, and response to wildfires.

Introduction

Wildland fire plays an integral role in many forest and rangeland ecosystems. Decades of efforts at extinguishing most fires on public lands have disrupted the natural fire regimes that once existed and have increased the fuel loadings. In April 1999, the General Accounting Office (GAO) published a report entitled Western National Forests: a Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats (http://www.gao.gov/products/RCED-99-65). In the report, the GAO states that, "[t]he most extensive and serious problem related to the health of national forests in the interior West is the over-accumulation of vegetation."

The Forest Service responded to the GAO report by developing, "Protecting People and Sustaining Resources in Fire-adapted Ecosystems: A Cohesive Strategy" (Cohesive Strategy) (http://www.fs.fed.us/publications/2000/cohesive_strategy10132000.pdf). Approved on October 13, 2000, the Cohesive Strategy provides an approach to achieve improved forest and grassland resilience, protect people and communities and sustain resources by reducing fuel loadings in fire-prone forests. In addition, in September 2000, the USDA and United States Department of Interior (USDI) issued a report titled Managing Impacts of Wildfires on Communities and the Environment (USDA Forest Service and USDI 2001). This report provided a strategic framework for reducing hazardous fuels within the Wildland Urban Interface (WUI), readily accessible watersheds, threatened and endangered species habitat, and other important local factors. This report, along with the USDI and Related Agencies Appropriations Act of 2001 and other strategies is known as the National Fire Plan (NFP). As a result of the NFP, reducing hazardous fuels in Colorado became a priority for the Forest Service. Reducing fuel loadings can be accomplished by several methods; however, the most common used in Colorado include: thinning, commercial timber harvest, stewardship projects, prescribed burning, and other mechanical biomass treatments such as hydro-mulching.

The Cohesive Strategy identifies priority areas for fuel reduction across the interior West. The priority areas include: (1) WUI areas where flammable wildland fuels are adjacent to homes and communities; (2) readily accessible municipal watersheds; (3) threatened and endangered species habitat; (4) maintenance of existing low risk Condition Class 1 areas[25].

[25] *The historic disturbance regime in Condition Class 1 areas is largely intact and functioning as defined by the historic natural fire regime.*

Fuel Treatments

Fuel treatments are not performed to prevent fires but to alter fuel profiles so that public and firefighter safety is improved and communities, watershed, infrastructure, and other values-at-risk are less vulnerable to wildfire impacts. The goals of hazardous fuel treatments are to achieve some combination of (a) reducing flammability, (b) reducing fire intensity, (c) reducing the potential for creating firebrands (spotting) and crown fires, and (d) increasing firefighter safety and effectiveness.

For hazardous fuels management to create the desired effect on fire behavior, management strategies must address the local and landscape scales. Local scale addresses effects of fire within a forest stand, treatment unit, or adjacent to or including the area around a house or other structure (Finney and Cohen 2003). Treatment of fuels only within the structure ignition zone (within 200 feet of structures) is not sufficient to reduce the threat to neighborhoods and individual structures. Fuel treatments outside and adjacent to a structure ignition zone could reduce flame and firebrand exposure (Finney and Cohen 2003). Research by Cohen (1995) has shown that structures with typical ignition characteristics are at risk of catching on fire from one of three sources: (1) direct exposure to intense flames from a nearby source (structures may be at risk from a flame front no more than 100 feet away); (2) less intense sources against or very near the side of the structure which can occur if a ground fire or firebrands ignite firewood or other flammable material next to the structure; and (3) firebrands (spotting) falling directly on roofs if the roof is flammable or if flammable debris is present.

Spotting is defined as behavior of a fire that produces firebrands that are transported by ambient winds, fire whirls, and/or convection columns causing spot fires ahead of the main fire perimeter (Andrews 1996; National Wildfire Coordinating Group 2005). Spotting can occur from a few meters to several miles (Albini 1983).

As there is no mechanism to require homeowners to engage in efforts to reduce the threat adjacent to their homes, they would continue to be at risk without management of the surrounding fuels. Fire prevention programs, Community Fire Safe Councils, as well as Community Wildfire Protection Plans (CWPPs) are valuable tools in communicating to the public the need for clearing and maintaining fuels away from residences and structures, assisting residences in coordinating local hazard reduction efforts, and educating individuals on less flammable building designs and construction materials.

While fuel treatments in themselves would not stop wildland fires, they can change fire behavior such that the outcomes are less catastrophic or may increase the effectiveness of fire suppression by reducing resistance to control. Fire behavior alteration is accomplished by removing ladder fuels and reducing stand densities. Priorities for hazardous fuels reduction are to reduce surface and ladder fuels, raise the bottom of the live canopy, reduce stand density by thinning, and provide safe zones for firefighters.

The performance of fuels treatments in wildfire situations has been documented in several recent evaluations (Jimerson and Jones 2000; USDA Forest Service 2007; USDA and USDI 2007; USDA 2008; Graham et al. 2009). Key findings include:

- Where fuels had been treated, fire behavior was noticeably different from that which occurred in neighboring untreated fuels. Most fuel treatments reduced fire behavior from a crown fire to a surface fire.

- Treatment location and juxtaposition and the treatments of surface fuels, ladder fuels and crown fuels (in order of importance) are major determinates of both wildfire intensity and burn severity.
- The presence of fuels treatments directly impacted the survivability of structures. Area fuel treatments adjacent to subdivisions provided important safety zones, increasing suppression effectiveness which saved houses. Fuel treatments, when of sufficient size, often provide safe zones for firefighters.
- Fuel treatments influence burn severity. A higher proportion of acres burned severely on untreated lands than where fuel or other vegetation treatments had been applied. Reduced fire severity in fuels treatments that result in remnant trees and green vegetation would lead to more rapid vegetative recovery compared to high severity areas where all trees are black. Fuel treatments that create irregular forest structures and compositions, both within and among stands (macro and micro mosaics), tend to produce wildfire resilient forests.
- Some fuel treatment units burned at high fire intensity because they were adjacent and downwind from untreated units. Crown fire momentum carried high fire intensity partway into these treated areas before the more widely spaced crowns and reduced surface fuel caused the fire to fall to the surface.
- Fuel treatment longevity and effectiveness are dependent on location, dead and live fuel ratios, and rate, composition, and structure of vegetation recovery. More recent and more intensive fuel treatments reduced fire behavior and fire effects more effectively than older and less intense treatments. Incomplete or partial treatments are less effective or can be ineffective. Large fuel removal alone, without the follow-up treatment of smaller diameter fuels, may not provide adequate fuels reduction to prevent a fire from becoming stand-replacing.
- Fuel treatments increase suppression effectiveness. By modifying the fire's behavior, fuel treatments present suppression opportunities that otherwise may not have been available. When Incident Management Teams had knowledge of treatments, they used these treated areas to plan and implement suppression. These opportunities include both providing locations for burnouts to placement of hand and machine fire lines. Decreased fire intensity in fuel treatments allow fire crews to more easily suppress spot fires that may ignite.
- Even in the face of extreme fire behavior, treated areas may slow the spread of the fire and disrupt the fire's progress.

In addition to structures in the WUI there are other values to be considered for fuels treatments. In July 2007, The Pinchot Institute for Conservation released an assessment report titled "Protecting Front Range Forest Watershed form High Severity Wildfires" (LeMaster et al. 2007). Key findings in the report include:

> "When forests burn, watersheds also are affected and in the case of high-severity wildfires, watersheds are substantially altered. Depending on intensity and duration, wildfires can change the soil composition of a watershed by consuming the litter layer at the surface of the soil and by destroying binding organic matter in the soil itself. A water-repellent zone or layer forms when hydrophobic organic compounds from

> burning vegetation coat soil aggregates or minerals at or parallel to the surface. This hydrophobic layer prevents water from penetrating soil aggregates and seals off soil during rainfall events, which accelerates surface runoff resulting in the transport and deposit of sediments.
>
> The adverse impacts continue when the water, sediment and debris pour off slopes into receiving channels, scouring banks and bottoms, often overwhelming them and causing flooding, sometimes many miles away from the precipitating wildfire event. Such sediment and organic debris can dramatically alter water courses.
>
> Wildfires are not only a threat to water supplies but the sediment transport and organic debris flows that often follow wildfires can be even more problematic. If watersheds are not protected through mitigation projects such as fuel breaks, then sediment and organic debris can destroy reservoirs as a functional part of the water supply system" (see Water section).

On national forests in the State of Colorado from FY 2001 to 2009, an average of approximately 64,000 acres of fuels treatments occurred per year. There was an average of 4,400 acres within the IRAs, 1,200 of which were mechanical treatments. There was an average of 3,400 acres within the CRAs, 1,100 acres of which was mechanical treatments. Approximately 19% of the acres treated within the IRAs occurred within 1.5 miles of the Forests on the Edge (FOTE) 2000 at-risk communities while 22% of the acres treated within the CRAs occurred within 1.5 miles of the FOTE 2000 at-risk communities (Stein et al. 2007).

Affected Environment

Natural disturbances such as fire, wind, and insects and diseases help shape forests. Although fire is widespread, it is seldom uniform; every forest has its own characteristic pattern of fire intensity, frequency, and size. Fire regime and condition class are used to characterize fire.

Fire Regimes

"Fire regime" refers to the nature of fire occurring over long periods and the prominent immediate effects of fire that generally characterize an ecosystem (Brown and Smith 2000, Lyon et al. 2008). There are five fire regime types, expressed as fire return interval and fire severity. They are, as modified by Keeley et al. (2009):

Table 3-12. Fire Regime Types

Fire Regime Type	Fire Return Interval (years)	Fire Spread Driven By	Fire Intensity	Fire Effects	Ecosystem Examples
I	1-35	Surface and other low understory fuels	Heavy understory and fuel consumption	Low to moderate fuel overstory mortality	Ponderosa pine, pine oak savannah, dry site Douglas-fir
II	1-35	Mostly surface fuels	Low to moderate	Above ground biomass killed, most fuels consumed	Drier grassland types, tall grass prairie, low scrub, some pacific chaparral communities
III	35-100	Surface and canopy fuels	Mixed high and low	High understory mortality and fuel consumption, thinning of the overstory	Western mixed conifer, dry site shrub communities
IV	35-100	Mostly canopy fuels	High	Above ground biomass killed, high fuels consumption	Chaparral, sagebrush, dry site lodgepole pine
V	>200	Mostly canopy fuel	High	Above ground biomass killed, high fuels consumption	Subalpine forests, cool moist lodgepole pine, Engelmann spruce

The fire regime classifications utilized in this analysis are based upon fire severity as detailed in Brown and Smith (2000) and the Forest Encyclopedia Network (Lyon et al. 2008). Using this system, the understory and mixed severity fire regimes apply only to forest and woodland vegetation types. All other ecosystem types are considered to have a stand replacement fire regime because the above ground vegetation is typically killed or removed by most fires.

Fire Regimes in Colorado

The analysis area generally falls into two fire regimes: III (less frequent, mixed severity); and IV (less frequent, high severity) (USDI Geological Survey 2007). Approximately 60% of the analysis area acreage, within 1½ miles of at-risk community (Stein et al. 2007), is in Fire Regime III and 20% is in Fire Regime IV. This is important, especially in the WUI, because these fire regimes (mixed severity and stand replacement, respectively) are difficult for firefighters to control. This leaves communities-at-risk vulnerable to the negative impacts and potentially adverse consequences of wildland fires. The table below details the fire regime classes in the 1.5 mile CPZ.

Table 3-13. Fire Regime Classes in 1.5 mile CPZ IRAs and CRAs

	Inventoried Roadless Areas		Colorado Roadless Areas	
Fire Regime	Acres in 1.5 mile CPZ	Percent of Area	Acres in 1.5 mile CPZ	Percent of Area
FR I	103,800	10%	107,700	10%
FR II	14,900	1%	14,600	1%
FR III	615,300	59%	619,200	60%
FR IV	215,000	21%	204,000	20%
FR V	43,800	4%	42,700	4%
Other	45,800	4%	46,400	4%
Total	1,038,700	100%	1,034,600	100%

Note: Totals may not add due to rounding

Fire Regime Condition Class

Fire Regime Condition Class (FRCC), also referred to as "Condition Class", describes the degree of departure from reference conditions, potentially resulting in changes to key ecosystem components such as vegetation characteristics (species composition, structural stage, stand age, canopy closure, and mosaic pattern); fuel composition, fire frequency, severity, and pattern; and other associated disturbances, such as insect and disease mortality, grazing, and drought (http://www.fire.org/niftt/released/FRCC_Guidebook_2010_final.pdf).

Condition Classes are defined as follows:

- Condition Class 1 – Ecosystems with low (< 33 percent) departure from reference conditions and still within the estimated historical range of variability over a specifically defined reference period. Risk of losing key ecosystem components is low.
- Condition Class 2 – Ecosystems with moderate departure (33 to 66 percent) departure from reference conditions. Risk of losing key ecosystem components is moderate.
- Condition Class 3 – Ecosystems with high (>66 percent) departure from reference conditions. Risk of losing key ecosystem components is high.

Characteristic vegetation and fuel conditions are those that occur within the natural fire regime, and are categorized as Condition Class 1. Uncharacteristic conditions are those that did not occur within the natural fire regime, and are categorized as Condition Class 2 or 3.

In the past 100 years, wildfires in forest ecosystems throughout the West have shown a trend of being larger, more intense and causing more damage than the fires that historically occurred in those same ecosystems, particularly during drought periods. In CRAs, seven wildland fires over 1,000 acres in size have occurred since 1980. From 1980 - 2008, over 1,700 ignitions affecting over 45,000 acres occurred in CRAs/IRAs. Approximately 75% of the fires were caused by lightning and 25% were human-caused.

In Colorado and throughout much of the Rockies, lodgepole pine forests are experiencing a severe and widespread epidemic of mountain pine beetle. In Colorado, tree mortality from the beetle currently covers over 2.9 million acres, which includes virtually all of the Colorado's mature lodgepole pine in addition to other forest types. Generally speaking, crown and surface-

fire risks change with time following outbreaks, and factors such as weather and forest composition play large roles in determining whether and how intensely a fire would burn (Bentz 2009).

Wildland Urban Interface (Community Protection Zones)

In Colorado, there are currently 1,712 at-risk communities listed in the Federal Register (66 FR 751). For analysis purposes, housing density information from the National Forests on the Edge (FOTE) (Stein et al. 2007) analysis is used as a proxy for communities-at-risk. The FOTE data map communities at-risk in Colorado in the year 2000 and projects the communities-at-risk (CAR) in the year 2030, based on projections of housing growth. They define three categories of housing densities:

- Rural I – lands with 16 of fewer housing units per square mile;
- Rural II – land with 17 to 64 housing units per square mile;
- Exurban/Urban – lands with 65 or more housing units per square mile.

The Rural II and Exurban/Urban categories were used for this analysis. Census blocks identified as Rural II or Exurban/Urban were buffered with an area defined as the "community protection zone" (CPZ). CPZ and WUI are used interchangeably in this analysis. The CPZ extends one-half mile from the boundary of an at-risk community, and up to one additional mile if any land exhibits one or more of the following characteristics:

1. has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community;
2. has a geographic feature that aids in creating an effective fire break, such as a road or a ridge top; or
3. is in condition class 3 as defined by HFRA.

The delineation of the CPZ around communities was determined using the 0.5 mile default distance and 1.5 miles as the maximum CPZ distance. Approximately 6% and 25% of the roadless acres are within 0.5 mile and 1.5 mile respectively of the FOTE 2000 CARs. Over 30% of the roadless acres on three National Forests, the Arapaho-Roosevelt, Pike-San Isabel and White River, are within 1½ miles of the FOTE 2000 at-risk communities.

As population increases in these communities, their boundaries may expand closer to National Forest land, it is expected that there would be moderate increases in the percentage of roadless acres within ½ mile and 1½ mile of the FOTE at-risk communities. It is forecast that approximately 7% and 26% of the roadless acres are within 0.5 mile and 1.5 mile respectively of the FOTE 2030 CARs. The most significant increases in the percentage of acres within 1½ miles of the FOTE 2030 at-risk communities are on the Arapaho-Roosevelt, Pike-San Isabel and White River National Forests. In 2030 it is projected that 35% or greater of the roadless acres on each of the forests would be within 1½ miles of the FOTE 2030 at-risk communities.

Within 1 ½ miles of the 2000 FOTE at-risk communities, approximately 43% of the IRA and CRA acreage is in Condition Class 2; and 15% of the IRA acreage and 16% of the CRA acreage is in Condition Class 3. These areas are generally in need of some type of fuel treatment to reduce the wildland fire threat to the public and firefighters, as well as to reduce the hazard to communities, municipal water supplies, and other local resources consistent with *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10 Year*

Comprehensive Strategy (USDA and USDI 2006). The table below details the current Condition Class present in the IRAs and CRAs.

Table 3-14. Condition Class in 1.5 mile CPZ in IRAs/CRAs

	Inventoried Roadless Areas		Colorado Roadless Areas	
Condition Class	**Acres in 1.5 mile CPZ**	**Percent of Area**	**Acres in 1.5 mile CPZ**	**Percent of Area**
1	386,900	37%	381,400	37%
2	445,700	43%	440,300	43%
3	157,000	15%	163,700	16%
Other	45,500	4%	45,600	4%
Total	1,035,100	100%	1,031,000	100%

Note: Totals may not add due to rounding

Carbon Storage and Fire

Forests can help mitigate atmospheric greenhouse gases by storing carbon in vegetation and soil (carbon sink); however, changes to forests, like fire, insects, and other disturbances, can result in greenhouse gas emissions (carbon source). Movement of carbon from the atmosphere into vegetation and soil, and back into the atmosphere, is a fundamental part of the terrestrial carbon cycle. Changes in this cycle can be natural, or influenced by human activities. Fires can dramatically impact the amount of stored carbon released into the atmosphere. Stand-replacing fires switch forest ecosystems from a carbon sink to a net source of carbon added to the atmosphere. Fires are a natural part of much of the western landscape; however, they have been altered though fire suppression and other forest management activities. Climate change is likely to increase the magnitude and frequency of fires in Colorado, as well as other Western states.

Forests contain large amounts of carbon, stored as biomass both in the above-ground biomass and soil component. Forests accumulate carbon through the process of photosynthesis, which converts sunlight and water to carbon. As the majority of forest ownership in Colorado is on federal lands, national forests are important for carbon storage.

Forests in the United States are thought to have been in approximate carbon balance from 1600 to 1800. A large pulse of carbon release occurred during the 1800s, largely due to utilization of forests (cutting) and land conversions, primarily to agricultural uses. The last century saw a re-growth of forests that had been harvested and the re-establishment of forests on abandoned agricultural lands. These conditions resulted in carbon storage in domestic forests. In the West, the effects of fire suppression are thought to have been a contributor to this increase in stored carbon (Birdsey et al. 2006).

Environmental Consequences

It is anticipated that most of the projected future treatments would generally be targeted at community protection in the mountain pine beetle impacted areas of the WUI in addition to the general priorities of lower elevation ponderosa pine, Gambel oak, Douglas-fir and dry type lodgepole pine. These are Fire Regime I, II and III, and Condition Class 2 and 3.

Assumptions Related to Hazardous Fuels Treatment Tools

Stephens et al. (2009) found that a combination of mechanical and fire treatments were the most effective in reducing fire severity. A single fire only treatment that creates standing dead trees would increase future fuel loads when the dead trees fall and shorten the longevity of fuel treatments. They found that several fire-only treatments would be needed to achieve a desired condition for potential fire behavior.

The longevity of the fuel reduction from these treatments depends on the type of treatment and the vegetation type. The period of effectiveness may be a relatively short time for fuel types with a simple structure such as grasslands, or many years in more complex fuel types such as multi-storied coniferous forests.

The period of time over which fuel reduction remains effective depends upon:

- the type and intensity of the treatment,
- the number of fuel layers involved,
- the rate of accumulation of fuels,
- fuel decomposition rates, and other factors.

Even though prescribed fire is not limited or restricted in any of the alternatives there may be:

1. a reduction in the number of acres treated because the risk of escape is too high due to the inability to mitigate high fuel loadings in burn units or the inability to create a buffer of sufficient depth to reduce the risk of an adverse outcome of an escaped fire to communities or
2. an increased risk of escape due to the need for multiple prescribed fire treatments to achieve the desired fuels conditions.

Prescribed fire alone, without mechanical treatments, is not likely to be a primary fuels treatment within the WUI due to a high risk of escape.

Assumptions Related to Access (Roads) and Costs of Hazardous Fuel Reduction

Only authorized roads are used for hazardous fuel management.

The four alternatives vary in the ability to use temporary roads to facilitate tree-cutting, sale or removal activities for hazardous fuels management. Critical locations within roadless areas may not be treated if the area cannot be accessed by roads. This can be due to factors such as:

- Size of material too large for hand treatments.
- Amount of material to be treated would result in unacceptable fuels beds; without removal the result is in a minimal reduction in fire hazard.
- Size of trees to be treated exceeds mastication equipment capabilities, generally maximum 8-10 inches diameter at breast height.
- Inability to "walk" equipment into critical treatment areas due to terrain and or distance limitations.

Assumptions Related to Hazardous Fuels Management and Response to Wildland Fires

Depending on the degree to which each alternative limits treatment activities in roadless areas, the following components of the wildland fire management program may be affected:

- None of the alternatives considered restricts the management response to a wildfire.
- The inability to conduct vegetation treatments to create defensible fuels profiles in the WUI/CPZ and in areas outside of the WUI/CPZ could result in an increase in fire suppression costs, property loss, and other economic impacts.
- Fewer hazardous fuels treatments can result in a higher risk of high-severity wildfires. The inability to disrupt the flow of fire across the landscape could impact both prescribed fire and wildfire management.
- Prohibitions on tree-cutting could result in fewer tactical options being available to fire management personnel. In areas with fuel treatments, there is often an increase in suppression opportunities.
- Depending on the point of ignition, as well as other factors, wildland fires could have the potential to become larger and more damaging as a result of no road access. Roads serve as fuel breaks, suppression fire lines, anchor points, and most importantly as safety zones for firefighters.
- Roads provide efficient access for firefighting crews and other suppression resources such as engines and heavy equipment for fire line construction, as well as aviation support needs. A lack of access can increase the exposure of firefighters to possible injury due to an increased reliance on hand treatment methods resulting in multiple trips, longer periods of exposure, and exposure to multiple hazards including rolling materials, lifting and burns.
- Larger and more damaging fires may result in the need for extensive and costly restoration and rehabilitation needs within roadless areas. The higher severity and larger fire size could result in increased adverse post fire effects due to erosion and slower vegetation recovery on lands near community watersheds or infrastructure.

As a measure of potential effects, each alternative was evaluated to determine the impact it would have on the ability to conduct hazardous fuels reduction treatments in the WUI/CPZ and the resulting impact on wildland fire management.

Alternative 1- 2001 Roadless Rule

This alternative is the most restrictive of the four alternatives in treating hazardous fuels. Under this alternative, tree-cutting, sale or removal is generally prohibited in IRAs with very limited exceptions. The one tree-cutting exception that could be used to reduce hazardous fuels is the cutting of generally small diameter trees to maintain or restore the characteristics of ecosystem composition and structure within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period. As stated in the Analysis Framework section of this chapter, this exception would be utilized primarily in the ponderosa pine/Douglas-fir and pinyon-juniper forest cover types. Lodgepole pine cover types rarely fit this exception. There is no corresponding road construction exception. Fuel reduction activities would generally consist of prescribed burning, mechanical treatments using existing roads, and

hand treatments.

Under this alternative, approximately 900 acres per year of mechanical fuels treatments is projected (tree-cutting, sale or removal) within the IRAs. The analysis area outside of the IRAs, managed according to direction in the forest plans, have a projected 900 acres per year of mechanical fuels treatments. An additional 500 acres per year of tree-cutting (not including incidental, administrative or personal use tree-cutting) are projected for purposes other than hazardous fuels reduction that may or may not modify fire behavior to meet desired conditions. Three hundred of the 500 acres are within IRAs and 200 acres are within the rest of the analysis area. Approximately 0.2% of the IRA acres would be treated per decade with an additional 2.6% of the analysis area outside of the IRAs treated per decade according to forest plan management direction. These projections are shown in Table 3-2.

The prohibition on road construction would result in less hazardous fuels treatment. Fuel reduction treatments would likely be focused in the substantially altered portion of the IRAs where there are existing roads. Other than in the roaded areas of the IRAs, fuel treatments that are completed are likely to be more expensive and less efficient to implement. This would result in the timeline for treating priority fuels being extended with incrementally increasing costs.

There would be a higher risk of a high-severity wildfire than in the other alternatives because of the smaller amount of hazardous fuels treatments. The lack of tree-cutting and road construction would impact suppression opportunities and could result in the need for extensive and costly restoration and rehabilitation.

Fewer treatments for maintenance and restoration of ecosystem composition and structure may lead to more dead trees and increase in severity of wildfires, which would release carbon as well as potentially unhealthy levels of smoke and particulates into the atmosphere. Without the ability to remove material from hazardous fuel and other treatments using roads, the opportunity to substitute this material for fossil fuels would be foregone.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

This alternative is less restrictive than alternatives 1 and 4, but more restrictive than alternative 3 in treating hazardous fuels in the standard tier. It is more restrictive than alternatives 1 and 3 and equal to alternative 4 in the upper tier. Under this alternative, tree-cutting, sale, or removal is generally prohibited in CRAs with limited exceptions. Two of the tree-cutting exceptions are available within the CRAs to reduce hazardous fuels in all but the upper tier acres, where there is no tree-cutting for this purpose. Within the CPZ, trees can be cut to reduce the wildfire hazard to an at-risk community or municipal water supply system. The additional conditions that extend the CPZ beyond 0.5 miles are specific and may not allow for many additional treatments outside the ½ mile portion of the CPZ.

Outside of the CPZ, trees can be cut to reduce the wildfire hazard to a municipal water supply system. Temporary road construction is allowed to facilitate the treatments within the first 0.5 mile of the CPZ only. All of the treatments would focus on small diameter trees to create strategic fuel breaks while retaining large trees to the maximum extent practical to the forest type. Fuel reduction activities would generally consist of prescribed burning, mechanical treatments, and hand treatments.

Under this alternative approximately 5,300 acres per year of mechanical fuels treatments are projected (tree-cutting, sale or removal) in the CRAs, with the majority within the first ½ mile of

the CPZ. Approximately 12% of the CRA acres within 0.5 miles of the FOTE 2000 at-risk communities (the 0.5 CPZ) are in upper tier where no tree-cutting can be done for hazardous fuels treatments. Approximately 13% of the CRA acres within 1.5 miles of the FOTE 2000 at-risk communities (the maximum 1.5 CPZ) are in upper tier where no tree-cutting can be done for hazardous fuels treatments. The analysis area outside of the CRAs, managed according to direction in the forest plans, has a projected 600 acres per year of mechanical fuels treatments. An additional 1,100 acres per year of tree-cutting for purposes other than hazardous fuels reduction (not including incidental, administrative or personal use tree-cutting) that may or may not modify fire behavior to meet desired conditions is projected. Five hundred of the 1,100 acres are within CRAs and 600 acres are within the rest of the analysis area. Projections show that 1.3% of the CRA acres are projected to be treated per decade with an additional 2.6% of the "substantially altered acres" projected for treatment per decade according to forest plan direction. Projections are shown in Table 3-2.

The increased flexibility as opposed to alternative 1 for temporary road construction in the first 0.5 mile of the CPZ could: reduce the costs of treatment; improve the efficiency of treatment implementation; increase the tools available to for fire prevention; and facilitate the removal and utilization of woody biomass from treated areas. All of the aforementioned items assist in the ability to treat priority acres and achieve desired conditions.

Although there is increased flexibility over alterative 1, critical locations outside the 0.5 mile CPZ may not be treated due to the limitations on temporary road construction. There would be a higher risk of a high-severity wildfire than in alternative 3 but less than alternatives 1 or 4, because of the projected amount of hazardous fuels treatments. Although there is a tree-cutting exception and a temporary road construction exception for hazardous fuels treatment, the purpose and area available for treatment and temporary road construction is restricted. Analysis (Langowski 2009) has shown that under moderate fire weather conditions, gusts of 20[26] mph produce spotting distance of over ½ mile and that under the influence of stronger gusts, such as those experienced from passing thunderstorms, spotting distances in excess of 1.5 miles are possible from groups of subalpine fir and lodgepole pine. Therefore the ½ mile may not be sufficient for community protection goals as spotting could easily breach the treatments. There may be critical locations in fire pathways that cannot be treated outside the CPZ.

Suppression opportunities would be impacted by the restrictions on tree-cutting and road construction. During their active life, temporary roads constructed for hazardous fuels treatments would provide short term increased firefighting efficiencies in the event a fire starts in the area near the road. In the event of a wildfire, there could be the need for extensive and costly restoration and rehabilitation.

Intermediate levels of treatments for maintenance and restoration of ecosystem composition and structure may lead to more dead trees and higher severity wildfires than alternative 3. Dead trees would release carbon and wildfire would release carbon as well as potentially unhealthy levels of smoke and particulates into the atmosphere. With reduced opportunity to remove material from hazardous fuel and other treatments using roads, the opportunity to substitute this material for fossil fuels would be foregone.

Alternative 3 – Forest Plans (No Action)

This alternative is the least restrictive of the four alternatives in treating hazardous fuels. Under

[26] *A maximum probable gust of 20 mph is associated with a 10 minute average 20 foot wind speed of 6 mph.*

this alternative, tree-cutting, sale or removal and road construction follows the direction in the forest plans. This alternative provides the most management flexibility of the four alternatives. Under this alternative, the options available for fuel reduction include prescribed fire, mechanical treatment, and road construction as needed to facilitate treatment.

Based on projections, approximately 13,100 acres per year of mechanical fuels treatments (tree-cutting, sale or removal) is projected to occur in the analysis area. An additional 3,600 acres per year of tree-cutting for purposes other than hazardous fuels reduction (not including incidental, administrative or personal use tree-cutting) that may or may not modify fire behavior to meet desired conditions is projected. Projections show 3.6% of the analysis area would be treated per decade under alternative 3. Projections are shown in Table 3-2.

The increase in treatments being implemented reflects the ability to treat priority acres that are not easily treated under the other three alternatives. The increased flexibility for road construction would allow for cost effective and efficient implementation of hazardous fuels reduction projects as well as an efficient means of removing the resulting biomass. In addition, greater access would be available to do maintenance treatments in the long term and at-risk communities would receive substantial benefit from hazardous fuels reduction treatments.

This alternative would likely have increased positive benefits to wildland fire management including a reduction in the cost of suppression. The ability to treat areas without limitation by the distance from the at-risk communities or purpose (i.e. watershed protection rather than municipal water supplies only) may result in reduced fire severity and less adverse fire effects. There may be more areas that firefighters can utilize in suppression efforts with a resulting increase in firefighter safety. The increase in projected roads would facilitate efficient initial attack response and increase firefighting efficiencies in both the short and long term during the active lifespan of the road.

This alternative allows the most treatment for maintenance and restoration of ecosystem composition and structure, so that there are the fewest dead trees and wildfires compared to other alternatives. Fewer dead trees would release less carbon, and fewer wildfires would release less carbon as well as lower levels of potentially unhealthy levels of smoke and particulates into the atmosphere. With the greatest opportunity to remove biomass from hazardous fuel and other treatments using roads, this alternative provides the best opportunity to substitute biomass for fossil fuels, thereby providing a low carbon energy substitute.

Alternative 4 - Colorado Roadless Rule with Public Proposed Upper Tier

This alternative is less restrictive than alternatives 1, equal to alternative 2, and more restrictive than alternative 3 in treating hazardous fuels in the standard tier. It is more restrictive than alternatives 1 and 3 and equal to alternative 2 in the upper tier. This alternative has the same prohibitions and exceptions as alternative 2. The difference is there are more upper tier acres where tree-cutting, sale or removal for hazardous fuels treatment is prohibited. As with alternative 2, fuel reduction activities allowed in this alternative would generally consist of prescribed burning, mechanical treatments, and hand treatments.

Under this alternative approximately 1,600 acres per year of mechanical fuels treatments (tree-cutting, sale or removal) are projected in the CRAs, with the majority within the first ½ mile of the CPZ. Approximately 48% of the CRA acres within 0.5 miles of the FOTE 2000 at-risk communities (the 0.5 CPZ) are in upper tier where no tree-cutting can be done for hazardous fuels treatments. Approximately 52% of the CRA acres within 1.5 miles of the FOTE 2000 at-risk

communities (the maximum 1.5 CPZ) are in upper tier where no tree-cutting can be done for hazardous fuels treatments. The analysis area outside of the CRAs, managed according to direction in the forest plans, has a projected 600 acres per year of mechanical fuels treatments. An additional 800 acres per year of tree-cutting for purposes other than hazardous fuels reduction (not including incidental, administrative or personal use tree-cutting) that may or may not modify fire behavior to meet desired conditions is projected. Two hundred of the 800 acres are within the CRAs and 600 acres are in the remainder of the analysis area. Projections show that 0.4% of the CRA acres would be treated per decade with an additional 2.6% of the "substantially altered acres" treated per decade according to forest plan direction. Projections are shown in Table 3-2.

The decrease in projected treatments being implemented in roadless areas from alternative 2 reflects the number of upper tier acres within the CRAs where tree-cutting for fuels treatment is prohibited.

On the acres within the CRAs that are not upper tier, the treatment options and effects are identical to those listed in alternative 2. Because of the large number of upper tier acres within the CPZ in this alternative, there would be a higher risk of a high-severity wildfire than in alternative 2 or 3 but slightly less than in alternative 1. Suppression opportunities would be impacted by the restrictions on tree-cutting and road construction. During their active life, temporary roads constructed for hazardous fuels treatments would provide short term increased firefighting efficiencies in the event a fire starts near the road. In the event of a wildfire, there could be the need for extensive and costly restoration and rehabilitation.

Compared to alternatives 2 and 3, fewer treatments for maintenance and restoration of ecosystem composition and structure may lead to more dead trees and higher severity wildfires, which would release carbon as well as potentially unhealthy levels of smoke and particulates into the atmosphere. With lessened ability to remove material from hazardous fuel and other treatments using roads, the opportunity to substitute biomass for fossil fuels would be reduced.

Cumulative Effects

Past fire exclusion, lack of treatment and insect outbreaks have contributed to an accumulation of fuels and the current amount of area that is in Condition Classes 2 and 3. Laws, regulations, and policies described in the Affected Environment section, such as the NFP and HFRA, have placed an emphasis on reducing hazardous fuels and unwanted and uncharacteristic wildland fires.

Residential development in the WUI has raised concern among natural resource managers and is recognized as a primary factor influencing management activities. This interface poses a number of challenges including invasive species, fragmentation and loss of wildlife habitat, and air pollution. Colorado was among the top nine western states with the greatest proportion of WUI expansion from 1970-2000, and is among the top six states from the intermountain west with the greatest anticipation of WUI expansion from 2000 to 2030 (Theobald and Romme 2007).

As development increases in fire-prone areas, the cost of protecting homes from wildfires is expected to continue to grow. Even with fuels treatments, the rising cost of wildland firefighting would not be controlled without additional controls at the state, county and local levels to control the pace, scale, and pattern of development in the WUI. Reliance on the federal

government to provide wildfire suppression services places an enormous financial burden on the Forest Service. Federal agencies do not have the power to regulate development. Zoning and planning authority rest entirely with State and local governments. (USDA and USDI 2006)

Over the next 15 years, the number of approved CWPPs in the State of Colorado is expected to increase with an end goal of having them in place for all identified at-risk communities. CWPPs coupled with other policies and implementation strategies would identify priority acres that are in need of some type of treatment to reduce the threat to communities, municipal water supply systems, and other critical resources. Fuel treatments are far more effective if they are strategically located and collaboration occurs between landowners and other cooperators. It is likely that other ownerships adjoining roadless areas would engage in implementing hazardous fuels reduction projects concurrent with those occurring on NFS lands.

Mineral Resource and Energy Development – Saleable, Locatable, and Leasable

Introduction

A variety of mineral and energy resources occur on NFS lands in Colorado's roadless areas. Mineral resources may be classified into three categories: saleable minerals, locatable minerals, and leasable minerals. Leasable minerals (oil, gas, and coal, etc.) are related to energy development.

Saleable Minerals

Saleable minerals are common variety mineral materials such as sand, gravel, stone, cinders, and clay. Generally, they are common, of low value, and used primarily for construction, building, or landscaping materials. Their value depends on market factors, quality of the material, and transportation costs. Disposal of these resources is at the discretion of the Forest Service and is subject to the provisions of 36 CFR 228, subpart C. Under these regulations, the Forest Service may either: (1) sell material for commercial use; (2) allow free use of material to the public and to non-profit organizations for non-commercial purposes or for public projects by federal, state, or local agencies; or (3) use material itself for Forest Service projects on NFS lands. The regulations also require that disturbance associated with mineral material sites is approved by the Forest Service in an operating plan that includes provisions to protect the environment and reclaim the surface in a timely manner.

Locatable Minerals

Locatable minerals are generally thought of as metals such as gold, silver, lead, zinc, molybdenum, and uranium but also include non-metallic minerals such as fluorspar, feldspar, and gem stones, and uncommon varieties of sand, stone, gravel, pumice, pumicite, and cinders such as high calcium limestone used for cement. Locatable minerals are appropriated through the location of mining claims under the General Mining Law of 1872, as amended. This law provides United States citizens a possessory right to these minerals, use of the surface for purposes reasonably incident to mining, and a right to reasonable access to these minerals across Federal land.

Developing roads for locatable mineral exploration or development and the right to timber from mining claims for mining purposes on those claims is part of the reasonable right of access provided under the 1872 Mining Law, as amended. Therefore, as these rights are granted by statute, they are not subject to the prohibitions contained in any of the alternatives. Thus, none of the alternatives differ in projections for developments associated with locatable minerals.

Leasable Minerals

Leasable minerals are those minerals that can be explored for and developed under one of several federal mineral leasing acts. Leasable minerals in Colorado include energy mineral resources such as oil, gas, coal, and geothermal. Moreover, for lands acquired or administered under the Weeks Act (PL 61-435) and the Bankhead-Jones Act (PL 75-210), the 1872 Mining Law does not apply and deposits of otherwise locatable minerals like gold and garnet are leasable.

The government's decision regarding whether to lease leasable mineral resources is discretionary, meaning that leasing may or may not be allowed. However, once issued, a lease

then becomes an irretrievable commitment of resource; a lease cannot be cancelled by the government, except by due process when the lessee does not meet the terms and conditions of the lease. The Bureau of Land Management (BLM) has the exclusive authority to dispose of leasable mineral resources on NFS lands. However, BLM must have the consent of the Forest Service before it can lease oil, gas, or geothermal resources. In the case of phosphate, BLM must seek Forest Service recommendations for measures to protect surface resources, but may lease without Forest Service consent. A federal lease conveys to the holder the right to explore and develop the leased commodity subject to lease terms, stipulations, and applicable regulations.

Although it varies by commodity, surface use associated with the exploration and development of leasable minerals requires access and haul roads, open pits, facilities, power lines, pipelines, and communication sites. Efficient exploration and development of leasable minerals is generally not possible without the ability to build new roads or reconstruct existing roads where needed. In the case of oil, gas, and geothermal resources, industry has the capability to avoid disturbing sensitive surface resources by using directional drilling techniques.

Affected Environment

Saleable Minerals

Sources for mineral materials are abundant and widespread throughout Colorado. Suitable material can be derived from glacial moraines, alluvium, talus, river benches, and other natural sources of loose material; or it can be quarried from rock outcrop. Because of the high cost of transportation, which often represents the majority of the cost for the material delivered to the project site, the largest sources with the most production are close to highways and major markets. Private lands more often meet these conditions then do NFS lands or at least sources on private lands are usually available so that production from NFS lands is not necessary.

The largest amount of mineral material use is driven by two distinctly different markets. One market is for building, construction, and landscaping materials needed for developing communities. To meet these needs, typically one or more mineral material sites with large reserves are developed, usually around the periphery of the community. Sites next to already existing highways and railroads are preferable but construction of transportation infrastructure solely for the purpose of developing good mineral material sites is not uncommon. The other market for mineral materials is for the construction and maintenance of roads and highways. In this situation, mineral material sites are developed along and in close proximity to the road corridor. Sites are generally smaller in size, more numerous, and dispersed along the course of the road. In this case, mineral materials are developed as the result of the need for the road rather than a road being constructed for the need of the mineral material deposit.

State-wide production of mineral materials in Colorado was reported at 83.88 million tons for the year 2006 (Cappa et al. 2007). In comparison, mineral material disposal from Colorado's national forests for 2006 totaled 525,800 tons for that same year (Forest Service annual production report for FY 2006). Thus the total average annual production of mineral materials from NFS lands represents less than one percent of the total mineral material production for all of Colorado. Although a specific breakdown of amounts of mineral materials generated from IRA's is not available, mineral material contributions from IRA's to the total NFS production is small and most likely used for public road projects (free use) or local Forest Service use where roads already exist or are being constructed for some purpose other than mineral material development. This lack of commercial interest is likely due to: IRA's being generally remote

from where mineral materials are needed, terrain too rugged for developing such a low value commodity, and widespread availability of other mineral material sources outside of IRA's. Additionally, the Forest Service encourages commercial operations on NFS land, such as oil and gas operations, to obtain their mineral material from private sources whenever possible.

Locatable Minerals

Base and precious metals usually occur in varying proportions in Colorado deposits and include mainly gold, silver, lead, zinc, and molybdenum. Most major Colorado mining districts for these locatable minerals lie in a zone called the Colorado mineral belt that extends from Boulder County southwest almost to the corner of the State (USDI Bureau of Mines, 1984). There are a few scattered, well known districts and mineral deposits occurring to the southeast of the Colorado mineral belt including Creede, Cripple Creek, and Summitville. Another important mineral belt is the Uravan mineral belt containing deposits of uranium and vanadium. It is an eastward convex mineral belt occurring near the lower western border of Colorado.

Valuable deposits of locatable mineral resources potentially exist in Colorado's inventoried roadless areas. Mineral related activities are occurring and would continue to occur in inventoried roadless areas where valuable deposits exist. While it is not possible to predict where and when development would occur, the existence of active mining claims within a given roadless area is an indicator of both potential for a valuable mineral deposit and for future mineral related activity.

The analysis for this EIS uses point count data of mining claims. These data have an accuracy only to the nearest surveyed or protracted section. Type, size, and location of the claims within any given section are unknown from these data. This means that for roadless areas with boundaries that cut through sections rather than follow section lines, it is not possible to know which side of the roadless area boundary the claims lie. Therefore, any information on the number of claims affected would be an approximation. A more accurate measure from these data would be the acres within those sections that contain mining claims that lie within roadless areas. These acres shall be referred to as the "acres of interest".

Based on a point count of year 2005 mining claim data extracted by the USGS (Causey 2007) from BLM's LR2000 database, approximately 75 percent of the roadless areas (IRA and CRA combined) in Colorado do not contain active mining claims. Of the remaining 25 percent, there are an estimated 2,000 active mining claims to potentially valuable deposits of locatable minerals. This is 21 percent of the total 9,445 active mining claims in Colorado in 2005. Acres of interest where these mining claims occur represent only 2.2 percent of the total combined IRA and CRA area (102,000 acres out of 4,653,100 acres). Of those 2,000 active mining claims, about 30 percent occur within the Whetstone IRA (Whetstone CRA) on the GMUG, 17 percent in the Hoosier Ridge IRA (Hoosier Ridge CRA) on the White River, and 11 percent in the Hermosa IRA (Hermosa CRA) on the San Juan. The remaining 42 percent of active mining claims in roadless areas are less concentrated. The number of claims within roadless areas is subject to change as new claims are staked and others are allowed to lapse. The existence of these claims in a roadless area indicates where there is some potential for roads and other development to occur.

Locatable mineral activity generally fluctuates with the rise and fall of metal prices. The recent rise in metal prices has resulted in increased interest in Colorado's mineral resources. However,

most renewed development and production occurs in areas of past mineral production. These areas typically already contain roads and private patented land. Thus, a significant increase in mineral development and production in inventoried roadless areas is not in the foreseeable future.

One exception is the surface use of mill site claims in the Whetstone IRA (Whetstone CRA) in support of the development of a nearby molybdenum deposit on patented land, although a proposal has not yet been submitted. If the price of metals continues to rise, there could be a corresponding increase in prospecting and exploration activity in roadless areas; however, an increase in prospecting and exploration does not result in a similar increase in development and production as most exploration efforts rarely result in the discovery of a mineable deposit. Furthermore, road construction and tree-cutting are not as necessary for locatable mineral prospecting and exploration as they are for development and production.

Leasable Minerals – Coal

This sub-section presents information and effects on accessibility to coal resources on National Forest System (NFS) lands within the analysis area. This analysis presents estimated projections of activities that might occur in the analysis area. The analysis presents only effects on accessibility to coal resources for national forest units on which coal resource development is likely to occur in the analysis timeframe of 15 years. The only unit for which coal resource development is anticipated is the GMUG National Forests.

Only a small number of IRAs and corresponding CRAs in Colorado have potential for existence of coal resources. A very small number have existing coal leases, and those all occur on the GMUG National Forests. Depending on the alternative, potential for future development could be limited based on the assumption that once a Colorado Roadless Rule is in effect, road construction and reconstruction necessary to develop coal resources might only be allowed on existing leases, or in a specific area on the GMUG National Forests.

General Information about the Federal Coal Program

The Forest Service participates with the USDI- BLM, the USDI- Office of Surface Mining Reclamation and Enforcement (OSM), and the State of Colorado Division of Reclamation Mining and Safety (DRMS) in managing coal resource development on NFS lands in the State. The Forest Service acts under the authorities defined in the Mineral Leasing Act of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976 for coal exploration licenses and coal leases. The Surface Mining Control and Reclamation Act of 1977 gives the Forest Service, as the surface managing agency (also referred to as the federal land management agency), a review and/or concurrence role in the OSM and DRMS coal mine permitting process.

Coal exploration licenses are issued by the BLM on specific lands nominated by industry through an application process. Where NFS lands are involved, the Forest Service provides BLM with conditions for use and protection of forest lands. Coal exploration licenses are issued with a 2-year term. Coal exploration drill sites and associated access roads are temporary, and are typically on the landscape for two years or less.

The Forest Service and BLM consider lands for coal leasing as they are nominated by industry through the application process. The Forest Service conducts a site-specific NEPA leasing analysis to determine whether to consent to BLM leasing the lands, and to identify stipulations for protection of non-coal resources. Similar to oil and gas leases, special stipulations on the

federal coal lease are modifications (additions) to the standard terms of a lease that establish binding conditions on surface use. For underground mining, special coal lease stipulations generally relate to protecting surface resources from effects of underground mine subsidence, and often include timing and surface use restrictions for certain resource conditions. Once the Forest Service has consented to leasing and identified lease stipulations, the BLM then offers, sells, and issues coal leases on NFS lands. Coal leases are issued for 20 year initial terms, and are in effect until formal relinquishment (initiated by the lease holder) occurs.

Mining operations on federal coal leases can only occur when a lease is part of an approved coal mining permit. Coal mine permitting in Colorado is managed by the DRMS with oversight from the OSM, which has the final authority for approving permit actions. Where NFS lands are involved at the time a federal lease is brought forward for inclusion in a mining permit, or when surface uses (such as roads, methane drainage wells, surface facilities) are proposed, the Forest Service has the responsibility to 1) ensure that the permit action is consistent with the Forest Plan, 2) designate the post-mining land use, and 3) include adequate protection measures for surface resources on NFS lands. The Forest Service responds to the State and/or OSM with specific measures (conditions) to protect surface resources within the agency's jurisdiction, or concurrence for the permit action as applicable. Depending on the scope of a permit action, the OSM may conduct a NEPA analysis.

Coal Resource Occurrence

Five national forest units in Colorado acknowledge that coal resources may exist within their boundaries; the Pike-San Isabel NFs, the Routt NF, the San Juan NF, the White River NF and the GMUG NF (forest plans, various dates). Areas where coal resources overlap NFS lands were assessed in forest plans using data from the U.S. Geological Survey (USGS), Colorado Geological Survey and the DRMS.

Table 3-15 shows an assessment of where coalfields/regions with potentially minable coal resources might occur on NFS lands in the State. Several IRAs and CRAs on NFS lands in the State overlap with some of these coalfields/regions. The USGS (2001) assessed the coal resources in Colorado as being potentially minable, or applicable for other uses. For the purposes of this analysis, only areas identified to have potentially minable coal resources were examined.

The Forest Service does not currently have sufficient site-specific information to estimate the amount of coal resources that may occur in IRAs or CRAs on the Pike-San Isabel, Routt or White River National Forests. According to information provided by the San Juan Forest for preparation of a forest plan revision, an estimated 1.5 billion tons of coal reserves may exist in the Durango Known Recoverable Coal Resource Area (this overlaps with the Pagosa Springs coalfield) in IRAs, CRAs, and non-roadless lands on the Forest. On the GMUG NF, there is currently insufficient site-specific information to estimate the amount of coal resources in the Carbondale, Crested Butte and Tongue Mesa coalfields. The GMUG NF estimates that about 1.6 billion tons of in-place coal reserves occur in IRAs, CRAs and non-roadless areas in the Somerset and Grand Mesa coalfields. About 1.2 billion tons of these reserves are estimated to occur in IRAs and CRAs.

Coal Leasing and Exploration Licensing Status:

Table 3-15 also shows the occurrence of coal exploration licenses and/or leases on NFS lands in the State. This information was provided by the BLM, or obtained from the LR2000 database. As

of November 2009, there were about 14,000 acres of land under lease for coal development on IRAs, CRAs and non-roadless lands in the Somerset Coalfield on the GMUG NF.

About 7,100 of the 14,000 currently leased acres are either in IRA and/or CRAs. About 3,100 of the currently leased acres are in IRAs only; about 2,800 acres of the currently leased acres are where IRA and CRA are in common and 1,200 acres in current leases fall into CRA only. There were no approved coal exploration licenses in roadless areas in November 2009. There were no leases or exploration licenses in place on the Pike-San Isabel, Routt, San Juan, or White River National Forests.

Table 3-15. Potentially Minable Coal Resources by National Forest, IRA and CRA in Colorado, with coalfield (where applicable).

National Forest	Coalfield/Region	CRA(s)	IRA name (if different)	Existing Leases or Exploration Licenses	Foreseeable Coal Activity
GMUG	Carbondale	Huntsman Ridge, Tomahawk, Munsey-Erikson	Drift Creek, Raggeds	No	None
	Crested Butte	Castle and Whetstone	Beaver, Castle, Whetstone Mountain	No	None
	Tongue Mesa	Cimarron Ridge	Cimarron	No	None
	Grand Mesa	Currant Creek and Kannah Creek	Priest Mountain	No	Yes
	Somerset	Flatirons, Sunset, Pilot Knob, Beckwiths, Flattops/Elk Park	West Elk, Springhouse Creek, Priest Mountain	Yes in Flatirons Sunset and Pilot Knob	Yes in Flatirons, Sunset and Pilot Knob
Pike-San Isabel	Trinidad	Spanish Peaks		No	None
Routt	Green River Region	Pagoda Peak, Morapos A, Morapos B, Chatfield, Nipple Peak South		No	None
San Juan	Pagosa Springs	HD Mountains		No	None
White River	Carbondale	Assignation Ridge		No	None
		Gallo Hill		No	None
		McClure Pass		No	None

Notes: Information on coalfields or coal region was taken from Carroll (2005); Information on locations of potentially mineable coal resources was taken from USDI Geological Survey (2001), and individual forest plans (various dates). Information on existing coal leases and exploration licenses were provided by BLM.

Current Coal Development

Coal from the federal leases on the GMUG NF is extracted exclusively with underground mining methods. Three underground mines (West Elk, Bowie #2, and Elk Creek) produce coal from private lands and leases on federal lands. Coal is mined underground and transported to the surface and processing facilities at the mine sites by conveyor. Collectively, the three existing mines currently produce about 15 million tons per year, which accounts for about 40 percent of the coal production in Colorado (Colorado Division of Reclamation, Mining and Safety 2009).

The coal resources currently being mined in Colorado meet the definition of compliant and super-compliant coal reserves according to the Clean Air Act. The coal has high energy value

(Btu), low sulphur; ash and mercury content, and is thus desirable for use in electric generation plants. The bulk of the coal is shipped to the Eastern US (Carroll 2005).

Coal will continue to be mined using underground mining methods. Changes in technology including improvement in roof support may contribute to more efficient mining during the analysis timeframe; however these are not expected to impart dramatic changes (USDI BLM 2005). In 2007, the Energy Information Administration (EIA) called for a 5 percent per year increase in coal production at Western mines as a result of increasing demand (USDOE 2007b). The EIA's 2009 report calls for a slower rate of increase (USDOE 2009). Either way, it is expected that demand for Western coal, such as that produced from these mines will continue or increase slightly over the analysis timeframe.

Past and Current Road Construction

Coal-related road construction currently only occurs on the GMUG NF, because it is the only unit on which coal activity is occurring. No coal activity is presently occurring on the Pike-San Isabel, Routt, San Juan or White River National Forests.

Approximately 75 miles of roads have been constructed or reconstructed since the 1960s in the West Elk IRA on the GMUG NF for the purposes of coal exploration, methane drainage and monitoring activities. An additional 1 mile of road has been approved, under the interim directives, for coal exploration in the Springhouse Creek IRA. Since 2001, 20 of the 75 miles have been constructed to drill methane drainage wells. Methane drainage well reclamation and access road decommissioning occurs continually following practices of contemporaneous reclamation, i.e. a facility and access roads are reclaimed or decommissioned as soon as they are no longer needed. Approximately 65 of the 75 miles have been decommissioned and reclaimed. Some coal-related road construction also occurred in the past on the White River National Forest, however specific data are not available. Those road miles have also been decommissioned and reclaimed.

Existing coal-related road construction that has occurred on coal leases or exploration licenses in roadless areas since 2001 has been consistent with applicable forest plan direction, rules and regulations, including the 2001 Roadless Rule or interim directives, as applicable to the timeframe when the road construction was approved.

Decommissioning by obliteration has been effective in restoring disturbed lands to the post-mining land use (livestock grazing and wildlife habitat) according to Forest Service conditions brought forward to the DRMS for the mine permit. Based on experience in the West Elk IRA, the decommissioning and subsequent reclamation is well established two to three years after reclamation (example photos in Colorado Roadless Rule EIS project record).

Projections for Coal Leases, Exploration Licenses and Development

No coal-related activity is presently occurring or foreseen on the Pike-San Isabel, Routt, San Juan, or White River National Forests in the 15-year analysis timeframe. However, coal exploration and development is expected to continue on the GMUG NF in the Somerset coalfield, and some activity in the Grand Mesa coalfield is expected in the analysis timeframe. It is expected that 6 or 7 coal exploration licenses would be brought forward for lands with potentially minable coal reserves in the next 15 years. Similarly, it is expected that a leasing application would occur about every 3 to 4 years on these lands in the next 15 years, amounting to about 4 leasing actions. Estimations are based on the frequency of exploration license and

lease applications submitted to BLM in the last decade. No activity is foreseen on the remaining coalfields on the GMUG NF during the analysis timeframe.

Given the current leasing situation and production rate, the 3 existing mines have combined reserves that will support about 22 years of mining, with a range per mine between about 4 and 12 years (USDI BLM 2009).

Projections for Road Construction and Reconstruction

This analysis assumes that roads would be necessary pursuant to issuance of coal exploration licenses to exercise the rights granted by a coal lease (whether existing or future). Road construction or reconstruction would be needed for exploration licenses so that coal reserve data required prior to leasing could be collected. Further, it is assumed that without roads, safe and economic development of coal resources under lease could not occur. Road construction and reconstruction may be precluded on portions of coal leases or exploration licenses in roadless areas where lease stipulations or license conditions limit surface use for the protection of other resources. The projections are only pertinent to the GMUG NF, as it is the only unit where coal activity is occurring, and for which coal activity is projected. No activity is projected for the Pike-San Isabel, Routt, San Juan or White River National Forests.

Typical coal-related surface uses include exploration drilling and associated road construction, methane drainage (vent) well drilling with associated access roads, on-going resource monitoring facilities, mine infrastructure facilities and life-of-mine roads. Certain coal-related surface facilities and associated roads may exist on the landscape for many years (20- 30) in the case of maintenance and monitoring of ventilation shafts or other facilities; however, there are no projected new roads for the purposes of surface facilities. Other roads would be of shorter term (less than two, or three to five years) in the case of exploration holes or methane drainage (vent) wells, and other short term uses.

Road construction or reconstruction to support exploration drilling occurs in conjunction with both coal leases and coal exploration licenses. Exploration roads are temporary, and typically on the landscape for less than two years. Road construction for exploration was projected using a rule of thumb that about four exploration holes per 640-acre section would be needed in unexplored areas. For analysis purposes, it was assumed that about 1.5 miles of road would be needed per section for exploration.

Recent experience with existing coal leases (all of which are on the GMUG NF) suggests that road construction and/or reconstruction will be needed to support construction of methane drainage wells, which have been necessary for removing methane (an explosive gas) from the mines. These wells are often part of a mine operator's Mining Safety and Health Administration (MSHA) – approved ventilation plan, and are needed to meet MSHA requirements for safe methane levels in underground mines to ensure worker safety. In general, between 10 and 20 methane drainage well locations per 640-acre section have been constructed at the existing mines. For the purpose of this analysis, it was assumed that about three miles of road per section would be needed for methane drainage purposes.

Using these assumptions, road construction/reconstruction is projected as shown in Table 3-16. It is important to note these projections are estimates, and were made without benefit of mine designs or plans.

Table 3-16. Projected Road Construction/Reconstruction in Coal Analysis Area by Alternative, 15-years.

	Alternative 1	Alternative 2 & 4	Alternative 3
	Road construction and reconstruction would be allowed in IRAs on coal leases in effect prior to effective date of rule; and in CRAs that are not within IRAs according to forest plan management direction	**Road construction and reconstruction could occur in CRAs within the North Fork Coal Mining Area; and in the IRAs that are not within the CRAs according to forest plan management direction**	**Road construction and reconstruction could occur in IRA and CRA according to forest plan management direction**
IRA only	2 miles temporary roads	2 miles temporary roads	2 miles temporary roads
IRA/CRA in common	5 miles temporary roads	44 miles temporary road	38 miles forest road 24 miles temporary road
CRA only	9 miles temporary or forest road	6 miles temp road	9 miles temporary or forest road
Total by alternative for 15 year	7 within IRAs; 16 total miles	50 within CRAs; 52 total miles	64 within IRAs; 73 total miles
Total by alternative annually	1 mile	3 miles	5 miles

Note: Estimates rounded to nearest mile

Road construction activity related to coal exploration or for other surface uses typically occurs intensively for one to several years, and then slows. There are typically gaps of time where no road construction occurs. Therefore, because initial road construction normally occurs over a concentrated period and subsequent use can occur over a range of subsequent years (from less than one year to 10 or more), projections for coal are presented over a 15-year period, rather than in yearly averages. Nevertheless, an estimated annual average is also presented in the table above. Roads used for coal exploration or surface uses are typically decommissioned as soon as they are no longer needed according to practices of contemporaneous reclamation. Some roads may remain on the landscape for the duration of mining in a particular area or lease, with the duration dependent on mine plans and monitoring needs.

Leasable Minerals – Oil and Gas

All national forests in Colorado have some areas with at least minimal geologic potential for natural gas and/or oil occurrence. However, only three forests have sizable areas in major proven natural gas-producing geologic basins, and consequently have high potential for primarily natural gas occurrence and development. Most of the areas that have potential for oil and gas occurrence are available for leasing under existing leasing decisions and forest plans. This sub-section describes the differences in the ways natural gas and oil resources would be managed in the analysis area among alternatives

Roadless areas with potential for oil and/or natural gas occurrence and relatively high levels of leasing have experienced slower development rates than adjacent lands largely due to challenging accessibility and complex permitting procedures with a corresponding high cost of development. Despite having high, and in some cases proven, production potential, these areas are costlier to develop than lower elevation areas with less rugged terrain, milder weather, a higher level of pre-existing access, and fewer environmental challenges. Consequently, the

roadless areas with high oil and gas occurrence and development potential described in this report are in some of the few remaining onshore areas of the United States with substantial known energy resources left to be developed.

Projections of oil and gas road miles, wells, and production that could occur in IRAs and CRAs in the next 15 years were estimated based on existing information in particular, BLM Reasonable Foreseeable Development Scenarios (RFDs) and assumptions and methodologies described in the resource specialist report contained in the project record and hereby incorporated by reference.

Estimated projections of oil and gas wells, roads, and production are not predictions, as there is a very high level of uncertainty about whether wells might be drilled and, if so, where they might be drilled. Projections of wells and road miles are highly speculative estimations and represent only what could happen – not what will happen – under the four scenarios represented by the proposed action and three alternatives. Projections do not represent any kind of binding limit on the number of future wells, but generally represent a maximum development scenario.

Estimated projected oil and gas road miles, wells, associated disturbance, and production in IRAs and CRAs vary slightly among the four alternatives. Table 3-17 summarizes the differences among the four alternatives in projected oil and gas road miles, number of wells, total acres of disturbance, and production in the analysis area.

Table 3-17. Comparison of estimated projections of oil and gas road miles, road acres, wells, pads, pad acres, and production in IRAs and CRAs under the four alternatives, and in IRAs and CRAs combined under the four alternatives. Road mile estimates in the table include assumed co-located pipelines.

Projected Activities	Alternative 1		Alternatives 2 and 4		Alternative 3
	IRAs	Other	CRAs	Other	IRAs &CRA's
Miles of road (nearest mile)	130	14	139	5	165
Number of Wells	659	27	681	5	783
Total acres of disturbance	1,074	201	1,134	141	1,318
Estimated ultimate recovery	949 BCFG 52,500 BO	97 BCFG 0 BO	1,028 BCFG 49,000 BO	18 BCFG 3,500 BO	1,154 BCFG 126,000 BO

Note: BCFG = billion cubic feet of gas and BO = barrels of oil

Nineteen IRAs with more than 640 acres under lease are on the GMUG, White River, and San Juan National Forests. These 19 IRAs had about 154,200 acres leased as of September 2009. Roads would be allowed on leases covering about 131,200 acres, and roads would be prohibited on leases covering about 22,600 acres.

There are 20 CRAs with more than 640 acres under lease on the GMUG, White River, and San Juan National Forests. These 20 CRAs had about 159,300 acres leased as of September 2009. Roads would be allowed on leases covering about 136,700 acres, and roads would be prohibited on leases covering about 22,700 acres.

Leasable Minerals – Geothermal

Geothermal resources are underground reservoirs of hot water or steam created by heat from

the earth. Geothermal steam and hot water can be utilized when they occur naturally on the surface of the earth in the form of hot springs, geysers, mud pots, or steam vents. Geothermal resources also can be accessed through drilling wells. The heat energy produced from wells can be used for generating electricity or for "direct uses", such as heating greenhouses, homes, commercial buildings, or aquaculture operations or for dehydrating vegetables. Geothermal is a "clean" energy source in that its utilization does not result in greenhouse gases or other undesirable emissions.

Geologic indicators of geothermal resource potential – heat flow, volcanism, recent faulting, and continental rifting – are present in Colorado (USDOE 2007a). However, the extent of Colorado's geothermal resource potential has yet to be assessed fully, and there are no definitive data indicating where and to what extent geothermal resources might occur in roadless areas. High heat flow values in the central part of the State are assumed to overlap, at least in part, with roadless areas. Volcanism, recent faulting, and continental rifting in various areas around the State also are assumed to overlap in part with roadless areas.

Currently, there is one geothermal lease application on the GMUG National Forest. The area of interest is not in an IRA or CRA. There are no other leases, lease applications, operations, or applications for operations on NFS lands in Colorado. The BLM-Forest Service programmatic EIS (USDI BLM and USDA Forest Service, 2008) addressed National Forest System lands that have potential for geothermal resources. The programmatic EIS provides the basis for future geothermal leasing availability analyses and decisions on NFS lands in Colorado and other states.

Saleable Minerals: Environmental Consequences

Alternative 1 – 2001 Roadless Rule

The 2001 Rule does not withdraw inventoried roadless areas from the development of mineral material sites. However, it does prohibit road construction or reconstruction associated with developing new mineral material sites within inventoried roadless areas. This effectively precludes the sale and disposal of mineral materials from sites well within inventoried roadless areas for the purposes of developing nearby communities and infrastructure. Under this alternative, no roads are foreseen to be constructed or reconstructed for the purpose of developing saleable minerals in IRA's. However, they could be developed in the areas in the analysis area that are not in the IRA's.

It is possible that new mineral material sites or expansion of existing sites could occur within inventoried roadless areas to provide material for new road construction or reconstruction associated with any of the exceptions under the 2001 rule. Such mineral material sites would have to be developed along an existing road or adjacent to a road being built pursuant to one of the exceptions to the prohibitions. In some cases, a few hundred feet of road could be expected to get material from a nearby deposit to the road that is under construction or reconstruction if sources of mineral materials outside of the inventoried roadless areas are not feasible.

Because there is likely to be little interest in the use of mineral materials from IRAs in Colorado, the effects on the production of this resource in IRA's under the 2001 rule provisions should be minimal.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Like the 2001 rule alternative, the Colorado Rule does not withdraw the roadless areas from the development of mineral material sites, but effectively precludes their sale and disposal by prohibiting the construction or reconstruction of roads for that purpose. Therefore, the effects from the Proposed Action are the same as they are for alternative 1 in this regard. No roads are foreseen to be constructed or reconstructed for the purpose of developing saleable minerals, and therefore, no new material sources off of CRAs for nearby community needs is expected.

The differences between alternatives 2 and 4 and alternative 1 as to the effects on salable minerals are minor. The difference is that more actual roadless areas are added while substantially altered areas are removed, and areas around ski resorts are removed. This change would have little impact on salable minerals in that mineral materials can already be accessed in the substantially altered areas, and the roadless areas and ski areas were already areas where the likelihood of mineral material development was low.

Under this alternative, the effects on saleable mineral production would be less than they are under the 2001 rule alternative.

Alternative 3 – Forest Plans (No Action)

Under this alternative, like the other alternatives, inventoried roadless areas are not withdrawn from mineral material development. Unlike the other alternatives, this alternative does not have a wide-spread prohibition against new road construction or reconstruction. Permissibility of road construction depends upon management area allocations that range from allowing no additional road construction to allowing road construction with no additional restrictions (temporary roads are encouraged, however). This alternative maintains flexibility for future mineral material development needs. If the need becomes great enough to develop mineral materials from a particular roadless area that does not allow additional road construction, an amendment to the plan can still be formulated to accommodate the need.

Even if road construction is allowed for development of a mineral material resource in some roadless areas, the remoteness of roadless areas and the widespread availability of mineral material sources outside of roadless areas create a reasonable expectation that only a minimal volume of mineral materials would come from the analysis area. Assuming the demand for mineral materials remains at current levels; low volumes of mineral materials would be produced from the analysis area, the principal uses being for Forest Service projects or for the limited instances when roads are constructed. The only exception is that there may be a greater need for mineral materials to support the increased amount of road construction expected for oil and gas lease exploration and developments under this alternative than is under the other alternatives.

Under this alternative, the effects on saleable mineral production would be less than they are under the other three alternatives.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier Acres

Under this alternative, the effects on saleable mineral production would be the same as alternative 2.

Locatable Minerals – All Alternatives: Environmental Consequences

Locatable mineral resource activities are non-discretionary. The public has a statutory right to come onto public domain land to prospect, explore, and develop locatable mineral resources, and the Forest Service cannot prohibit this activity on these NFS lands. Therefore, none of the proposed alternatives would affect the statutory right of reasonable access to prospect, explore, and develop NFS lands open to mineral entry and location.

Rules and procedures for the use of the surface of NFS lands in connection with locatable mineral operations are provided in regulations found at 36 CFR 228, Subpart A. Construction or reconstruction of roads for locatable mineral exploration or development is part of the reasonable right of access provided under the General Mining Laws.

Under all alternatives, an estimated average of less than ¼ mile per year of road construction or reconstruction is projected to occur in roadless areas during the next 15 years for all locatable mineral related activities.

The amount of road construction or reconstruction associated with the small volume of mineral materials produced from roadless areas during the next 15 years is assumed to be little to none in that this production would come from areas with roads already in place or would be associated/included with the construction of roads for some purpose other than mineral material production. Construction of roads to develop sources of mineral materials from roadless areas for local community development is unlikely due to the abundance of this resource outside of roadless areas. No roads are projected for the purpose of developing mineral material sites within any of the alternatives for the next 15 years.

Leasable Minerals – Coal: Environmental Consequences

For the purposes of this analysis, effects are based on overall 'accessibility' to coal resources, in which 'accessibility' is linked to the ability to construct (or reconstruct) roads for exploration or lease development purposes, which subsequently affects the accessibility to coal reserves. It was assumed that where road construction or reconstruction would be prohibited, that mining would be severely limited to the point that mining the reserves would be uneconomic.

The development of coal for energy produces greenhouse gasses through the expenditure of fossil fuels during development and processing, and also through emissions from longer-term extraction, transportation, and processing facilities. Prohibitions on extraction of these resources within CRAs would likely shift production to areas outside of roadless areas, and for demand in the eastern U.S., to other western U.S. sources. It is unlikely that reduced mineral extraction in roadless areas related to any alternatives would result in a significant change to total atmospheric greenhouse gas concentrations, due to the substitution of other fossil energy sources. Methane, a gas produced in underground coal mines and removed for safety reasons, is a potent greenhouse gas and capturing or flaring gas produced from the existing, as well as future, coal leases could be an important contribution to greenhouse gas reduction.

Table 3-18 at the end of this section includes estimates of the accessible coal resources by alternative for the whole analysis area. These and other effects are further discussed in the following sections.

Alternative 1- 2001 Roadless Rule

For alternative 1, road construction or reconstruction in IRAs would be limited to areas under

lease prior to the effective date of the Colorado Rule. Road construction and reconstruction would not be permitted on IRA lands in leases let after that date. Road construction and reconstruction could occur on newly identified roadless acres (i.e. CRAs) that are not within IRAs, and would be managed according to forest plan direction. As of November 2009, only the GMUG NF had any coal leases in place. About 5,900 acres of the 14,000 acres currently under lease are in IRA, and substantially altered acres of IRA. There are also about 1,200 acres of lands currently leased, and an additional 1,500 acres of currently unleased lands in CRA that are not within IRA that would be accessible under this alternative.

Only currently leased coal resources within IRAs in the Somerset Coalfield on the GMUG NF would be accessible. No coal resources in IRA elsewhere on the GMUG NF, or on other forests would be accessible under this alternative. Coal resources on lands outside of IRAs would remain accessible according to forest plan direction, including some leased coal resources in CRAs in the Somerset Coalfield, and unleased coal resources in CRAs in the Grand Mesa Coalfield on GMUG NF.

Effects of alternative 1 on coal leasing and development include the following estimated projections of activities on the GMUG NF over the 15-year analysis period:

- About 16 miles of temporary or forest road construction is projected. About 7 miles of this road construction would be on the 5,900 acres of existing leases in IRA which such activity would be allowed. About nine miles of this road construction are projected on newly identified roadless acres (i.e. CRAs) that are either currently leased or unleased. About six of these projected miles would be on currently leased lands, and three miles on unleased lands.
- All road construction would be included in a separate site-specific analyses pursuant to NEPA and be done in a manner that minimizes effects to surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with lease stipulations, forest plan direction, regulations, and laws. Roads would be decommissioned by obliteration when no longer needed for the purposes of the lease. Most roads would be in place for approximately three to five years, and would then be decommissioned.
- Continued access to about 108 million tons of recoverable coal reserves in IRA that are currently under lease. This accessible tonnage represents about seven years of production based on the current mining rates for the three mines currently producing coal from these leases.
- Access to about 2,700 acres of coal resources in newly identified roadless acres (i.e. CRA that are not within IRA). Of these acres, about 1,200 of them are currently under lease, and contain about 22 million tons of recoverable coal reserves. The remaining 1,500 acres are currently unleased but would be accessible for exploration, and would provide access to an estimated 27 million tons of coal reserves.
- Decommissioning and obliteration of at least 6 miles of road constructed in the 15 year analysis timeframe. Other roads would likely be constructed and decommissioned consistent with coal lease, license, or permit terms in this same timeframe.

Effects of road prohibitions on development of coal resources under alternative 1 include the following:

- Lost opportunities for exploration and development of federal coal resources and potential bypassing of economic federal coal resources in areas within IRAs not leased by the effective date of the Colorado Rule.
    - These areas include all identified coalfields/regions on the GMUG NF (except the areas of leases effective prior to date of a Colorado Rule as described above), and the Pike-San Isabel, Routt, San Juan, and White River National Forests. The extent of these coal resources are unknown, therefore the quantity of coal the road prohibitions might affect cannot be estimated.
    - These include un-leased federal coal resources on about 31,000 acres of the GMUG NF in IRAs that overlap with the Somerset and Grand Mesa coalfields. Restrictions on road construction would prohibit exploration and would in turn dramatically limit the ability of the coal industry to meet BLM coal data requirements when coal lease applications in and outside of (adjacent to) IRAs are submitted to the BLM.
- Limits on the overall longevity of the existing mines operating on the GMUG NF, and bypassing of federal coal resources due to prohibitions on road construction that may be needed to support mining. Estimated effects on longevity of existing mining operations are discussed in the Economics section.
- Limits on placing facilities to manage coal mine methane. Methane capture opportunities would use existing coal mine roads, or new roads built on coal leases in place prior to the date of the Rule, or on an oil and gas lease effective prior to the date of the Rule if methane is captured pursuant to a gas lease. Use of existing coal roads for methane capture could result in the roads remaining on the landscape for a longer period of time.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Under alternative 2, road construction or reconstruction in CRAs could be approved pursuant to existing and future coal leases, and on future coal exploration licenses, in the North Fork coal mining area on the GMUG NF. About 4,025 acres of the CRA lands in the North Fork coal mining area are currently under lease. Road construction and reconstruction for the purposes of coal exploration or as needed pursuant to a coal lease could occur on existing leases, and on about 15,600 acres of currently unleased lands in CRA in the North Fork coal mining area, for a combined access to about 20,000 acres. Road construction and reconstruction for coal exploration and in conjunction with future leases would be prohibited in all other CRAs.

On lands within the CRAs that are not currently under lease, only coal in the North Fork coal mining area in the Somerset coalfield on the GMUG NF would be accessible. No coal resources within CRAs elsewhere on the GMUG NF or within CRAs on other forests would be accessible under this alternative. Coal resources outside CRAs, including those in substantially altered acres would remain accessible according to forest plan direction. This would include about 5,000 acres of unleased coal reserves in IRAs that are not in CRAs; 300 acres of coal reserves in IRAs not in CRAs that are within the North Fork coal mining area, and 3,100 acres of leased lands in IRAs that are not in CRAs.

The North Fork coal mining area includes certain lands in the Somerset coalfield where potentially minable coal resources overlap with CRAs. The boundaries of this area were derived

by overlaying coal resource occurrence data with CRA boundaries. An assumption was that coal resources lying deeper than 3,500 feet below the land surface would not be economical to develop. For this part of the analysis, coal resource potential was evaluated using more detailed data from the USGS, Colorado Geological Survey and BLM that were compiled by the GMUG NF (USDA 2006). The boundaries of these intersected areas were brought to the closest section line or subdivision thereof to facilitate future use of standard legal land description.

Effects of alternative 2 on coal leasing and development, include the following projected activities in the North Fork coal mining area over the 15-year analysis period based on road construction and reconstruction allowed under this alternative.

- Continued access to develop coal in existing leases, which includes about 4,000 acres of CRA in the North Fork coal mining area, and 3,100 acres in IRA not in CRA, with collective access to about 130 million tons of recoverable coal reserves.
- About 50 miles of coal-related temporary road construction and reconstruction within CRAs. It is projected that there could be an additional 2 miles of coal-related temporary road construction and reconstruction on IRA acres that are not part of a CRA. The road construction primarily would be for coal exploration and/or methane drainage purposes and roads are expected to be on the landscape for 3 to 5 years. Roads would be constructed in a manner that minimizes effects to surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with lease stipulations, forest plan direction, regulation and laws. The roads would be administrative only, closed to the public and open only to coal operators and their contractors, to the Forest Service and other Federal and State agencies with jurisdictional authority over mining, and emergency personnel. When no longer needed, these roads would be decommissioned by obliteration, and reclaimed and restored to natural conditions as specified in the applicable lease, license, or permit. Coal mine permit conditions would call for reclaiming disturbed lands to support the post-mining land use, which would be based on forest plan direction.
- At least 6 miles of road decommissioning in the 15 year analysis timeframe. Other roads would likely be constructed and decommissioned consistent with coal lease, license, or permit terms in this same timeframe.
- Access to about 15,600 acres of unleased lands with an estimated 285 million tons of recoverable coal resources within CRAs in the North Fork coal mining area in the Somerset coalfield.
- Access to about 5,300 acres of unleased land with about 97 million tons of recoverable coal resources that are in the substantially altered acres outside the CRA.
- Within CRAs, coal mine methane capture operations would be restricted to using existing coal mine roads. Coal mine roads used to access sites of wells used for methane capture may be in use longer than if methane were vented to the atmosphere. Methane capture is desirable compared to venting or flaring due to the fact that methane is a potent greenhouse gas. The use of captured methane would also substitute for other fossil fuels, and thereby eliminate the environmental impacts, including greenhouse gases, associated with the production and transport of those fuels.

- Any coal mine road no longer needed for methane venting or capture would be decommissioned by obliteration and reclaimed and restored to natural conditions as specified in lease, license or permit conditions. Permit conditions call for reclaiming disturbed lands to support the post-mining land use, which would be based on forest plan direction.
- Coal resources in substantially altered roadless areas on any forest unit would be managed according to applicable forest plan direction under this alternative. Data are insufficient to estimate quantities.

Effects of road prohibitions on development of coal resources under alternative 2 include the following:

- Lost opportunities for exploration and development of federal coal resources and potential bypassing of economic federal coal resources not within the North Fork coal mining area, and not leased as of the effective date of the rule. These areas include all identified coalfields/regions on the GMUG NF (except the North Fork coal mining area), and the Pike-San Isabel, Routt, San Juan, and White River National Forests. The extent of these coal resources are unknown, therefore the quantity of coal the road prohibitions might affect cannot be estimated.

Alternative 3 – Forest Plans (No Action)

Under alternative 3, road construction or reconstruction could be approved on existing and future coal leases and coal exploration licenses in IRAs as well as the entire analysis area with coal resource potential according to management direction in existing forest plans. Each forest would review specific lands prior to leasing or exploratory activity for consistency with the applicable forest plan.

Effects of alternative 3 on coal leasing and development include the following projected activities in IRAs during the 15-year analysis period.

- In general, about 46,000 acres of land in the Pagosa Springs coalfield is available for coal leasing if applications are received. Some of the Pagosa Springs coalfield is in roadless areas on the San Juan National Forest. These lands are in a variety of management area prescriptions, all which allow for leasing with protections for specific resources, and either, allow road construction, limit or restrict road construction in some areas, or require no surface occupancy for leases that are in roadless areas.
- Ability to consider lands in IRAs in the Trinidad coalfield on the Pike-San Isabel National Forest for coal leasing if applications are received. These lands would be accessible under current forest plan direction, and road construction would be allowed.
- Ability to consider lands in IRAs in the Carbondale coalfield on the White River National Forest if leasing applications are received. The lands in this coalfield are in a variety of management area designations, some of which allow road construction, and others which do not. There are also some management designations that restrict mineral development.
- Ability to consider lands in IRAs in the Green River coal region on the Routt National Forest if leasing applications are received. The lands in this coal region are in a variety of management area designations some of which allow road construction, and others

which do not. There are also some management designations that restrict mineral development.

- Various coal exploration and development activities on the GMUG NF, as follows:
    - Continued access to develop coal in existing leases, which includes about 5,900 acres of IRAs, and 1,200 acres of CRAs not within IRAs, with collective access to about 130 million tons of recoverable coal reserves.
    - Approximately 64 miles of temporary or forest road construction and reconstruction on about 31,000 acres of IRAs in the Somerset and Grand Mesa coalfields. About 9 miles of road construction or reconstruction on about 2,700 acres that are not in IRAs but are in the analysis area. This road construction is expected to be needed principally for coal exploration and/or methane drainage for mining pursuant to a coal lease. These lands are in a variety of management area prescriptions which allow road construction; however, one management area specifically calls for obliterating temporary roads in one season after use, another management area calls for minimizing mineral disturbance in riparian areas and timely reclamation to restore productivity comparable to that before disturbance. Roads would be constructed and decommissioned consistent with forest plan standards and guidelines, and to support the post-mining land use. This would include constructing the minimum standard road needed to support project traffic; closing new roads to public motorized use; decommissioning roads and returning the lands to resource production within one year of cessation of activities; managing road use for wildlife habitat needs, and involving the State wildlife agency in planning road use in winter range areas.
    - Access to an estimated 595 million tons of unleased recoverable coal resources in the analysis area, including 568 million tons in IRA, and about 27 million tons in the remainder of the analysis area.
    - At least 6 miles of coal-related road decommissioning within the 15 year analysis timeframe. Other roads would likely be constructed and decommissioned consistent with coal lease, license, or permit terms in this same timeframe.
    - Access to coal in the Carbondale, Crested Butte and Tongue Mesa coalfields. These lands are in a variety of management area prescriptions which allow road construction; however, one management area specifically calls for obliterating temporary roads in one season after use, and another calls for minimizing mineral disturbance in riparian areas and timely reclamation to restore productivity comparable to that before disturbance.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Since there are no proposed upper tier acres that overlap with current or projected coal leases, the effects would be the same as alternative 2.

Table 3-18. Summary of Effects for Coal Resources, Grand Mesa-Uncompahgre-Gunnison National Forest

Resource	Alternative 1 – 2001 Roadless Rule	Alternatives 2 and 4 – CO Roadless Rule	Alternative 3 – Forest Plan	Comments
Coal analysis area: 39,600 acres	36,900 within IRAs	31,200 within CRAs	39,600 in analysis area	Somerset and Grand Mesa coal fields
Leased acres in analysis area: 7,100 acres	5,900 in IRAs	4,000 in CRAs	7,100 in analysis area	32,500 estimated coal resources unleased in analysis area
Unleased acres in analysis area: 32,500 acres	31,000 in IRAs	27,200 in CRAs	32,500 in analysis area	
Acres of accessible coal resources in alternative's roadless areas	5,900 (all currently leased)	19,625 – in North Fork coal mining area (4,025 acres currently leased)	36,900 (5,900 acres are currently leased)	These are acres leased in IRA in alternative 1; leased and unleased acres within CRAs in the North Fork Coal Mining area in alternative 2; and leased and unleased acres in IRA for alternative 3.
Estimated accessible recoverable coal resources in roadless areas (tons)	108 million	360 million	675 million	
Estimated production time from accessible resources in roadless areas	7 years	24 years	45 years	Based on current production rate of 15 million tons per year from 3 mines.
Acres of accessible coal resources in analysis area not in the alternative's roadless areas	2,700	8,405 (3,100 acres currently under lease)	2,700	For alternative 1 and 3, includes 1,200 acres of leased lands in CRA, and 1,500 acres unleased land in CRA. For alternative 2, includes 3,100 acres of leased and 5,305 acres unleased coal reserves in IRA not in CRA.
Estimated accessible recoverable coal resources in analysis area not within the alternative's roadless areas (tons)	49 million	154 million	49 million	For alternative 1 and 3, includes 22 million tons on the 1,200 acres of leased lands in CRA, and 27 million tons on the 1,500 acres unleased land in CRA.
Estimated production time from accessible resources in analysis area not within the alternative's roadless areas.	3 years	10 years	3 years	Based on current production rate of 15 million tons per year from 3 mines.
Estimated total coal resources accessible by alternative (tons)	157 million	514 million	724 million	
Estimated recoverable coal resources potentially rendered inaccessible in roadless areas due to rulemaking	31,000 acres 568 million tons	11,570 acres 212 million tons	None	Specific data available for Somerset and Grand Mesa coalfields. Insufficient data for remaining coalfields.
Projected Road construction in alternative	16 miles total; 7 within IRAs	52 miles total; 50 within CRAs	73 miles total; 64 within IRAs	

Leasable Minerals – Oil and Gas: Environmental Consequences

General Effects

Road construction and reconstruction for oil and gas development would be allowed under all alternatives in IRAs and CRAs in conjunction with oil and gas leases that are issued before the effective date of the Colorado Roadless Rule with terms allowing road construction and reconstruction.

Future leases would not allow road construction or reconstruction under alternatives 1, 2 and 4. Future leases under alternative 3 would be subject to individual forest plans which are revised on an ongoing basis, so that alternative 3 would allow more oil and gas development than alternatives 1, 2 and 4, which allow roads for existing leases only.

Estimated effects of roadless area designations and prohibitions on road construction and reconstruction and on the development of oil and gas resources over the 15-year analysis timeframe under alternatives 1, 2, and 4 include the following.

- Roads associated with oil and gas activity, including drilling, development, and production, would not be allowed in any of the roadless areas that have no existing leases (no leases issued prior to the effective date of the Colorado Roadless Rule), are not available or analyzed for leasing, or are available for leasing but with No Surface Occupancy, or Controlled Surface Use (specific to roads) stipulations.
- There are existing oil and gas leases in IRAs and CRAs. Projected oil and gas activity in conjunction with existing leases in 34 of those roadless areas with high development potential could result in up to an estimated 144 miles of new road construction and reconstruction., along with up to an estimated 686 wells with 1,275 total acres of disturbance.
- Though unlikely, there could be some non-quantified low level of activity, including roads, in conjunction with existing leases in roadless areas with low development potential.

Estimated effects of roadless area designations and prohibitions on road construction and reconstruction on the development of oil and gas resources under alternative 3 would vary as development and production would be subject to individual forest plan. Any additional opportunities for exploration and development of oil and gas resources in all roadless areas with potential for resource occurrence and not under lease prior to the effective date of the Colorado Roadless Rule would be foregone in alternatives 1, 2 and 4 for the 15-year analysis timeframe.

The development of oil and gas for energy produces greenhouse gases through the expenditure of fossil fuels during development and processing, and also through emissions from longer-term extraction, transportation, and processing facilities. Prohibitions on extraction of these resources within Colorado Roadless Areas would likely shift oil and natural gas production to areas outside of roadless areas with the same associated impacts to the environment in terms of greenhouse gases. It is unlikely that reduced oil and gas production in roadless areas related to any of the alternatives would result in a significant change to total atmospheric greenhouse gas concentrations, due to the substitution of other sources of oil and gas or other fossil fuels. The use of natural gas for energy produces fewer greenhouse gases than the use of coal.

Alternative 1- 2001 Roadless Rule

Under alternative 1 oil and gas development in IRAs over the 15-year analysis timeframe is most likely to occur in IRAs on the GMUG, San Juan, and White River National Forests in conjunction with existing leases and where there currently is development and production in and/or adjacent to IRAs.

Table 3-19 lists IRAs with existing leases and illustrates the extent to which existing leases in IRAs allow surface occupancy, including roads. The table distinguishes between leases with terms allowing surface occupancy (including road construction and reconstruction) and leases with terms that prohibit surface occupancy (including roads). This distinction provides a general idea of which IRAs may have oil and gas roads and development activity. Map 7 in the Map Packet illustrates Existing Oil & Gas Leases, Wells & Inventoried Roadless Areas on the GMUG and White River National Forest; Map 8 is the same for the San Juan National Forest.

Table 3-19. Acres leased in IRAs as of September 2009[1]. Leased acres with terms allowing surface occupancy and road construction or reconstruction are distinguished from leased acres with terms prohibiting surface occupancy, including road construction or reconstruction. IRAs in boldface are those considered most likely to have oil and gas development activity and associated roads in conjunction with leases issued as of the effective date of the Colorado Roadless Rule.

Forest	IRA [1]	Acres leased	Leased acres with terms allowing surface occupancy	Leased acres with terms prohibiting surface occupancy
GMUG	Battlement Mesa [2]	8,800	100	8,700
	Clear Creek	22,700	22,700	0
	Drift Creek	4,100	4,100	0
	Hightower	1,900	1,900	0
	Priest Mountain	4,000	4,000	0
	Raggeds	2,100	2,100	0
	Salt Creek	1,000	1,000	0
	Springhouse Creek	17,600	17,600	0
Manti-La Sal	Roc Creek [3]	2,800	2,800	0
Pike-San Isabel	256Rare2 [3]	8,100	8,100	0
San Juan	**HD Mountains**	13,500	12,000	1,500
	South San Juan [3]	2,200	2,200	0
White River	**Baldy Mountain**	6,000	6,000	0
	East Divide/Four Mile Park	8,900	8,900	0
	East Willow	4,600	4,600	0
	Housetop Mountain [2]	8,300	0	8,300
	Mamm Peak	11,900	7,900	4,000
	Reno Mountain	9,700	9,700	0
	Thompson Creek	16,000	16,000	0
Total		154,200	131,700	22,600

Acres rounded to nearest 100 acres, totals may not add due to rounding.
[1] IRAs with fewer than 640 acres under lease are not listed, as they are considered to have such a small percentage of the roadless area leased that there would be essentially no potential for development and associated roads in the IRA.
[2] IRAs with low development potential due to No Surface Occupancy stipulations on leases.
[3] IRAs with low development potential due to less favorable positions in oil and gas basins, relatively small lease areas, distance from proven production, and/or unsuccessful attempts at establishing production in or near the IRAs.

Nineteen IRAs with more than 640 acres under lease are primarily on the GMUG, White River,

and San Juan National Forests. These 19 IRAs had about 154,200 acres leased as of September 2009. Roads would be allowed in conjunction with leases covering about 131,700 acres, and roads would be prohibited in conjunction with leases covering about 22,600 acres.

For effects analysis purposes, 14 IRAs (Table 3-19, IRAs in boldface) are considered to have high potential for oil and gas roads and development activity over the 15-year analysis timeframe. Of the 19 listed IRAs with existing leases, three – Roc Creek on the Manti-La Sal National Forest, 256 Rare2 on the Pike San Isabel National Forest, and South San Juan on the San Juan National Forest – are considered to have low development potential (Table 3-19). Oil and gas wells and roads are not projected in these IRAs. However, projections are uncertain estimates, and given the entrepreneurial nature of oil and gas exploration, it is possible that there could be some level of activity associated with existing leases in these IRAs. Two additional IRAs – Battlement Mesa on the GMUG National Forest and Housetop Mountain on the White River National Forest – have high development potential based on geologic factors, high level of leasing, and proximity to existing development. However, No Surface Occupancy lease stipulations would prohibit future development in these IRAs.

The 308 IRAs that do not have existing leases are assumed to have low to moderate potential for oil and gas occurrence and low to no potential for development. The quantified extent of potential oil and gas production from these IRAs has not been estimated for this analysis. Potential production from these IRAs is assumed to be considerably less than that projected for the IRAs identified as having high potential for oil and gas occurrence and development.

Any lands leased in an IRA, after the effective date of the Colorado Roadless Rule, would prohibit road construction or reconstruction but would otherwise be available for development as described in future programmatic leasing analyses or a site-specific analysis prepared pursuant to NEPA.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Under alternative 2 road construction and reconstruction for oil and gas development would be allowed in CRAs only in conjunction with oil and gas leases that are issued before the effective date of the Colorado Roadless Rule and whose terms allow road construction and reconstruction. Waivers, exceptions, or modifications to stipulations prohibiting road construction or reconstruction would not be granted. Future oil and gas leasing would be allowed per forest plans and leasing availability decisions, but road construction and reconstruction in conjunction with those leases would be prohibited. Oil and gas development in CRAs over the 15-year analysis timeframe is most likely to occur in CRAs on the GMUG, San Juan, and White River National Forests in conjunction with existing leases and where there currently is development and production in and/or adjacent to CRAs.

Table 3-20 lists CRAs with existing leases and illustrates the extent to which existing leases in CRAs allow surface occupancy, including roads, under alternative 2. The table distinguishes between leases with terms allowing surface occupancy and road construction and reconstruction in conjunction with a lease, and leases with terms that prohibit surface occupancy, including roads, in conjunction with a lease. This distinction provides a general idea of which CRAs may have oil and gas roads and development activity. Map 9 in the map packet illustrates existing oil and gas leases, wells & CRAs on the GMUG and White River National Forest; Map 8 does the same for the San Juan.

Table 3-20. Acres leased in CRAs as of September 2009[1]. Leased acres with terms allowing surface occupancy and road construction or reconstruction are distinguished from leased acres with terms prohibiting surface occupancy or road construction or reconstruction. CRAs in boldface are those considered most likely to have oil and gas development activity and associated roads in conjunction with leases issued as of the effective date of the Colorado Roadless Rule.

Forest	CRA [1]	Acres leased	Leased acres with terms allowing surface occupancy	Leased acres with terms prohibiting surface occupancy
GMUG	Battlements [2]	4,000	0	4,000
	Clear Fork	15,300	15,300	0
	Currant Creek	800	800	0
	Flat Tops/Elk Park	1,400	1,400	0
	Horsefly Canyon	2,100	2,100	0
	Huntsman Ridge	5,200	5,200	0
	Pilot Knob	17,200	17,200	0
	Sunnyside [2]	4,200	0	4,200
	Tomahawk	2,100	2,100	0
	Turner Creek	6,900	6,900	0
Manti-La Sal	Roc Creek [3]	2,800	2,800	0
Pike-San Isabel	Rampart East [3]	10,400	10,400	0
San Juan	**HD Mountains**	21,900	18,900	3,100
White River	**Baldy Mountain**	6,100	6,100	0
	East Divide/Four Mile Park	8,600	8,600	0
	East Willow	4,700	4,700	0
	Housetop Mountain [2]	8,300	0	8,300
	Mamm Peak	12,00	9,000	3,100
	Reno Mountain	9,700	9,700	0
	Thompson Creek	15,600	15,600	0
Total		159,300	136,700	22,700

Acres rounded to nearest 100 acres, totals may not add due to rounding

[1] CRAs with fewer than 640 acres under lease (including the South San Juan CRA on the San Juan National Forest) are not listed, as they are considered to have such a small percentage of the roadless area leased that there would be essentially no potential for development and associated roads in the CRA.

[2] CRAs have low development potential due to No Surface Occupancy stipulations on leases.

[3] CRAs have low development potential due to less favorable positions in oil and gas basins, relatively small lease areas, distance from proven production, and/or unsuccessful attempts at establishing production in or near the IRAs.

There are 20 CRAs with more than 640 acres under lease on the GMUG, White River, and San Juan National Forests. These 20 CRAs had about 159,300 acres leased as of September 2009. Roads would be allowed in conjunction with leases covering about 136,700 acres, and roads would be prohibited in conjunction with leases covering about 22,700 acres.

For effects analysis purposes, 15 CRAs (Table 3-20, CRAs in boldface) are considered to have high potential for oil and gas roads and development activity in the next 15 years. Of the 20 listed CRAs with existing leases, two (Roc Creek on the Manti-LaSal National Forest and Rampart East on the PSI National Forest) are considered to have low development potential. Oil and gas wells and roads are not projected in these CRAs. However, projections are uncertain estimates, and it is possible that there could be some level of activity associated with existing

leases in these two CRAs. Three additional CRAs – Battlements and Sunnyside on the GMUG National Forest and Housetop Mountain on the White River National Forest – have high development potential based on geologic factors, high level of leasing, and proximity to development. However, No Surface Occupancy lease stipulations would prohibit future surface disturbance in these CRAs.

Under alternative 2, CRAs that do not have existing leases are assumed to have low to moderate potential for and gas occurrence and low to no potential for development. The quantified extent of potential oil and gas production from these CRAs has not been estimated for this analysis. Potential production from these CRAs is assumed to be considerably less than that projected for the CRAs identified as having high potential for oil and gas occurrence and development.

Any lands leased in a CRA, after the effective date of the Colorado Roadless Rule, would prohibit road construction or reconstruction but would otherwise be available for development as described in future programmatic leasing analyses or a site-specific analysis prepared pursuant to NEPA.

Alternative 3 – Forest Plans (No Action)

Under alternative 3 (roadless area management under forest plan direction), road construction and reconstruction for oil and gas development would be allowed in roadless areas in conjunction with existing and future oil and gas leases whose terms allow road construction and reconstruction. Future oil and gas leases could be offered, sold, and issued under the direction of forest plans and oil and gas leasing availability decisions.[27] Road construction and reconstruction would be prohibited in conjunction with existing and future leases where lease stipulations prohibit surface occupancy or roads. Waivers, exceptions, or modifications to stipulations prohibiting surface occupancy on existing leases would be considered (not necessarily granted) at the time operations are proposed, if such are requested.

Oil and gas development in roadless areas over the 15-year analysis timeframe is most likely to occur in roadless areas that have high potential for oil and gas occurrence and development on the GMUG, San Juan, and White River National Forests. Oil and gas development is most likely to occur in these areas where there currently is development and production in and/or adjacent to roadless areas in conjunction with existing and future leases in those areas. Oil and gas leasing with subsequent development could also occur in currently unleased roadless areas where lands are available for leasing under forest plans and leasing availability decisions. Development could occur on future leases where lease terms allow surface occupancy and roads.

Table 3-21 lists roadless areas with existing leases, and illustrates the relative extent to which existing and future leases in roadless areas with potential for development would allow surface occupancy, including roads, under alternative 3. The table makes a distinction between the following: acres leased and unleased but available for leasing with terms allowing surface occupancy, including road construction and reconstruction, and acres leased and unleased but available for leasing with terms that prohibit surface occupancy, including roads, in conjunction with a lease.

[27] *The Forest Service is required to analyze NFS lands for oil and gas leasing and make decisions designating specific lands available to be leased and stipulations that would apply to leasing before authorizing BLM to offer NFS lands for lease. (36 CFR 228.102)*

Only the GMUG and White River National Forests have any substantive potential for oil and gas roads and development in roadless areas, both in conjunction with existing leases and in conjunction with leases issued after the effective date of the Colorado Roadless Rule under alternative 3. Potential for oil and gas roads and development in conjunction with leases issued after the effective date of the Colorado Roadless Rule (alternative 3) on the San Juan National Forest (HD Mountains roadless area) is unknown because there is no current designation of lands available for leasing. Lands potentially available for lease are currently under analysis, and a decision on what lands would be available for leasing, and what stipulations would apply to any lands designated as available, has not yet been made.

Map 10 in the map packet illustrates existing oil & gas leases, wells & CRAs on the GMUG and White River National Forest; Map 8 does the same for the San Juan. There is low potential for development in roadless areas outside of those areas on the GMUG, White River, and San Juan National Forest listed in Table 3-21.

Nineteen roadless areas with more than 640 acres are under lease on the GMUG, White River, and San Juan National Forests. These roadless areas have about 268,500 acres leased or available for leasing as of September 2009. Roads would be allowed in conjunction with existing and future leases covering about 173,100 acres, and roads would be prohibited in conjunction with existing and future leases covering about 95,400 acres.

For effects analysis purposes, 14 roadless areas (Table 3-21, roadless areas in boldface) are considered to have high potential for oil and gas roads and development activity associated with existing and future leases over the 15-year analysis timeframe. Of the 19 listed roadless areas with existing leases, three (Roc Creek on the Manti-La Sal National Forest, 256 Rare2 on the Pike-San Isabel National Forests, and South San Juan on the San Juan National Forest) are considered to have low development potential. Oil and gas wells and roads are not projected in these roadless areas. However, projections are uncertain estimates, and it is possible that there could be some level of activity associated with existing and future leases in these three roadless areas. Two additional roadless areas – Battlement Mesa on the GMUG National Forest and Housetop Mountain on the White River National Forest – have high development potential based on geologic factors, high level of leasing, and proximity to development. However, No Surface Occupancy lease stipulations would prohibit future development in these CRAs.

Table 3-21. Acres leased and acres available for leasing under forest plans and oil and gas leasing availability decisions as of September 2009. Leased acres and acres available but not leased are distinguished as follows: Acres with terms allowing surface occupancy, including road construction or reconstruction in conjunction with a lease, and acres with terms prohibiting surface occupancy, including road construction or reconstruction in conjunction with a lease. IRAs in boldface are those considered most likely to have oil and gas development activity and associated roads in conjunction with existing leases and future leases issued under direction of forest plans and leasing availability decisions.

Forest	Roadless Areas [1]	Acres leased	Acres available (includes leased acres)	Leased acres and acres not leased but available, with terms allowing surface occupancy	Leased acres and acres not leased but available, with terms prohibiting surface occupancy
GMUG	Battlement Mesa [2]	8,800	36,000	500	35,500
	Clear Creek	22,700	42,800	37,500	5,300
	Drift Creek	4,100	9,300	8,700	600
	Hightower	1,900	4,600	4,000	500
	Priest Mountain [3]	4,000	43,200	32,700	10,500
	Raggeds [4]	2,100	13,300	12,300	1,100
	Salt Creek	1,000	11,000	1,400	9,700
	Springhouse Creek	17,600	17,500	17,600	0
Manti-La Sal	Roc Creek [5]	2,800	0	0	0
Pike-San Isabel	256Rare2 [5]	8,100	0	0	0
San Juan [6]	**HD Mountains**	13,500	0	0	0
	South San Juan	2,200	0	0	0
White River	**Baldy Mountain**	6,000	6,000	6,000	0
	East Divide/Four Mile	8,900	8,900	8,900	0
	East Willow	4,600	7,100	7,100	50
	Housetop Mountain [2]	8,300	12,700	0	12,700
	Mamm Peak	11,900	25,300	8,100	17,200
	Reno Mountain	9,700	12,400	12,400	100
	Thompson Creek	16,000	18,400	16,100	2,300
Total		154,200	268,500	173,100	95,400

Acres rounded to nearest 100 acres, totals may not add due to rounding.

[1] Roadless areas with fewer than 640 acres under lease are not included, as they are considered to have such a small percentage of the roadless area leased that there would be essentially no potential for development and associated roads in the roadless area.

[2] Roadless areas have low development potential due to No Surface Occupancy stipulations on leases.

[3] About 51,700 acres of Priest Mountain Roadless Area is designated not available for leasing.

[4] About 3,100 acres of Raggeds Roadless Area is designated not available for leasing.

[5] Roadless areas have low development potential due to less favorable positions in oil and gas basins, relatively small lease areas, distance from proven production, and/or unsuccessful attempts at establishing production in or near the roadless areas.

[6] San Juan National Forest currently is conducting analysis for oil and gas leasing availability, so for purposes of this report, no lands are shown as being available for leasing. Once the leasing decision is issued, there may be additional lands designated as available for lease in the HD Mountains and South San Juan roadless areas.

Table 3-22 shows 115 roadless areas that are available for leasing, but have no existing leases or less than 640 acres leased in an individual roadless area. These areas are considered to have some level of potential for oil and gas occurrence, but low to no development potential. No oil and gas development activity or road construction or reconstruction is projected in these roadless areas. However, because projections are uncertain estimates, it is possible that there

could be some level of oil and gas activity and roads associated with future leases. Unleased lands in roadless areas on the San Juan National Forest are not included in Table 3-22 because the forest is in the process of considering lands to make available for leasing. Once the leasing decision is issued, there may be additional lands in the HD Mountains and South San Juan roadless areas designated as available for lease.

Outside of the areas of the GMUG and White River National Forests in the Piceance Basin, very few roadless area lands are available for leasing with surface occupancy allowed, and only a small fraction of IRA lands have existing leases. All other roadless areas not listed in Tables 3-22 and 3-23, or shown as leased or available for leasing on the oil and gas map on the Colorado Roadless Rule website are considered to have little to no recognized potential for oil and gas occurrence and no potential for development.

Roadless areas that are available for leasing but do not have existing leases are assumed to have low to moderate potential for occurrence of oil and gas and low to no potential for development. The quantified extent of potential oil and gas production from these roadless areas has not been estimated for this analysis. Potential production from these roadless areas is assumed to be considerably less than that projected for the roadless areas identified as having high potential for oil and gas occurrence and development. All other roadless areas (not available or not analyzed for availability) are considered to have low to no potential for development.

Opportunities for exploration and development of oil and gas resources in roadless areas would be limited only by direction in forest plans and oil and gas leasing availability decisions. Forest plan direction and leasing availability decisions prohibit roads for oil and gas operations in a limited number of roadless areas in areas with potential for oil and gas resource occurrence. Any lands lease in a roadless area, after the effective date of the Colorado Roadless Rule, could prohibit road construction or reconstruction, based on forest plan direction, as described in future programmatic leasing analyses or a site-specific analysis prepared pursuant to NEPA.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

The effect under alternative 4 would be identical to alternative 2. Some existing leases occur on upper tier acres identified by the public. Upper tier designation would have no effect on road construction or reconstruction prohibitions as roads would be authorized under existing leases. New leases in both standard and upper tier areas would prohibit road construction or reconstruction, but would otherwise be available for development as described in future programmatic leasing analyses or a site-specific analysis prepared pursuant to NEPA.

Table 3-22. Roadless areas with lands available for leasing in areas with low potential for development as of September 2009. This table also describes the extent to which available lands have surface occupancy allowed or prohibited. "NSO" indicates No Surface Occupancy stipulations applied to leases. IRAs with high potential for oil and gas development and existing leases are listed in Table 3-19.

Forest [1]	Roadless area	Nature of Availability
Arapaho-Roosevelt	Gold Run	NSO
	Indian Peaks Adjacent Area	Small portion available, NSO
	James Peak	Small portion available, NSO
	Never Summer Adjacent Area	NSO
	Troublesome	Mostly NSO
GMUG	Johnson Creek	Portion available, ½ NSO, ½ surface occupancy allowed
	Roubideau	Portion available, NSO
	Tabeguache	Portion available, NSO
	Ute Creek	Small portion available, surface occupancy allowed
	West Elk	Portion available, surface occupancy allowed
Rio Grande	Alamosa River	Portion available, NSO
	Beaver Mountain	¾ NSO, ¾ surface occupancy allowed
	Bennet Mountain/Blowout/Willow	NSO
	Bristol Head	Small portion available, ½ NSO, ½ surface occupancy
	Butterfly	NSO
	Chama Basin	1/3 available, NSO
	Conejos River/Lake Fork	Mostly NSO
	Cotton Creek	NSO
	Crestone	NSO
	Cumbres	NSO
	Deep Creek/Boot Mountain	Most available, ½ NSO, ½ surface occupancy allowed
	Dorsey Creek	NSO
	Four Mile Creek	Very small portion available, NSO
	Fox Creek	Portion available, NSO
	Fox Mountain	NSO
	Gibbs Creek	NSO
	Kitty Creek	NSO
	La Garita Wilderness	Mostly NSO
	Lake Fork	Portion available, ½ NSO, ½ surface occupancy allowed
	Lower East Bellows	Mostly NSO
	Middle Alder	NSO
	Miller Creek	NSO
	Pole Creek	NSO
	Pole Mountain/Finger Mesa	Small portion available, NSO
	Sawlog	NSO
	Snowshoe Mountain	Very small portion available, NSO
	Spruce Hole/Sheep Creek	NSO
	Sulphur Tunnel	NSO
	Summit Peak/Elwood Pass	NSO
	Tewksberry	NSO
	Tobacco Lakes	Small portion available, NSO
	Trout Mountain/Elk Mountain	NSO
	Ute Pass	Small portion available, NSO
	Wightman Fork/Upper Burro	Small portion available, NSO

Forest [1]	Roadless area	Nature of Availability
	Willow Mountain	Portion available, NSO
Routt	Kettle Lakes	NSO
	Grizzly Helena	NSO
	Dome Peak	Small portion available, mostly NSO
	Elkhorn	Surface occupancy allowed
	Shield Mountain	NSO
	Nipple Peak North	Surface occupancy allowed
	Nipple Peak South	NSO
	Sugarloaf North	Surface occupancy allowed
	Sugarloaf South	Mostly NSO
	Black Mountain	Large areas of NSO
	Barber Basin	About 1/3 NSO
	Morrison Creek	Very small portion available
	Bushy Creek	Mostly available, small portion NSO
	Chatfield	About ½ NSO, ½ surface occupancy allowed
	Bunker Basin	NSO
	Pagoda Peak	NSO
White River	Adam Mountain	Surface occupancy allowed
	Assignation Ridge	Mostly NSO
	Basalt Mountain A	Surface occupancy allowed
	Basalt Mountain B	Surface occupancy allowed
	Berry Creek	Surface occupancy allowed
	Big Ridge to South Fork A	Mostly NSO
	Big Ridge to South Fork B	Surface occupancy allowed
	Boulder	Surface occupancy allowed
	Buffer Mountain	Surface occupancy allowed
	Burnt Mountain	Surface occupancy allowed
	Crystal River	Surface occupancy allowed
	Deep Creek	Portion available, part NSO, part surface use allowed
	Dome Peak	Surface occupancy allowed
	East Vail	Surface occupancy allowed
	Fawn Creek/Little Lost Park	Surface occupancy allowed
	Freeman Creek	Surface occupancy allowed
	Gallo Hill	Surface occupancy allowed
	Game Creek	Surface occupancy allowed
	Grizzly Creek	Surface occupancy allowed
	Hardscrabble	Surface occupancy allowed
	Hay Park	Surface occupancy allowed
	Hunter	Part available, surface use allowed
	Little Grand Mesa	Surface occupancy allowed
	Lower Piney	Surface occupancy allowed
	Maryland Creek	Surface occupancy allowed
	McClure Pass	Surface occupancy allowed
	Meadow Mountain A	Surface occupancy allowed
	Meadow Mountain B	Surface occupancy allowed
	Morapos A	NSO
	North Elk	Surface occupancy allowed
	North Woody	Surface occupancy allowed

Forest [1]	Roadless area	Nature of Availability
	Pagoda Peak	NSO
	Piney Lake	Surface occupancy allowed
	Porcupine Peak	Surface occupancy allowed
	Ptarmigan A	Surface occupancy allowed
	Ptarmigan Hill A	Surface occupancy allowed
	Red Dirt A	Surface occupancy allowed
	Red Dirt B	Surface occupancy allowed
	Red Mountain	Surface occupancy allowed
	Ryan Gulch	Surface occupancy allowed
	Salt Creek	Surface occupancy allowed
	Sloan Peak	Surface occupancy allowed
	Spraddle Creek B	Surface occupancy allowed
	Sweetwater A	Surface occupancy allowed
	Sweetwater B	Surface occupancy allowed
	Tenderfoot Mountain	Surface occupancy allowed
	West Brush Creek	Surface occupancy allowed
	West Lake Creek	Surface occupancy allowed
	Wildcat Mountain	Surface occupancy allowed
	Wildcat Mountain B	Surface occupancy allowed
	Wildcat Mountain C	Surface occupancy allowed
	Williams Fork	Surface occupancy allowed
	Willow	Surface occupancy allowed
	Woods Lake	Part available, surface occupancy allowed

[1] *Pike-San Isabel National Forest is not included because leasing availability data were not available. However, Pike-San Isabel has very few, if any, roadless areas with any kind of development potential. San Juan National Forest is not included because the oil and gas leasing availability decision-making process is underway.*

Leasable Minerals – Geothermal: Environmental Consequences

Currently there are no geothermal leases within an IRA or CRA and therefore there likely would be no development of geothermal resources under alternatives 1, 2 and 4. Future leasing of geothermal resources would be allowed but road construction would be prohibited and therefore limit the potential for any future development.

Alternative 3 would allow development of geothermal resources in roadless areas to the extent that forest plans would allow for such activities in roadless areas, including roads. Specific geothermal assessment information is insufficient to quantify or even qualify the extent and location of possible development.

Cumulative Effects

Saleable Minerals

Under all of the alternatives considered in detail there is minimal direct and indirect effects to saleable minerals and would not result in a significant cumulative effect.

Locatable Minerals

No direct or indirect effects to locatable minerals are anticipated from any of the alternatives and therefore would not result in a significant cumulative effect.

Leasable Minerals – Coal

Population growth would continue to drive demand for coal resources for use in electric power generation. Road prohibitions under alternative 1 would restrict access to known reserves of compliant and super-compliant coal, contributing to less overall availability of "clean" coal to meet demand. Under alternative 1, coal production from existing mines could dissipate in about 20 years, as remaining unleased reserves would be inaccessible for exploration and surface uses related to mining. Under alternatives 2 and 4, roads allowed for developing known coal reserves in the North Fork coal mining area would facilitate an estimated potential 365 million tons of recoverable coal reserves to be developed and contribute to supply needed to meet demand. However, road prohibitions in Colorado Roadless Areas outside the North Fork coal mining area would contribute to an undetermined quantity of coal not being explored or developed, contributing to a known resource base being unavailable to meet demand. Under alternative 3, access to leased coal reserves and other coal resources in roadless areas throughout the State would contribute to supply needed to meet demand. Alternative 4 would have the same effect as alternative 2 because no upper tier acres overlap with current or project coal leases.

When comparing the direct and indirect effects of other actions that overlap both geographically and temporally there would be no significant cumulative effect to coal resources from any of the alternatives analyzed in detail.

Leasable Minerals – Oil and Gas

Demand for natural gas is projected to increase 0.2 percent per year through 2030 (USDOE 2009). Domestic demand for oil is projected to remain steady through 2030. Production of natural gas and oil from NFS lands will contribute to supply needed to meet demand. The fossil energy resource most likely to contribute to supply from Colorado roadless areas is natural gas.

When comparing the direct and indirect effects of other actions that overlap both geographically and temporally there would be no significant cumulative effect to the development of oil and gas resources from any of the alternatives analyzed in detail.

Leasable Minerals – Geothermal

Depending on applicable forest plan direction, access to these resources under all alternatives could allow some development that would contribute to energy supply, however, with road construction prohibitions associated with alternatives 1, 2 and 4 development is highly unlikely. Any contribution to supply cannot be quantified due to minimal assessment of geothermal resources in Colorado and corresponding lack of data and any effects could not be analyzed in a meaning manner. Therefore none of the alternatives would result in a significant cumulative effect to geothermal resources.

SOIL, WATER & AIR RESOURCES

Introduction

The Physical Resource analysis evaluates the potential environmental consequences on soil, water and air. These resources have measurable characteristics that can be assessed in light of the prohibitions and exceptions for tree-cutting, sale or removal; road construction/reconstruction; discretionary mineral activities as well as natural processes. High-quality or undisturbed soil, water, and air are important roadless area characteristics; therefore the analysis evaluates the potential consequences on these three components.

Soil: Affected Environment

This analysis evaluates potential effects of the alternatives on the soil resource, focusing on key differences in foreseeable activities under each rulemaking alternative. Changes in soil conditions typically have interrelated effects on vegetative productivity and water quality; the analyses of effects on other resources are described in separate sections.

Soil is a fundamental component of the environment. Soil health has been defined as "capacity of a specific kind of soil to function within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water quality, and support human health and habitation" (Karlen et al. 1997).

Soil within the potentially affected roadless areas in Colorado is generally in a satisfactory condition. Roadless areas in Colorado have many different soil types because of the wide ranges in: geologic parent material, elevation, precipitation, topography, and geologic time during which soil formation has been taking place. Some soil types are relatively more prone to accelerated surface erosion, due primarily to inherent soil properties and terrain features such as slope. Erosion hazard on most of the soils in the analysis area can be characterized as low to moderate, with the moderate rating being dominant. High erosion hazards are associated with soils on slopes greater than 40 percent.

Soil: Environmental Consequences

All Alternatives

Tree-cutting, sale or removal; road construction/reconstruction; and use of linear construction zones can affect soil productivity by compacting soils, increasing erosion, displacing soils, releasing carbon dioxide, depleting nutrients, increasing overland flow in areas of high amounts of precipitation and soil disturbance, and reducing soil strength. Most of the changes in soil conditions would be limited to relatively small, localized areas. Construction of permanent roads or other long-term infrastructure such as communication sites or oil and gas drilling pads is considered a dedicated use.

During project-level analysis, areas sensitive to surface erosion are identified and appropriate mitigation measures are used to reduce surface erosion and sediment production. New road location or facility construction would be done to minimize placement on highly sensitive soil. Roads would typically not be located on steep slopes (over 40 percent) where landslides are more common. Resource protection measures, such as those in the Forest Service regional watershed conservation practices handbook and other best management practices including

post-project rehabilitation of disturbed soil, would be applied during any ground disturbing activities to minimize soil loss. Erosion is a naturally occurring event; the objective is to retain erosion rates following project implementation that approximate pre-existing background rates. Implementation of a well-prepared surface erosion and sediment control program in conjunction with tree-cutting, road construction, or linear construction zones can mitigate the potentially degrading impacts of surface erosion. Under all alternatives, roads decommissioned would have a beneficial effect on soil resources by restoring infiltration and vegetative cover, thus reducing soil erosion. In those areas that need ground cover, disturbed sites would be revegetated after the project is completed.

Other ongoing ground-disturbing activities in roadless areas are known to contribute to localized impacts on soil quality but are not measurably different under any of the alternatives. Examples include: prescribed fire and wildland fire, hard-rock mining, livestock grazing, and recreational use. Whether or not the permitted acres of ski areas remain within the roadless areas under an alternative, the extent of new ski area roads and facilities is projected to be minimal over the next 15 years.

The potential for adverse impacts on the soil resource in roadless areas would differ slightly among the alternatives based on acres disturbed by projected road construction or reconstruction, tree removal, linear construction zones, or other ground disturbing activities. Alternatives 1, 4, and 2 have restrictions on tree-cutting and road construction to facilitate tree-cutting for hazardous fuels treatments (in the order listed with alternative 1 being the most restrictive). Restrictions may result in a greater risk of high-severity wildfires and larger fires (see Fire/Fuels section). The higher severity and larger fire size would result in increased adverse post fire effects due to erosion and slower vegetation recovery as compared to other alternatives.

In general, impacts in any alternative would be limited in geographic extent and be distributed over many different roadless areas. Thus, the actual effects on soil quality would be minor and of short duration.

Alternative 1 – 2001 Roadless Rule

This alternative would have the least potential for accelerated rates of erosion or landslides in roadless areas caused by tree-cutting activities and road construction, or reconstruction due to the prohibitions on these activities. Very few permanent roads or major facilities would be expected to be built in the roadless areas with little to no permanent loss of the productive capacity of the land. The use of linear construction zones is not limited in this alternative. There is an increased risk of a high-severity wildfire event over the other three alternatives, which could increase soil erosion or landslides.

The limited miles of road construction, tree-cutting, sale or removal and linear construction zones in IRAs would be scattered among many different roadless areas. Only a fraction of these activities would occur on high erosion hazard soils and mitigation measures would be implemented to minimize soil erosion.

Maintaining restrictions on new road construction in the substantially altered areas would further help to maintain desirable soil conditions in the roadless areas, even though tree-cutting activities would continue to occur along existing roads in those areas. The 409,500 acres of unroaded areas outside IRAs would continue to incur the same soil effects that are currently occurring, and potential soil impacts may increase if roads are built in those areas in the future.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Alternative 2 would result in slightly higher risk then alternatives 1 or 4 but less than alternative 3, of affecting the soil resource but the soil resource would remain in a functioning condition, with no significant loss of long-term soil productivity.

Activities in this alternative are limited in geographic extent and would be distributed over many different roadless areas. Trees would be cut for the reduction of wildfire risk in the CPZ with limited temporary road construction. Coal mining would be limited to the North Fork coal mining area. The 15-year projection for coal mining and related temporary road construction is greater than alternative 1, less than 3 and the same as alternative 4. As this activity is completed, these areas would be reclaimed. The use of linear construction zones is limited to three exceptions under alternative 2. The upper tier acres would essentially have no new road construction and limited individual trees cut.

Not including the substantially altered areas in CRAs under alternative 2 is projected to result in some miles of new road construction in those areas over the next 15 years, which would not occur under alternative 1. The addition of 409,500 acres of unroaded areas into CRAs would reduce the potential for road-related impacts on soil quality in those areas. Impacts of road construction would be mitigated to a large extent. Nearly all the roads constructed in the CRAs would be decommissioned. Very few forest roads are projected to be constructed in the CRAs in the next 15 years that result in a permanent loss of soil productivity.

Alternative 3 – Forest Plans (No Action)

This alternative would result in a higher risk of adversely affecting soil resource in the analysis area compared to the other alternatives. This is because of the additional ground disturbing acreage in IRAs projected to be used for tree-cutting and removal activities, road construction, and oil, gas and coal development activities. There is an increased risk of localized and short-term soil impacts, including a higher risk of road-related soil erosion, because there would be more acres of soil disturbance in this alternative. The forest roads projected to be built in the IRAs would result in those acres being permanently converted to a non-vegetated state, with an associated loss in soil productivity on those acres. Soil quality impacts on the 409,500 acres of unroaded areas not included in IRAs under alternative 3 would be the same as described for alternative 1. Like alternative 1, there would be a higher potential for adverse soil quality impacts from future road construction or reconstruction and other development activities in these unroaded areas. However, overall the soil resource impacts would not substantially differ from the other alternatives, and long-term soil productivity in IRAs would be expected to be maintained at a satisfactory level.

Alternative 3 allows for tree-cutting and road construction to facilitate tree-cutting for hazardous fuels treatments, dependent on forest plan direction. The ability to treat areas without limitation as to the distance from the at-risk communities or purpose (i.e. watershed protection rather than municipal water supplies only) may result in reduced fire severity and adverse fire effects. The potential for post-fire accelerated erosion and other wildland fire-related impacts to soil quality in roadless areas is reduced under this alternative.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Alternative 4 would result in slightly higher risk then alternative 1 but less than alternatives 2 or 3, of affecting the soil resource. The soil resource would remain in a functioning condition,

with no significant loss of long-term soil productivity.

The environmental consequences of this alternative are similar to alternative 2. The difference between the two alternatives is the extent of the upper tier acres within CRAs. Because of over 2 million additional upper tier acres, less tree-cutting and road construction is projected than alternative 2. The potential for accelerated rates of erosion or landslides in roadless areas caused by tree-cutting activities and road construction, or reconstruction is less than alternative 2 but there is an increased risk of a high-severity wildfire event over alternative 2, which could increase post-fire soil erosion or landslides.

Water: Affected Environment

Water Quality

Colorado is a headwaters state. Four of the great rivers in the United States have their origins in the Rocky Mountains of Colorado: the Colorado, Platte, Arkansas, and Rio Grande. There are seven major river basins in Colorado: Arkansas, Rio Grande, San Juan, Colorado, Green, Platte, and Republican. Each major river basin contains many distinct watersheds, which are mapped by the U.S. Geological Survey and referenced with 8-digit hydrologic unit codes (maps available at www.water.usgs.gov). The 5th–level (hydrologic unit code) watersheds range from 40,000 to 250,000 acres in size and 6th-level sub-watersheds typically range from 5,000 to 40,000 acres.

Water quality is generally good in roadless areas due to their location, often located either in the headwaters of stream systems or immediately down slope of relatively undisturbed areas such as wilderness. Streams and lakes are better protected in large, relatively undeveloped areas where management activities are limited. Changes to water quality or quantity from activities that occur within a roadless area is most evident at the 6th-level sub-watershed scale and may not be evident at the 5th-level watershed scale or river basin scale because of the interaction of pollutants coming from other activities in the larger watershed.

The seven major river basins in Colorado contain approximately 252,300 acres of lakes, reservoirs, and ponds (waterbodies). Only 3,700 acres of these waterbodies are on NFS lands and a small percentage of those occur in the roadless areas. Colorado contains approximately 95,500 miles of rivers and streams (Table 3-23). Approximately 17% of the waterbody acreage in Colorado and approximately 13% of the river and stream miles are listed as impaired in the State's 305(b) report (Colorado Department of Public Health and Environment, Water Quality Control Division 2008a). An impaired listing means it does not meet state or federal water quality standards for one or more critical pollutants. Based on these low percentages, the water quality of waterbodies and streams in Colorado is considered to be very good.

Table 3-23 shows the distribution of stream miles within the seven major river basins, along with the stream miles listed as impaired in Colorado and in roadless areas (Colorado Department of Public Health and Environment, Water Quality Control Division 2008b). There is not a substantial difference in the number of impaired stream miles in IRAs or CRAs, so they are shown in the same column (as a range of miles where they differ slightly).

Table 3-23. Streams and impaired streams in Colorado, and impaired stream miles in roadless areas, by river basin

River basin	Total stream miles [1]	Impaired stream miles [1]	Impaired stream miles in CRAS-IRAs [2]
Arkansas	22,100	3,100	43
Rio Grande	10,100	300	0
San Juan	5,800	200	5 - 8
Colorado	19,300	4,100	23
Green	13,400	2,300	0
Platte	19,000	2,800	10
Republican	5,800	40	0
Total	95,500	12,840	83

Totals may not add due to rounding.
[1] State of Colorado 2008 305(b) report (Colorado Department of Public Health and Environment, Water Quality Control Division 2008a).
[2] State of Colorado 2006 303(d)-listed streams (Colorado Department of Public Health and Environment, Water Quality Control Division 2006) overlaid with GIS maps of IRAs and CRAs (Roadless Area GIS Database 2008) as modified by State of Colorado 2008 and 2010 303(d) lists (Colorado Department of Public Health and Environment Water Quality Control Division 2008b, 2010).

Table 3-24 displays the impaired streams in the roadless areas by national forest and the cause for the impairment. The major pollutants are selenium; other metals such as iron, zinc and copper; pathogens (fecal coliform and E. coli); and sediment. Pollutants causing impairments to aquatic life in lakes and reservoirs are unknown biologic stressors, mercury, selenium, pH, and dissolved oxygen saturation. Waterbody acres are not shown in the table because there are so few in the roadless areas.

Table 3-24. Streams in the analysis area and impaired streams by national forest, and the cause for impairment

National forest	Total stream miles [1]	Impaired stream miles in CRAs-IRAs	Cause of impairment [2]
Arapaho-Roosevelt	500	3	Metals
GMUG	1,500	10	Selenium
Manti-La Sal	10	0	---
Pike-San Isabel	800	43	Selenium, pathogens, metals
Rio Grande	700	0	
Routt	700	7	Iron
San Juan	700	8	Metals
White River	900	13	Selenium, sediment metals
TOTAL	5,810	83	

Totals may not add due to rounding
[1] Roadless Areas GIS database- streams layer and IRA/CRA layers, April 2008).
[2] State of Colorado 2006 303(d) listed streams (Colorado Department of Public Health and Environment Water Quality Control Division 2008a; Roadless Areas GIS Database, April 2008; Colorado Department of Public Health and Environment Water Quality Control Division 2008b).

The roadless areas on the Pike-San Isabel National Forests have the greatest number of impaired stream miles. These miles are primarily in the Pikes Peak East CRA (East Pikes Peak IRA) and Pikes Peak West CRA (West Pikes Peak IRA) roadless areas and are impaired by either selenium or pathogens. A major source of selenium in streams is from irrigation of high selenium soils downstream from National Forest System lands. Sources of pathogens can be

wildlife, livestock, and/or humans—from dispersed recreation, from storm water discharges in developed areas, or from poorly functioning sanitation facilities such as failing septic tanks. Historical mining activities are likely the primary source of metal causing impairment. Black Gore Creek in the East Vail CRA/IRA is impaired by sediment primarily from Interstate 70 road de-icing sand.

For waterbodies listed as impaired, Section 303(d) of the Clean Water Act requires the calculation of a Total Maximum Daily Load (TMDL), the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. For those State-listed impaired stream segments occurring in roadless areas, the table below details their TMDL status by river basin. Additional details are in the EIS record.

Table 3-25. Status of Total Maximum Daily Loads for Impaired Waterbodies in Roadless Areas

River Basin	Delisted in 2008	Completed TMDLs in 2008/2009	Draft TMDLs Completed in 2008/2009	Draft TMDL in works	Delisted in 2010	TMDLs with No Info
Arkansas	4	7	0	1	7	4
Rio Grande	0	4	0	0	4	0
San Juan	0	0	0	1	1	0
Colorado	0	7	2	6	7	2
Green	0	0	0	0	1	0
Platte	0	4	0	1	4	5
Republican	0	0	0	0	0	0
Total	4	22	2	9	24	11

Water Supply

Water is used for a variety of purposes including public water supply, agriculture, industrial uses (including mining), recreation, and support of aquatic life. Roadless areas are composed mostly of mountainous terrain that receives the highest amounts of precipitation in the State. Approximately 68% of the water yield in Colorado originates on NFS lands and much of this is from within the roadless and wilderness areas (Brown et al. 2005). More than 95% of the roadless areas in Colorado overlap one or more source water assessment areas, watersheds identified by the State around public surface and groundwater supply sources (Colorado Department of Public Health and Environment, Water Quality Control Division 2004 and 2008a). The Forest Service is required to manage public supply watersheds for multiple uses recognizing the domestic water supply needs, and to use only proven techniques in managing these watersheds (36 CFR 215.9 and Forest Service Manual 2542). Numerous reservoirs, diversions, ditches, tunnels, and other water conveyance facilities located in roadless areas are important for storing and delivering water supplies to downstream users. Water conveyance structures change the stream flow regime.

There are no sole source aquifers or drinking water sources in the IRAs or CRAs that are subject to §149 of the Safe Water Drinking Act. The Environmental Protection Agency (EPA) has the authority for this program and has not designated such sole source aquifers in Colorado.

Climate change also has occurred and is continuing to occur (USDA Global Change Program Office 2001). Climate change is expected to result in a gradual warming trend that would affect hydrologic systems within Colorado. There would continue to be less precipitation and more drought conditions anticipated in the future (Saunders et al. 2008). Climate change is expected

to result in decreased winter snowpacks, more winter precipitation as rain rather than snow, earlier snowmelt, and reduced summer low flows (Saunders et al. 2008). These climatic trends would be expected to increase the size and magnitude of wildland fire events, and the magnitude of insect-disease outbreaks, which would affect hydrologic functions, water yield, and water quality in roadless area watersheds.

Water: Environmental Consequences

Activities that result in soil compaction, erosion, loss of vegetation cover and excess water runoff can cause excess sediment and other pollutants to more easily enter waterbodies degrading water quality. The most common sources of potential water quality impacts in the analysis area that vary by alternative are: tree-cutting activities; road construction/reconstruction; linear construction zones; and oil-gas or coal operations. Other sources of potential water quality impacts do not vary measurably by alternative such as: off-highway vehicle use, livestock grazing, hard-rock mining, biking, and dispersed camping.

Potential impacts from management activities on NFS lands are mitigated (avoided, reduced, or minimized) by following best management practices (BMPs) designed to control nonpoint sources of pollutants and meet Clean Water Act standards for water quality (Forest Service Manual 2532). Water quality impacts are also mitigated through application of the Forest Service regional watershed conservation practices handbook (FSH 2509.25). This handbook is recognized in Colorado's nonpoint source management program as a technical reference and guidance document for planning and implementation of Colorado's BMPs (Colorado Department of Public Health and Environment, Water Quality Control Division 2005). Some activities authorized in roadless areas are subject to permit requirements outlined in sections 401, 402, and 404 of the Clean Water Act. Permits may be required for such actions as road construction, mining and oil and gas development.

Leasable and Locatable Minerals

Oil and gas development activities are subject to Colorado Oil and Gas Conservation Commission (COGCC) rules (2 CCR 404-1). Disposal of produced water from oil and gas development is regulated by the State to protect water quality. Other activities, such as hard-rock mining, are sometimes subject to State permits. All these permits and regulations mandate use of BMPs and monitoring to minimize discharge of pollutants to waterbodies.

Road construction

Research has found that road construction and road use on national forests can adversely affect watershed geomorphology, hydrologic processes, stream sedimentation, and chemical pollution (Gucinski et al. 2000; MacDonald and Stednick 2003). The longer a road feature remains in place, the greater is the potential for adverse effects to water quality resulting from that road. All things being equal, a well-designed and located temporary road that is decommissioned after use would have less long-term adverse effects on water quality than a permanent forest road that is continually open and requires periodic maintenance.

Water Yield and Flooding

Water yield can be affected by large-scale changes in vegetation cover within a watershed. At least 20 to 30 percent of the basal area in a watershed needs to stop transpiring to generate a measurable increase in water yield (MacDonald and Stednick 2003). The hydrologic recovery

following large-scale removals of vegetation to pre-disturbance water yield levels can take as long as 60 years (MacDonald and Stednick 2003).

The wide-spread mountain pine beetle epidemic that is killing pine species throughout Colorado is likely contributing to some temporary increases in water yield. The Rocky Mountain Regional Entomologist estimates that the majority of the lodgepole pine forests in Colorado will be killed by the beetles within the next five years (Cain 2008). The effect on water yield occurs when a tree dies whether or not it is removed from the site.

Large, high-severity, stand-replacing wildland fires are known to cause temporary increases in water yield and peak flows on NFS lands in Colorado. High-severity fires typically cause a loss of protective vegetative ground cover and may create a hydrophobic layer or "seal" over the soil surface, resulting in substantial runoff of rainfall water. The short-duration, high-intensity rainstorms that follow a fire can produce high peak flows and flash floods changing channel structures and adversely affect water quality due to high sediment loads. During these post-fire rainstorms, a large quantity of rainwater is carried rapidly down burned slopes, carrying ash, topsoil, and small woody material into stream drainages. The risk of post-fire floods during summer convective storms is greatest in the first two or three years following the fire (MacDonald and Stednick 2003).

Early season run-off events could be accentuated by impacts associated with climate change. Climate change understanding, at this point in time, does not allow for accurate, site-specific predictions for conditions such as flooding, and subsequent management responses. However, in general, warmer winters and changes in precipitation regimes may lead to increased flooding.

All Alternatives

Water yield in Colorado would not be measurably altered by activities in any alternative. No alternative projects tree-cutting to the magnitude or extent, (e.g. exceeding the 20% basal area threshold), to cause a measurable change in water yield. Many roadless areas would continue to be affected by continued pine tree mortality, together with potential for high-severity wildland fires, resulting in future short-duration, localized increases in water yield.

Where ground-disturbing activities occur, the potential for adverse impacts on water quality is increased from possible accelerated erosion and sedimentation entering nearby waterbodies. The extent and location of the ground disturbance with its duration on the ground are all factors in the potential impact of the disturbance on water quality. Most of the activities allowed in the alternatives would be scattered among many different roadless areas and watersheds, and limited to relatively small, localized areas. Many of the ground disturbing activities in the alternatives are of relatively short duration including linear construction zones or temporary roads.

All projects are subject to the NEPA process and site-specific analysis to determine appropriate mitigation measures. With the application of mitigation measures and BMPs to each project, the potential would be very low for exceeding water quality standards. Activities are unlikely to contribute to further impairment of streams currently listed on the State 303(d) list.

Project areas where vegetation is removed and soil is exposed are restored to natural vegetation cover after the project completion. Reduction of road density is one of the best watershed restoration treatments that can be used to improve watershed and stream health. Road

decommissioning treatments help disperse surface water runoff and eliminate the road as a source of stream sedimentation. Where slope re-contouring is used to decommission the road, subsurface water flow paths would be restored, further erasing the effect of the road. Projected decommissioning of existing roads in the analysis area is the same under all alternatives. Alternatives 2 and 4 require decommissioning of all new road construction when no longer needed for the established purpose; however, this is generally the case in all alternatives.

Oil and gas operations may generate large volumes of water throughout the life of the project. This produced water may or may not be of sufficient quality to be disposed of on the surface and may need to be re-injected into deep aquifers. Water produced by the project that is discharged into waterbodies is regulated by State discharge permits to ensure water quality standards are met. There is an increased potential for chemical contamination of surface and groundwater by hydrocarbons or other substances (fracking compounds) used in oil and gas production, although BMPs would be used to prevent chemical contamination from areas like drilling pits. Another potential source of chemical contamination is accidental spills, the risk increasing with the amount of oil and gas activity. Site-specific mitigation measures and regulatory requirements such as Clean Water Act permit requirements and COGCC rules would be used to adequately protect water quality during these activities.

A high-severity wildland fire can result in an elevated risk of water quality impacts on municipal water supplies. In the event water quality for a municipal water supply is threatened from the effects of a high severity wildland fire, the Burned Area Emergency Response (also known as BAER) program (Forest Service Manual 2523) would be used to identify post-fire threats, critical values at risk and the need for emergency stabilization measures. Emergency stabilization measures are implemented as needed to moderate the intensity or severity of effects, reducing the risk to municipal water supplies and other critical values at risk.

Alternative 1 – 2001 Roadless Rule

This alternative projects the least amount of tree-cutting or road construction over the next 15 years of the four alternatives. It has the least risk of potential adverse effects on water quality. Maintaining the substantially altered areas within IRAs with the general prohibition on new roads would further help to maintain desirable soil and water quality conditions in the IRAs. Tree-cutting would continue to occur along existing roads in those areas, but it would not be expected to result in adverse impacts on water quality. On the 409,500 acres of unroaded area outside IRAs, there could be an increase in potential impacts on water quality from future land use activities that otherwise would be prohibited in IRAs.

Alternative 1 poses a slightly increased risk of experiencing a high-severity wildland fire because of the low amount of fuel reduction projected to occur in IRAs. The risk of flash floods and increased sedimentation in streams is increased. Implementing the Burned Area Emergency Response program would reduce the risk to municipal water supplies and other critical values at risk.

This alternative does not limit the use of linear construction zones. New water conveyance structures could be constructed or maintained using a linear construction zone. However, the lack of a road construction exception for this purpose could limit some new water conveyance structures from being located in IRAs. New water developments could occur in the 409,500 acres not in IRAs that are guided by forest plan direction. It is likely this alternative would have the least risk for water quality effects from construction of new water conveyance structures

including reservoirs, or for changes in stream flow regimes due to new flow diversions or storage facilities of all the alternatives.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

This alternative projects an increased level of both tree-cutting and road construction over alternatives 1 and 4, but less than 3. There is a slightly greater risk of adverse impacts on water quality in CRAs. Removing the substantially altered acres and adding the acres of unroaded into the CRAs, slightly decreases the amount of roadless acres in this alternative from the IRA acres in alternatives 1 and 3. There would be a slight increase in the potential for water quality impacts on those lands where ground disturbing activities could occur.

Alternative 2 has increased projections for coal mining and associated new roads in the North Fork coal mining area and would increase the potential for adverse water quality impacts in those CRAs. There would be an increased risk of higher sediment, chemical contamination and accidental chemical spills in streams within the North Fork coal mining area. Mitigation measures and BMPs would reduce the likelihood of significant impacts from large sediment loads or accidental chemical spills. Remediation actions are applied if such accidents occur. The potential for significant adverse impacts from sediment and chemical inputs from increased coal activities would be expected to be negligible.

The risk of a high-intensity wildland fire in a roadless area resulting in water quality impacts on a municipal water supply would be decreased under alternative 2 relative to alternatives 1 or 4. More acreage would be treated to abate wildland fire hazards in CRAs to protect at-risk communities and municipal water supply sources. Implementing the Burned Area Emergency Response program would reduce the risk to municipal water supplies and other critical values at risk.

This alternative includes both a road construction exception (other than in the upper tier acres) and a linear construction zone exception for new water conveyance structures authorized pursuant to water rights granted by a pre-existing water court decree. All of the water conveyance structures that have a pre-existing water court decree within CRAs could be constructed but future structures within CRAs would be extremely limited because of the prohibition on road construction. Water quality effects, including changes in stream flow regimes, from the construction of new flow diversions, storage facilities (e.g. reservoirs) or water conveyance structures may be higher in this alternative than alternatives 1 or 4.

Alternative 3 – Forest Plans (No Action)

Alternative 3 projects the highest level of tree-cutting and road construction of the alternatives. There is a slightly greater risk of adverse impacts on water quality in CRAs. With effective mitigations, this alternative is not expected to cause water quality standards to be exceeded in the analysis area.

Alternative 3 has the greatest amount of projected oil, gas and coal operations and therefore has the greatest potential risk of adverse effects on water quality from those activities. Site-specific mitigation measures and regulatory requirements would be expected to adequately protect water quality during these activities. However, the risk of accidental chemical spills or increased sediment or chemical levels in streams would be the highest under this alternative.

Alternative 3 poses a decreased risk compared to the other three alternatives of experiencing a high-severity wildland fire because of the flexibility and level of fuel reduction projected to

occur in the analysis area. As in the other alternatives, in the event that water quality for a municipal water supply is threatened by the effects of a high severity wildland fire, the Burned Area Emergency Response program would be implemented.

Construction and maintenance of water conveyance structures would be guided by forest plan direction in alternative 3. In most of the analysis area, there is no restriction or limitation and the potential for new water conveyance structures is greatest in this alternative. The potential for risks to water quality or to changes in streamflow regime in the analysis area would be greatest in alternative 3.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

The environmental consequences of this alternative are similar to alternative 2. However, there are over 2 million more upper tier acres in this alternative. Because of this, tree-cutting and road construction projections are less than alternative 2; reducing the risk of adverse impacts on water quality in CRAs.

Coal mining development levels are the same as alternative 2. The risk of a high-intensity wildland fire in a roadless area resulting in water quality impacts on a municipal water supply is increased from alternative 2 because of the smaller amount of projected fuel reduction treatments. Fewer water conveyance structures would be located within CRAs due to the lack of a road construction exception in the upper tier acres. A linear construction zone could be used on the upper tier acres.

Air: Affected Environment

Air Quality

The Forest Service coordinates with the State of Colorado, the Environmental Protection Agency and other agencies to prevent air quality impacts on Forest Service administered lands, in accordance with Clean Air Act, the Wilderness Act, and the Organic Act. Of the airsheds that overlap portions of roadless areas in Colorado, no areas are currently designated as "non-attainment" for particulate matter (http://apcd.state.co.us; and http://www.epa.gov/oar/oaqps/greenbk/), which means they are in compliance with state and federal Clean Air Act standards for air quality and do not exceed thresholds for specific pollutants. All of the airsheds that overlap roadless areas in Colorado meet all air quality standards.

There are eleven Class I airsheds located within a 10-mile radius of roadless areas. Class I areas must be managed to meet more stringent air quality levels compared to other areas. They are typically large wilderness areas and National Parks. Many of the roadless areas lie adjacent to these Class I areas. All currently meet state and federal air quality standards.

The eleven Class I airsheds do have existing visibility impairment over background levels and do not meet the national visibility goal of having no anthropogenic (human) caused visibility impairment (http://www.cdphe.state.co.us/ap/regionalhaze.html). The national visibility goal in the Clean Air Act is to achieve visibility conditions in Class I areas that are unimpaired by anthropogenic sources of air pollution or in other words to achieve natural background visibility conditions. Generally, monitoring data has not shown a discernible trend, although given the energy development in the West it is anticipated that the visibility impairment may increase. The Forest Service cooperates with the State of Colorado, the Environmental

Protection Agency, and the National Park Service in monitoring potential impacts on air quality to prevent any future and remedy any existing visibility impairment.

A deciview is a measure of visibility impairment measured using a logarithmic scale similar to decibels for sound. In the regional haze rule definition of deciview, the Environmental Protection Agency states: "A deciview is a haze index derived from calculated light extinction, such that uniform changes in haziness correspond to uniform incremental changes in perception across the entire range of conditions, from pristine to highly impaired" (40 CFR §51.301).

Table 3-26 shows the annual average, cleanest 20%, and haziest 20% natural background conditions for Colorado Class I areas (measured in deciviews). Comparing those to the annual average, cleanest 20%, and haziest 20% monitored (baseline) visibility conditions for the period 2000 to 2004 shows that natural background visibility conditions in those Class I areas have not been met and that there is existing visibility impairment in those Class I areas.

Table 3-26. Class 1 Area Visibility (measured in deciviews (dv))

IMPROVE Site	Class I Area(s)	Annual Average Natural Conditions	Annual Average Baseline*	Clearest 20% Natural Conditions	Clearest 20% Baseline*	Haziest 20% Natural	Haziest 20% Baseline*
GRSA1	Great Sand -Dunes	3.47	8.27	1.24	4.5	6.66	12.78
MEVE1	Mesa Verde	3.33	8.13	1.06	4.32	6.83	13.03
MOZI1	Mount Zirkel Flat Tops	2.41	5.8	0.55	1.61	6.44	10.52
ROMO1	Rocky Mountain Rawah	3.29	7.79	0.53	2.29	7.24	13.83
WEMI1	Weminuche La Garita Black Canyon of Gunnison	3.23	6.49	1.02	3.11	6.24	10.33
WHRI1	Maroon Bells West Elk Eagles Nest	2.17	4.85	0.52	0.7	6.54	9.61

** From 2000-2004 monitoring data at IMPROVE sites (http://vista.cira.colostate.edu/improve/)*

Air: Environmental Consequences

All Alternatives

Air pollution sources from activities that could occur in roadless areas under the four alternatives include: fine particulate (dust) emissions from road construction and use of unsurfaced roads; volatile organic compounds and oxides of nitrogen from gasoline combustion; soot, volatile organic compounds, oxides of nitrogen, and sulfur dioxide from diesel engines; various pollutant emissions from oil and gas extraction operations; and particulates and noxious compounds from smoke generated from prescribed burning. Some of these are greenhouse gas emissions, most notably carbon dioxide, but also methane and nitrous oxide. The less these activities occur in the alternatives, the less the risk of air pollution.

There is some trade-off between the particulates and noxious compounds from smoke from prescribed burning and those generated from wildfires. If prescribed burning occurs, the Forest Service would continue to consult with the Colorado Department of Public Health and Environment through the permitting processes prior to conducting prescribed burns in order to ensure that any effects to air quality are within state and federal air quality standards. Wildfires, on the other hand, may exceed air quality standards.

Alternative 3 does allow for a higher level of oil and gas development than the other three alternatives, increasing the risk of air pollution. Forest projections, as detailed in the Analysis Framework and the Oil and Gas Resource Section, detail a slight increase under this alternative. Air analysis will occur when a development proposal is received by the Forest Service as part of the NEPA analysis.

Based on the projected land management activities under the alternatives, atmospheric emissions within roadless areas are not anticipated to directly, indirectly, or cumulatively increase to a level that would be likely to exceed state or federal air quality standards. This is because the amount and geographic extent of impacts from dust particulate, volatile organic compounds, and other emissions from projected activities in roadless areas would be relatively low, localized, and of short duration. They would not likely accumulate in the lower atmosphere in significant concentrations or linger for long periods of time. In addition, those infrequent or short-duration emissions would not likely create visibility impairment or public health hazards in high-sensitivity areas such as schools, hospitals, airports, or residential areas.

Differences in effects on air quality do not substantially differ among alternatives because there is little difference in the amount, scale, and type of activities that could create air pollution among alternatives. All alternatives are expected to have minimal impact to air quality.

Soil, Water & Air Resources: Cumulative Effects

Cumulative effects on soil, water and air resources within roadless areas considers the effects from past, ongoing and reasonably foreseeable future activities that could, when combined with effects described for each alternative, create impacts that are judged to be detrimental or beneficial. This includes the activities and effects listed in Appendix E. The primary activities that could affect these resources in roadless areas include the existing roads and road uses; tree-cutting; livestock grazing; fire and fuels treatment; oil, gas and coal development; and recreation activity. All alternatives project a minimal amount of annual tree-cutting and road construction that are limited to a relatively few areas. Uses adjacent to roadless areas can have an effect as well as natural events including wildland fires, floods, windstorms, and insect and disease outbreaks.

There is a wide body of knowledge about the effects of logging and forest roads on soil erosion. Those studies indicate that "... most erosion occurring on timber harvest areas was due to large mass wasting events found on a small fraction of the harvest sites (Rice and Lewis 1991). Researchers acknowledge that only a few of the logging or road construction sites accounted for most of the erosion, and avoiding or mitigating impacts on steep slopes and other erosive sites is key to reducing erosion on a cumulative basis. Studies find that repeated entry onto the same site for harvest can lead to detrimental loss of topsoil or excessive compaction and displacement. The Forest Service avoids activities on high erosion hazard soils, mitigates activities and generally does not re-enter forested stands for 20 years or more, thereby minimizing the potential for cumulative compaction or displacement. Considering the relatively

limited extent, magnitude, and duration of potential soil quality impacts under any of the alternatives with the project's mitigation measures, ground-disturbing activities are not likely to create any significant adverse impacts on the soil resource.

Water yield within roadless area watersheds is not anticipated to change as a result of any of the alternatives analyzed in this EIS; there would be no cumulative effect on water yield. Natural events including the large insect-disease outbreaks and wildland fires that cause tree mortality would continue to contribute to alterations in water yield in the affected watersheds. The potential for cumulative effects on water quality is based primarily on the amount of activity projected to occur. The direct and indirect effects on water quality from projected activities in roadless areas are unlikely to be detected beyond the sub-watershed scale because BMPs and other mitigation measures are used to mitigate effects. Downstream changes in water quality at the watershed scale would be more likely to result from activities downstream outside the roadless areas than from activities within the roadless areas. Alternative 1 would have the least potential for cumulative effects at the watershed scale, and alternative 3 would have the greatest potential, because of differences in the magnitude and extent of activities allowed in roadless areas under each alternative. The contributions from activities associated with the alternatives would not result in any significant cumulative effect when added to the water quality impacts from other past, ongoing, or foreseeable future activities in the same roadless area watersheds.

The anticipated continued increases in population growth and associated human developments in Colorado would affect soil, water, and air quality in the watersheds and airsheds that overlap roadless areas. The demand is increasing for greater amounts of high-quality water for municipal, agricultural, and other purposes. Coupled with the increased demand for water supplies is an increased demand for water storage and conveyance facilities. Roadless areas located high in watersheds are attractive for future new development or expansion of existing facilities to take advantage of low evaporation rates and gravity distribution. As the population growth increases, the demand for raw materials—including timber, minerals, oil, gas and coal—and for recreational and residential opportunities also goes up, increasing the potential for adverse effects on soil, water and air quality by creating land use changes and disturbances.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

Geological Resources: Introduction

Geologic processes such as landslides, earthquakes, or volcanic hazards, and naturally occurring hazards such as asbestos-bearing rock, affect peoples' lives. To manage these safety hazards, the Forest Service can control or restrict uses in these areas. To enhance public understanding and appreciation of geological special interest areas, the Forest Service may develop interpretive sites to highlight examples of unique or interesting geology.

Geological Resources: Affected Environment

Karst and cave resources most commonly occur on areas underlain by limestone or marble. Some of the values associated with karst and cave resources are their ability to store and transmit groundwater, their importance as subterranean wildlife habitats, their importance as cultural resource or paleontological sites, and their ability to provide interpretive sites or recreational opportunities for spelunkers or cavers. They can also present hazards, such as sinkholes, to resource use and development.

NFS lands are available for collecting rocks and minerals under its 36 CFR 228 mineral regulations, except on lands withdrawn to prohibit these activities.

Paleontological Resources: Introduction

On March 30, 2009, Congress passed the Omnibus Public Land Management Act of 2009. Title VI, subtitle D of this act is titled Paleontological Resources Preservation. It states that "The Secretary shall manage and protect paleontological resources on Federal land using scientific principles and expertise. The Secretary shall develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources …" Paleontological resources are recognized as important both for their scientific and natural resource values, and in terms of the active protection required in their management. Pre-existing policies regulate the collection and disposition of significant fossils until actual regulations are written for the management and protection of these resources. Vertebrate fossils are always considered significant whereas invertebrate or plant fossils generally are not unless they are of unusual rarity or quality. The Paleontological Resources Preservation Act (PRPA) allows the casual collection without a permit of common invertebrate and plant fossils for personal use and enjoyment. All other collection of fossils from NFS requires a permit.

Paleontological Resources: Affected Environment

The Forest Service uses a Potential Fossil Yield Classification (PFYC) system to assist the management of fossil resources. PFYC is a planning tool wherein geological units, usually at the rock formation or member level, are classified according to the probability of yielding paleontological resources that are of concern to land managers. There are five potential levels ranging from not likely to contain recognizable fossil remains (Class 1) to highly fossiliferous geologic units at low risk of degradation (Class 4) or at high risk of degradation (Class 5).

Forest Service data show highly fossiliferous Class 5 rock units in Colorado's roadless areas. (Class 4 units are not identified on a regional scale). While it is not possible to predict where significant fossils occur, the existence of Class 5 rock units within a given roadless area is an

indicator of the potential for significant fossils to occur.

Based on Forest Service PFYC data created in 2006, within the analysis area, Inventoried Roadless Areas (IRA) and Colorado Roadless Areas (CRA), contain an estimated 1,332,800 acres of Class 5 rock units. Thus, 32% of the approximately 4,135,000 total acres of Class 5 rock units on National Forest System land in Colorado occur within lands subject to this analysis. The IRA acres under alternative 1 and 3 contain approximately 29% of the approximately 4,135,000 total acres. The CRA acres in alternatives 2 and 4 also contain approximately 29% of the approximately 4,135,000 total acres but within a slightly different area than alternative 1.

Nearly two thirds of the affected PFYC Class 5 lands occur on just two of the Forests (GMUG with 433,240 acres and White River with 381, 315 acres). Most of the changes between the IRA acres of Class 5 rock units and the CRA acres of Class 5 rock units occur on three Forests, the GMUG loses 15,860 Class 5 acres that are within the IRAs but not within the CRAs but the San Juan and Pike San Isabel gain 15, 470 Class 5 acres within the CRAs that were not within the IRAs.

Geological and Paleontological Resources: Environmental Consequences

All Alternatives

Management of the geologic and paleontological resources described in the Affected Environment section of this document does not require road construction or tree-cutting to implement, and therefore, are not predicted to result in any new road construction or reconstruction in roadless areas under any alternative. Accordingly, effects under any of the alternatives are expected to be the same.

For geological hazards, the construction of roads most likely would have negative effects. Although we avoid unstable sites, roads can lead to more landslides than would occur naturally. Tree-cutting practices can also lead to more landslides if done improperly. Also, roads constructed across rock formations containing naturally occurring hazardous material, such as asbestos rock, would expose the public to this hazardous material.

For paleontological resources, road construction can have both positive and negative impacts. Roads constructed across highly fossiliferous rock units would have the potential to damage significant fossils. On the other hand, road construction could lead to the finding of significant fossil resources that otherwise would not have been discovered. Roads can also help facilitate the permitted collection and removal of fossil resources that can weigh hundreds of pounds, which are not easily removed by backpacking. In isolated areas, large vertebrate fossils eroding from the bedrock may go unfound, or if found, left to continued natural destruction through erosion as collection would be difficult without some form of vehicular access.

THREATENED, ENDANGERED, AND SENSITIVE PLANTS

Roadless areas generally contain natural landscapes that provide habitat for some of the rarest elements of the Colorado flora. This analysis evaluates the known or likely occurrences of threatened, endangered, candidate, and sensitive species and their overlap with roadless areas. This analysis also examines the potential environmental consequences of the prohibitions and exceptions described elsewhere in this document. Separate sections of the EIS cover threatened and endangered (T&E) and sensitive fish and wildlife, and their habitats.

Threatened, Endangered, and Sensitive Plants: Affected Environment

Taken as a whole, T&E and sensitive plants in Colorado occur in a wide variety of habitats, ranging from aspen forests or piñon-juniper woodlands to wetlands or alpine tundra. Within these broad habitat types, T&E and sensitive plants are typically restricted to small areas having specific combinations of soil type, moisture regime, elevation range, and plant communities, among other factors. Some species (called endemic) grow nowhere else in the world except Colorado, where they may be restricted to a single mountain range, or even a single peak. Other plant species are rare in Colorado because they are at the edge of their geographic range, or are disjunct from their main area of distribution.

Nothing specific about habitat conditions within roadless areas makes them more likely to harbor T&E and sensitive plants than places outside roadless areas. However, because roadless areas are generally less altered by human activities compared to more intensively managed lands, T&E and sensitive plants in roadless areas are less likely to have been adversely affected by management activities or recreational pursuits enabled by roads. These areas may also have lower threats from invasive non-native plants.

Climate change can be expected to alter the distribution of plants and other species (Hansen et al. 2001; Intergovernmental Panel on Climate Change 2007). Some species will be more vulnerable to the effects of climate change than others (Millar et al. 2007). Alpine plants may be among those in the most precarious situations because they already exist at high elevations with little higher terrain available for them to migrate to; some are already on the highest peaks in Colorado and are isolated from other potentially suitable habitat. Pollinators may be more capable of migrating but may leave some plant species behind and become unable to produce viable seeds. Some of these changes are unlikely to occur to a measurable extent over the next 15 years, but other changes have already been documented. For example, earlier snowmelt near Crested Butte, Colorado, has been found to result in earlier flowering of some subalpine plants (Inouye 2008). The earlier flowering dates subject these plants to frost, which results in significantly lower seed production. This reduced seed production can lead to in turn changes in plant community composition, which may alter habitat suitability for some plants and their pollinators. Additionally, changes in land use challenge the ability of plants to adapt to climate change (USDA Global Climate Change Office 2001).

Threatened, Endangered, and Proposed Species

This section discusses the plant species listed or proposed for listing under the Endangered Species Act (ESA) by the U.S. Fish and Wildlife Service. One plant species listed as threatened (U.S. Fish and Wildlife Service 1993) is known to occur within roadless areas: Penland's eutrema (*Eutrema penlandii*); see Table 3-27. No other plant species listed under the ESA are known or are

likely to occur in roadless areas in Colorado.

One plant species, which has been formally proposed for listing under the ESA (USDI Fish and Wildlife Service 2010), is known to occur in a roadless area: Debeque phacelia (*Phacelia scopulina* var. *submutica*); see Table 3-27. Proposed species are afforded some protection under the ESA. This is the only plant species proposed for listing under the ESA that is known or is likely to occur in roadless areas in Colorado.

Two other plants listed under the ESA were previously thought to occur in roadless areas: Uinta Basin hookless cactus (*Sclerocactus glaucus*, also known as Colorado hookless cactus), a threatened plant, and Kremling milkvetch (*Astragalus osterhoutii*), an endangered plant. Current information shows that neither of these plants occurs within roadless areas.

Table 3-27. Occurrence of threatened and endangered plant species within roadless areas (IRAs or CRAs)

Species – common name, scientific name (ESA Status)	Habitat description	Roadless areas with T&E species occurrence
Penland's eutrema *Eutrema penlandii* (threatened)	Rooted in mosses on stream banks and in wetlands that remain wet all season in the alpine at elevations of 12,300 to 13,100 feet	Hoosier Ridge CRA and Silverheels IRA/ Silverheels CRA
Debeque phacelia *Phacelia scopulina* var. *submutica* (proposed)	Sparsely vegetated, steep slopes; on expansive clays derived from the Atwell Gulch or Shire members of the Wasatch Formation at elevations of 4,700 to 6,200 feet.	Battlement Mesa IRA, not included in any CRA

Habitat for Penland's eutrema is treeless and narrowly restricted to the Mosquito Range, where the plant lives in alpine seeps on soils that remain wet year-round. For all of the alternatives, projections of foreseeable activities in roadless areas indicate that there is no likely potential for oil, gas, or coal development, new roads, linear construction zones or tree-cutting activities in the Penland's eutrema habitat found within roadless areas (IRAs or CRAs).

Debeque phacelia is a tiny annual plant with habitat restricted to a small area in Garfield and Mesa counties in Colorado. The plant occurs on sparsely vegetated, steep slopes on clays derived from the Wasatch Formation, which have a high shrink-swell potential, and often have large cracks on the surface when dry. For all of the alternatives, projections of foreseeable activities in roadless areas indicate that there is no likely potential for oil, gas, or coal development, new roads, linear construction zones, or tree-cutting activities in the Debeque phacelia habitat found within roadless areas (IRAs or CRAs).

Consultation with the U.S. Fish and Wildlife Service, in accordance with section seven of the ESA, has been initiated and will be ongoing during this proposed rulemaking action. As part of the section seven process, the estimated effects on federally listed plants from the preferred alternative will subsequently be documented in a biological assessment and submitted to the U.S. Fish and Wildlife Service for consultation, once a preferred alternative has been clearly identified (between the draft and final EIS).

Forest Service Sensitive Species

Forest Service sensitive species are those designated by a Regional Forester for which population viability is a concern (Forest Service Manual 2670.5). All roadless areas in Colorado are within the Forest Service's Rocky Mountain Region except the Roc Creek Roadless Area, which is in the Intermountain Region. No Intermountain Region sensitive plants are known or

are likely to occur within the Roc Creek Roadless Area (Franklin 2008; Hubbard 2008; Smith 2008), and no Rocky Mountain Region sensitive plants are known to be or are likely to be found in that area. Therefore, this analysis includes only those sensitive plant species listed in exhibit one of the Rocky Mountain Region's 2009 supplement to the Forest Service Manual 2672.11(4).

Forest Service sensitive species have special conservation status and protection requirements. Forest Service objectives for sensitive species include: (1) ensure that sensitive species do not become endangered or threatened by Forest Service actions; (2) maintain viable populations distributed throughout the species' geographic range on National Forest System (NFS) lands; (3) implement management objectives for populations and/or habitat; (4) develop and implement conservation strategies; and (5) coordinate management with state and federal agencies, tribes, and other cooperators (FSM 2670 and the Region 2 supplement to FSM 2670). The list of sensitive plant species includes consideration of plants that are "candidate" species for listing under the ESA.

Inventories of sensitive plant species on NFS lands in Colorado are incomplete, especially in roadless areas. Per the data that is available, there are 43 sensitive plant species known or are likely to occur in the roadless areas in Colorado (Table 3-28). This estimate was based on analysis of spatial GIS map data and species occurrence information, using data from the Colorado Natural Heritage Program and information from the national forests. Less than one third of the existing roadless areas and about one fourth of Colorado Roadless Areas are known or are likely to support sensitive plants. Sensitive plant species that are not known or are not likely to occur in any roadless areas were eliminated from further analysis in this EIS.

Table 3-28 provides a list of sensitive plant species within the roadless areas, grouped by general habitats. The assignment of species to general habitats was primarily based on descriptions for each plant contained in the *Colorado Rare Plant Field Guide* (Spackman et al. 1997) and conservation assessments produced by the Forest Service (available 2010 online at: http://www.fs.fed.us/r2/projects/scp/assessments). Because the general habitat categories used for these groups are not exclusive, it is important to note that some plants could be placed in more than one category. For example, plants that occur in alpine wetlands could be placed under either the alpine group or wetlands group. Some species may occur naturally in more than one type of habitat. Nevertheless, these general categories provide a broad overview of the range of habitats that support sensitive plants in roadless areas, and the relative distribution of species among these habitats. The wetlands and high-elevation alpine habitats in roadless areas contain the widest variety of sensitive plant species.

Table 3-28. List and distribution of sensitive species by habitat groups within roadless areas

Habitat group	Scientific name	Common name
Alpine or subalpine	*Aliciella sedifolia**	stonecrop gilia
	Armeria maritima ssp. sibirica	Siberian sea thrift
	Braya glabella ssp. glabella	smooth northern-rockcress
	*Draba exunguiculata**	clawless draba
	*Draba grayana**	Gray's draba
	*Draba smithii**	Smith's draba
	Festuca hallii	plains rough fescue
	*Oreoxis humilis**	Rocky Mountain alpineparsley
	Parnassia kotzebuei	Kotzebue's grass of Parnassus
	Ranunculus karelinii	ice cold buttercup
Wetlands, seeps, or wet areas	*Aquilegia chrysantha var. rydbergii*	Rydberg's golden columbine
	Carex diandra	lesser panicled sedge
	Carex livida	livid sedge
	Drosera anglica	English sundew
	Drosera rotundifolia	roundleaf sundew
	Eriophorum altaicum var. neogaeum	whitebristle cottongrass
	Eriophorum chamissonis	Chamisso's cottongrass
	Eriophorum gracile	slender cottongrass
	*Mimulus gemmiparus**	Rocky Mountain monkeyflower
	Primula egaliksensis	Greenland primrose
	*Ptilagrostis porteri**	Porter's false needlegrass
	Rubus arcticus ssp. acaulis	dwarf raspberry
	Salix candida	sageleaf willow
	Salix serissima	autumn willow
	Sphagnum angustifolium	sphagnum
	Utricularia minor	lesser bladderwort
Meadows or open areas	*Botrychium lineare*	narrowleaf grapefern
	*Botrychium tax. nov. "furcatum"**	fork-leaved moonwort
	Ipomopsis aggregata ssp. weberi	scarlet gilia
Aspen or conifer forests	*Astragalus ripleyi*	Ripley's milkvetch
	Cypripedium parviflorum	lesser yellow lady's slipper
	*Penstemon degeneri**	Degener's beardtongue
	*Potentilla rupincola**	rock cinquefoil
	Viola selkirkii	Selkirk's violet
Piñon-juniper or shrublands	*Astragalus proximus*	Aztec milkvetch
	Astragalus wetherillii	Wetherill's milkvetch
	*Penstemon harringtonii**	Harrington's beardtongue
Shale/clay barrens or other sparsely vegetated areas	*Astragalus missouriensis var. humistratus**	Missouri milkvetch
	*Cirsium perplexans**	Rocky Mountain thistle
	Lesquerella pruinosa	Pagosa Springs bladderpod
	Machaeranthera coloradoensis	Colorado tansyaster
	*Neoparrya lithophila**	Bill's neoparrya
	*Thalictrum heliophilum**	Cathedral Bluff meadow-rue

** Endemic plants, occurring only in Colorado.*

Fifteen of the sensitive plant species that are known or are likely to occur in roadless areas (IRAs or CRAs) are considered endemic because they occur only in Colorado[28]. Endemic species may be at higher risk of extinction due to their small number of populations and very limited geographic range.

Populations of one sensitive plant species occur in portions of IRAs (in alternatives 1 and 3) that are not included in CRAs (in alternatives 2 and 4):

- plains rough fescue (*Festuca hallii*)

Three sensitive plant species occur in portions of CRAs (in alternatives 2 and 4) that are not included in IRAs (in alternatives 1 and 3). The first is endemic to Colorado:

- Rocky Mountain monkeyflower (*Mimulus gemmiparus*)
- Rydberg's golden columbine (*Aquilegia chrysantha* var. *rydbergii*)
- Greenland primrose (*Primula egaliksensis*)

Forest Service Manual direction requires that potential adverse impacts to sensitive species be avoided or minimized to a point that they do not result in a loss of viability or create significant trends toward federal listing (FSM 2070.32, item #4). Management actions, such as road construction or tree-cutting, typically include mitigation measures that adjust locations of these activities to avoid populations of sensitive plants. However, agency manual direction does provide discretion to the line officer making the project-level decision to allow adverse impacts to sensitive species, provided that the decision does not result in loss of species viability or create significant trends toward federal listing of the species under the ESA.

In addition to policies that require actions to avoid or minimize harm to sensitive plants, projects may also be designed to have beneficial effects for sensitive plant populations. For example, projects implemented in roadless areas for forest health, fuel reduction, or other purposes could be designed to correct poor road alignment or existing soil erosion impacts on sensitive plants, or to reduce the risk of a high-severity wildfire that might eliminate a sensitive plant population and its seed bank. Thus, some management actions in roadless areas could benefit sensitive plants over the long term, even if there are short-term adverse impacts.

Of the 43 sensitive plant species known or likely to occur in roadless areas, five sensitive plant species grow in forest habitats (the aspen/conifer habitat group listed in Table 3-28) that might benefit from tree-cutting to reduce the risk of severe stand-replacing wildfires. It is possible that other sensitive plants may also benefit from reduced risk of severe wildfires, because wildfires could spread into or otherwise adversely affect other habitat groups as well. However, depending on where and how equipment is brought on-site for fuel reduction projects, there also could be increased risk of adverse impacts on sensitive plant species (for example, temporary road construction or skidder operations across shrublands or open areas near forest habitats). Similarly, road construction for oil and gas exploration or development could increase the risk to sensitive plants.

[28] *Aliciella sedifolia, Astragalus missouriensis var. humistratus, Botrychium tax. nov. "furcatum", Cirsium perplexans, Draba exunguiculata, Draba grayana, Draba smithii, Mimulus gemmiparus, Neoparrya lithophila, Oreoxis humilis, Penstemon degeneri, Penstemon harringtonii, Potentilla rupincola, Ptilagrostis porteri, Thalictrum heliophilum.*

Threatened, Endangered, and Sensitive Plants: Environmental Consequences

All Alternatives

As mentioned in the Affected Environment section, there would be no adverse impacts to threatened, endangered, or sensitive plants in IRAs or CRAs from road construction or reconstruction, tree-cutting and removal activities, linear construction zones, or oil, gas or coal development activities because none of these activities is projected to occur in any roadless areas where federally listed or proposed plants occur under any of the alternatives. For all of the alternatives, there are no projected activities that would occur in the IRAs/CRAs where Penland's eutrema and Debeque phacelia are found. Potential direct impacts on T&E or sensitive plants from future projects not foreseen in this analysis would be minimized by avoiding such plant populations through site-specific project analysis and design.

Under all of the alternatives, there is some risk of indirect impacts on federally listed or proposed plants from the spread of invasive non-native plants. The spread of invasive non-native plants could increase as a result of road construction or reconstruction, tree-cutting and removal activities, linear construction zones, or oil, gas and coal development activities. Some invasive plants can spread from more distant activity areas (inside or outside of roadless areas) into habitat for threatened, endangered, or sensitive plants.

The potential risk of direct adverse impacts on sensitive plants under each alternative depends on whether those activities may occur within the specific areas where sensitive plant species occur. Such activities are assumed not to pose a risk in IRAs or CRAs where sensitive plants are not known or likely to occur. For each alternative, the potential risk of adverse effects on sensitive plants is tied to the differences in the likelihood of projected road construction, tree-cutting, linear construction zones, and oil, gas or coal development. These activities would pose some risk of injuring or killing sensitive plants, as well as indirectly rendering the habitat unsuitable or promoting invasion by non-native plants. It is also assumed that there would be some risk of adverse impacts on sensitive plants related to inadvertent mistakes made during project implementation, the potential spreading of invasive plants, or other unintended consequences from management activities projected to occur over the next 15 years.

The spread of invasive plants may be an indirect effect of projected activities, which could adversely impact sensitive plants. The abundance and distribution of invasive, non-native plants would likely increase over time as a result of road construction, tree-cutting activities, linear construction zones, or oil, gas and coal development. This is because increased ground disturbance is known to enable expansion of existing infestations and because new populations could become established from seeds or root fragments carried by vehicles and heavy equipment operating on or off roads. Sensitive plants would be more likely than T&E or proposed plants to be affected by the spread of invasive non-native plants because there are more habitats in roadless areas for sensitive plants than for T&E or proposed plants. Some of the potential indirect impacts from invasive plants would be mitigated by implementation of the Forest Service's weed management and prevention programs (see Invasive Species section). However, over time, weeds could spread from activity areas into sensitive plant habitat, even if the activities are conducted at some distance from these habitats.

Authorized activities are designed and conducted to avoid habitat containing sensitive plant species when practical, or to at least avoid a loss of population viability over the species'

geographic range (as described in the Affected Environment section). Nevertheless, under any alternative, there would be some level of risk of accidental damage to sensitive plants or their habitats during project implementation, or of indirect impacts from increases in invasive plant populations.

There would be low potential for beneficial effects on sensitive plants from by allowing management activities in roadless areas associated with improving ecosystem conditions. The projected activities under any of the four alternatives would not likely be of sufficient magnitude to measurably reduce soil erosion or the risk of severe wildfires within sensitive plant habitat.

Alternative 1 – 2001 Roadless Rule

Threatened and Endangered Species

Under this alternative, no projected activities occur in any IRA where federally listed or proposed plants occur. As discussed in the Environmental Consequences section for all alternatives, there is some risk of indirect impacts on federally listed or proposed plants from the spread of invasive non-native plants. The risk under alternative 1 is the lowest of the four alternatives because of the tighter restrictions on new road construction and other activities in the IRAs compared to the standard tier of 2 and 4. Continued management under alternative 1 could benefit T&E or proposed plants because it restricts or limits new road construction and other management activities within IRAs.

Sensitive Species

Various types of activities are projected to be likely under provisions of the 2001 Rule in approximately 25% of the 101 IRAs where sensitive plants are known or are likely to occur (see Appendix D regarding projections). Under alternative 1, sensitive plants in the balance of the analysis area (outside of IRAs) would be managed under existing forest plans. This would include 19 locations in the newly identified roadless acres that are not within IRAs, some of which have projected activities.

The overall risk of adverse impacts on sensitive plants from management activities in roadless areas would be lower under alternative 1 compared to the other alternatives because of the lower number of management activities projected to occur in the IRAs that are known or are likely to support sensitive plants. Because of the lower projections of activities, alternative 1 would result in less risk of adverse effects to sensitive plants from invasive plants than would be expected under alternatives 2, 3, or 4.

Overall, alternative 1 may adversely affect individual sensitive plants but it is not likely to result in a loss of viability for sensitive plant species on any national forest in Colorado, nor cause a trend toward federal listing for the sensitive plant species analyzed in this document. The programmatic biological evaluation in the EIS record will contain additional details about the potential effects on sensitive species, in accordance with policy requirements in FSM 2670.32.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Threatened and Endangered Species

Under this alternative, no projected activities would occur in any CRA where federally listed or proposed plants are found. As discussed in the Environmental Consequences section for all alternatives, there is some risk of indirect impacts on federally listed plants from the spread of

invasive non-native plants. The risk is higher under alternative 2 than alternatives 1 and 4 but lower than alternative 3 because of the amount of projected activities. Continued management under alternative 2 could benefit threatened or proposed plants more than alternative 3 because it restricts or limits new road construction, linear construction zones, and other management activities within CRAs, in general as well as on the upper tier acres.

Sensitive Species

The risk to sensitive plants would be higher under alternative 2 than alternative 1. Under this alternative, more of the roadless areas that contain sensitive plants are projected to have activities in them. Sensitive plants in the balance of the analysis area (outside of CRAs) would be managed under existing forest plans. This would include 15 areas that would no longer be managed as IRAs, more than half of which are projected to have activities like tree-cutting and/or road construction over the next 15 years. Therefore, the risk of adverse impacts on sensitive plants would be higher under alternative 2 than under alternative 1.

Indirect adverse impacts on sensitive plants from the expected spread of invasive non-native plants would be similar to the impacts described for alternative 1. However, there would be a higher potential for such impacts under alternative 2 due to the greater number of projected activities over the next 15 years in the CRAs where sensitive plants are known or likely to occur.

Compared to alternative 1, the projected hazardous fuels treatments in CRAs under alternative 2 would have a better chance of reducing the potential for high severity wildfires to eliminate a sensitive plant population and its seed bank. However, only about five of the 43 sensitive plant species in roadless areas are found in forests or similar habitats that would benefit from projected activities intended to reduce the risk of severe wildfires. The great majority of sensitive plant species in roadless areas would not benefit from projected activities intended to reduce fire hazards.

Overall, alternative 2 may adversely affect individual sensitive plants but is not likely to result in a loss of viability for sensitive plant species on any national forest in Colorado or cause a trend toward federal listing for the sensitive plant species analyzed in this document. The programmatic biological evaluation in the EIS record will contain additional details about the potential effects to sensitive species, in accordance with policy requirements in FSM 2670.32.

Alternative 3 – Forest Plans (No Action)

Threatened and Endangered Species

Under alternative 3, no projected activities would occur in any IRA where federally listed or proposed plants are found. As discussed in the Environmental Consequences section for all alternatives, there is some risk of indirect impacts on federally listed plants from the spread of invasive non-native plants. This risk is the highest of the four alternatives because the management under the forest plans is generally not as restrictive as the other three alternatives.

Sensitive Species

The effects on sensitive plants under alternative 3 would be essentially the same as those described for alternative 2. This is because under alternative 3, one third of the analysis area (IRAs and the balance of CRA acreage likely to support sensitive plants) is projected to include road construction, tree-cutting, linear construction zones, or oil, gas, or coal development activities under forest plans over the next 15 years. The estimated percentage of the analysis

area supporting sensitive plants likely to experience the same types of projected activities under alternative 3 is virtually the same as alternative 2, with the indirect effects similar to those under alternative 2. The difference between alternatives 2 and 3 is probably not meaningful in terms of risk to rare plants. The risk is higher than under alternative 1.

The potential for beneficial effects to sensitive plants would be the same as described for alternative 2 and would affect only a small percentage of the habitats where sensitive plants are known or likely to occur in roadless areas. Most sensitive plants in IRAs do not occur in habitats where tree-cutting would reduce wildfire hazard.

Overall, alternative 3 may adversely affect individual sensitive plants but is not likely to result in a loss of viability for sensitive plant species on any national forest in Colorado or cause a trend toward federal listing for the sensitive plant species analyzed in this document. The programmatic biological evaluation in the EIS record will contain additional details about the potential effects on sensitive species, in accordance with policy requirements in FSM 2670.32.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Threatened and Endangered Species

No projected activities occur in any CRA where federally listed or proposed plants occur under this alternative. As discussed in the Environmental Consequences section for all alternatives, there is some risk of indirect impacts on federally listed plants from the spread of invasive non-native plants. The risk is higher than alternative 1 but lower than alternatives 2 or 3 because of the projected activities. Continued management under alternative 4 could benefit threatened or proposed plants because it restricts or limits new road construction, linear construction zones, and other management activities within CRAs in general as well as on the upper tier acres.

Sensitive Species

The risk to sensitive plants would be lower under alternative 4 than alternatives 2 or 3 but greater than alternative 1. Due to the greater number of upper tier acres under this alternative than alternative 2, there are fewer projected activities. Sensitive plants in the balance of the analysis area (outside of CRAs) would be managed under existing forest plans. This would include 15 areas which would no longer be managed as IRAs, more than half of which are projected to have activities like tree-cutting and/or road construction over the next 15 years.

Indirect adverse impacts on sensitive plants from the expected spread of invasive non-native plants would be similar to the impacts described for alternative 1. However, there would be a higher potential for such impacts under alternative 4 due to the greater number of projected activities over the next 15 years in the CRAs where sensitive plants are known or likely to occur.

Compared to alternative 1, the projected hazardous fuels treatments in CRAs under alternative 4 would have a better chance of reducing the potential for wildfires to eliminate a sensitive plant population and its seed bank. However, only about five of the 43 sensitive plant species in roadless areas occur in forests or similar habitats that would benefit from projected activities intended to reduce the risk of severe wildfires. The great majority of sensitive plant species in roadless areas would not benefit from projected activities intended to reduce fire hazards.

Overall, alternative 4 may adversely affect individual sensitive plants but is not likely to result in a loss of viability for sensitive plant species on any national forest in Colorado or cause a trend toward federal listing for the sensitive plant species analyzed in this document. The

programmatic biological evaluation in the EIS record will contain additional details about the potential effects to sensitive species, in accordance with policy requirements in FSM 2670.32.

Environmental Consequences Summary

Table 3-29 displays the overall relative risks to T&E and sensitive plants associated with each of the alternatives, which reflects the previous narrative discussions. Although linear construction zones are limited in alternatives 2 and 4, their projected use is similar in all alternatives except for an increased use in alternative 3.

Table 3-29. Relative risk to rare plants under each alternative due to projected activities and associated threats from weed invasion or fragmentation

Activity or threat	Relative risk to T&E plants	Relative risk to sensitive plants
Coal development	None anticipated	None anticipated
Oil and gas development *per se*	None anticipated	None anticipated
Road construction	None anticipated	Alt 1 < Alt 4 <Alt 2 = Alt 3
Linear construction zones	None anticipated	Alt 1 = Alt 2 = Alt 4< Alt 3
Tree-cutting	None anticipated	Alt 1 < Alt 4 <Alt 2 = Alt 3
Invasive species	Alt 1 < Alt 4 <Alt 2 = Alt 3	Alt 1 < Alt 4 <Alt 2 = Alt 3
Fragmentation*	None anticipated	Alt 1 < Alt 4 <Alt 2 = Alt 3

Abbreviations and symbols: Alt means "alternative"; < means "less than"; = means "essentially equal".
** See discussion of fragmentation under Cumulative Effects.*

Threatened, Endangered and Sensitive Plants: Cumulative Effects

There are a number of past, present and reasonably foreseeable programs, activities, or events in roadless areas and on lands of all ownerships immediately surrounding them that are likely to affect T&E and sensitive plants. These primarily include tree-cutting, livestock grazing, road work, oil, gas, or coal development, climate change, and land conversion (for example, home construction on private lands outside roadless areas). These actions may adversely affect T&E and sensitive plants, their habitats, or their pollinators, and may contribute to habitat fragmentation for the plants or their pollinators. Some of these actions may also provide beneficial effects, such as mimicking natural disturbance regimes to which such plants are adapted, or controlling erosion. These activities and other activities considered for this cumulative effects analysis are described more fully in the cumulative effects in Appendix E.

Fragmentation of T&E or sensitive plant species' habitat can result from the combined effects of a wide array of ongoing, future, or past management actions in and around roadless areas. Habitat fragmentation has been cited frequently as a concern for wildlife, and its impact on plants can vary widely depending on the species' breeding system, capacity for migration, and other factors (Lienert 2004). Although some plant species are able to persist in very small populations over long periods of time, there is also evidence for the disruption of plant–pollinator relationships in fragmented landscapes (Harris and Johnson 2004). The causes may include a lack of nesting sites for insect pollinators or reduced pollinator visits to small plant populations, which can lead to lower seed production, with subsequently reduced seedling recruitment and eventually smaller plant populations or local extirpation of populations. Habitat fragmentation can also affect plant populations through a loss of genetic diversity

within populations (USDA Forest Service and University of California 2006).

The Rocky Mountain Region of the Forest Service generally updates its sensitive species list every two years to account for new information. During an update, species are considered for sensitive status based on factors ranging from geographic distribution and abundance, to population trend and life history characteristics. There are currently more than 100 plant species for which insufficient information has been available to determine whether or not designation as sensitive species by the regional forester is merited. Information will likely be collected and evaluated in order to resolve the status of these species over the next 15 years. It is reasonable to assume that some will warrant sensitive status, while others will not. Those designated sensitive during the next 15 years that are known or likely to occur within roadless areas would likely be addressed during project-level analysis.

The effects of all these past, present, and reasonably foreseeable activities, plus climate change, would likely combine with the effects previously described for each of the roadless rulemaking alternatives to raise the risk to T&E or sensitive plants. These adverse cumulative effects cannot be quantitatively described in this programmatic evaluation. However, many human activities occurring in and adjacent to roadless areas would be likely to further (cumulatively) increase the risk of invasive plant spread or inadvertent impacts on T&E or sensitive plants in roadless areas. For example, continuing population growth and land development adjacent to roadless areas, plus recreation activities within roadless areas, taken together with increases in climatic extremes and warming trends, pose an increased risk of additive adverse impacts to T&E or sensitive plants in roadless areas. Based on the discussion of direct and indirect effects, the risk of adverse cumulative effects would be somewhat lower under alternative 1 because the total amount of ground-disturbing activity would be less under that alternative than under the other alternatives.

AQUATIC SPECIES AND HABITAT

This analysis evaluates potential effects of the alternatives on aquatic (water-based) habitat and species. The aquatic species evaluated in this analysis include fish, aquatic macroinvertebrates (such as crayfish and insect larvae), and aquatic mammals (such as the American beaver)..

This analysis is organized to emphasize threatened and endangered species, Forest Service sensitive species, and management indicator species (MIS), and their associated habitats. This approach covers the full range of habitats potentially affected by differences among the alternatives analyzed in this EIS. The analysis focuses on the most significant differences in the potential for environmental consequences (effects) among the four roadless area management alternatives.

Aquatic Species and Habitat: Affected Environment

The fishery resources and associated aquatic habitat in Colorado are a result of evolution, migration, climatic changes, and influences from non-native settlers. The Continental Divide forms a "barrier" between fish migrations from the western United States and the Mississippi drainage to the east. Periodic changes in climate and topography have resulted in isolation, movement and subsequent evolution of the current native fish found in the State. There are a wide range of aquatic habitats and species in the roadless areas in Colorado, which range from approximately 3,000 to 14,000 feet in elevation. Relatively few fish species are able to survive the varying and often harsh conditions associated with the mountain streams in the higher elevations of the roadless areas in Colorado. This is due to reductions in temperature, stream size, nutrient input and the "growing season" in streams at higher elevations. Historically, native fish populations were greatest in the mid to large size streams in lower elevations in Colorado, with headwater streams containing relatively fewer fish populations.

The results of historic logging practices in the Colorado Rockies have negatively influenced current aquatic habitat conditions (Allan 1995). However, past commercial timber harvesting in the roadless areas has been limited because of the lack of road access. Management activities have occurred more frequently and extensively in the lower elevations of the roadless areas in Colorado. Historic management activities in the larger rivers and lower elevation streams in Colorado included stocking of non-native fish species, mining, road construction, and other activities. De-watering of streams has resulted in a loss of habitat and native fish species, and it is unlikely that they can be restored to their pre-settlement condition (Behnke 2002). As a result of the numerous human activities along these larger, lower elevation streams, these areas are typically not considered for restoration efforts (USDI Fish and Wildlife Service 1998).

Historically, aquatic habitat quality was inversely proportional to elevation in the Colorado Rockies; however, the influence of human settlements and land uses has changed this relationship (Wohl 2001). The largest impacts on aquatic habitats have been occurring where streams are adjacent to human population centers, roads, and other human activities.

Recreational and land management activities are generally concentrated at the lower to mid elevation portions of roadless areas that are more accessible (Winters et al. 2004). Therefore, while historically the highest quality aquatic habitats in Colorado would have occurred at the lower elevations, aquatic habitat has been degraded from proximity to human population centers, roads, and other activities that occur more frequently in the lower elevations. Higher

elevations in Colorado provide the highest quality aquatic habitats for protection and restoration of native aquatic species and their habitat.

Native fish species populations have declined from their historic levels on all national forests in Colorado, even those further from large population centers in part due to water developments, such as dams, and road crossings restricting movements (Winters and Staley 2008).

Non-native fish species such as rainbow, brook, and brown trout have affected native trout populations in Colorado (Behnke 2002). Colder water temperatures limit the expansion of those non-native trout species into upper elevation streams in the roadless areas in Colorado (Vincent and Miller 1969), which is one reason why higher elevation roadless areas are often selected for native species reintroduction projects. These high-elevation streams may also serve as refugia if stream temperatures rise with climate change. Restrictions on road construction and tree-cutting may reduce fragmentation and sedimentation on high-elevation streams, conserving suitable habitat for native cold-water species under moderate climate change scenarios.

Managing for native fish species must be balanced with the high recreational and economic value of non-native fish species. While fishing pressures have greatly contributed to the reduced range of native trout, roadless areas generally do not contain roads open to public vehicular use. Therefore, there is a reduced risk of over-fishing in roadless areas.

This analysis examines the activities that are identified as part of the Roadless Rule alternatives for Colorado and their associated risks. Road construction, linear construction zones and tree-cutting activities are prohibited with few exceptions in three of the four alternatives.

Threatened, Endangered and Sensitive Species

Threatened, endangered (T&E) and proposed species are evaluated in accordance with requirements set forth under Section 7 of the Endangered Species Act (ESA), in the Code of Federal Regulations (50 CFR 402), and in Forest Service Manual 2670.31-2672.42. The ESA "candidate" species are discussed as Forest Service sensitive species later in this section; they are automatically included on the regional list of sensitive species.

Based on ESA requirements, the Forest Service initiated informal consultation with the U.S. Fish and Wildlife Service on this proposed rulemaking action, and continued consultation throughout the development of rulemaking.

The greenback cutthroat trout is federally listed as a threatened species that occurs in roadless areas. The yellow fin trout was historically found in the Arkansas River basin on the Pike-San Isabel National Forest, is presumed extinct, and will not be analyzed further in this analysis. There are no fish species identified as proposed under ESA, and there is no designated critical habitat for T&E fish in Colorado.

Forest Service sensitive species are species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or in habitat capability that would reduce a species' existing distribution (Forest Service Manual 2670.5). The Forest Service policy for sensitive species is to conserve sensitive species so that they do not become T&E species and their habitats remain well distributed throughout their geographic range on NFS lands (Forest Service Manual 2670.22). The list of sensitive species includes federal candidate species.

Table 3-30 lists the threatened and sensitive species that are likely to occur in roadless areas by national forest.

Table 3-30. Threatened, endangered or sensitive fish species that occur or are likely to occur in roadless areas in Colorado

Common name	Scientific name	Major river drainage(s)	National forest occupied	Status (TES)
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	Arkansas and South Platte	Arapaho-Roosevelt, Pike-San Isabel	Threatened
Rio Grande cutthroat trout	*Oncorhynchus clarki virginalis*	Rio Grande	Rio Grande	Sensitive (+candidate)
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*	Colorado	Grand Mesa, Uncompahgre, Gunnison, Manti-La Sal, Routt, San Juan, White River	Sensitive (+candidate)
Flannelmouth sucker	*Catostomus latippinis*	Colorado	Grand Mesa, Uncompahgre, Gunnison, San Juan, White River	Sensitive (+candidate)
Bluehead sucker	*Catostomus discobolus*	Colorado	Grand Mesa, Uncompahgre, Gunnison,, San Juan, White River	Sensitive
Mountain sucker	*Catostomus platyrhynchus*	Colorado	Grand Mesa, Uncompahgre, Gunnison,, Routt, San Juan, White River	Sensitive

The three native trout species listed in Table 3-30 (one threatened and two sensitive) represent some of the very few fish that are historically found in high elevation portions of Colorado. These native cutthroat trout currently inhabit only a small fraction of their historic range. In the past, most mountainous streams in Colorado that were not impeded by natural barriers and elevated stream temperatures harbored populations of native cutthroat (Behnke 2002). Through a variety of human influences, including stocking of non-native trout and habitat fragmentation and reduction, these trout populations are now primarily limited to areas such as wilderness, roadless, national parks, and other relatively remote areas of the State. More recently, human activities have introduced invasive species, such as the whirling disease parasite, other diseases, and possibly mollusks, such as the New Zealand mud snail, which threaten the sustainability of native fisheries. In the less altered, higher elevation stream systems in roadless areas, the whirling disease parasite does not appear to be well established.

Populations of all three native suckers that are listed as sensitive species appear to be declining. Bluehead and flannelmouth suckers generally tend to inhabit larger stream and river habitats, while mountain suckers are found sporadically throughout the western slope of Colorado in small streams. All three of these suckers are apparently being out-competed and hybridized by more common western white suckers (*Catostomus commersoni*) and longnose suckers (*Catostomus catostomus*) that have been introduced west of the Continental Divide. While scientists are only beginning to understand the exact mechanism for this replacement, it appears that competition, hybridization, habitat fragmentation and stocking have contributed to this problem. Although these fish have minimal recreational or human food value, they contribute to biodiversity and play an important ecological role in these aquatic ecosystems of Colorado.

Other T&E Fish

In addition to T&E and sensitive fish species that may be directly influenced by the activities that vary by alternative in the roadless areas, there are four endangered fish species that occur downstream of NFS lands in the Colorado River and some of its larger tributaries that could be indirectly affected by those same activities in the roadless areas shown in Table 3-31. These residents of relatively large river systems have become increasingly rare, mostly due to

dramatic changes in hydrology, water quality, and habitat conditions (Sublette et al. 1990). Water quantity changes on NFS lands in Colorado and other states have been closely monitored by the U.S. Fish and Wildlife Service to ensure any future development would not negatively affect these fish. Although these fish do not occur in rivers in Colorado, they could be affected by the combination of different activities that are likely to occur in the roadless areas that may affect their habitat conditions. In addition to the T&E species shown in Table 3-31, there are sensitive species and MIS of fish that also occur in some of the rivers downstream from the roadless areas.

Table 3-31. Federally listed fish found downstream of the roadless areas in Colorado that could be influenced by upstream activities on NFS land

Common name	Scientific name	Federal status
Razorback sucker	*Xyrauchen texanus*	Endangered
Bonytail chub	*Gila elegans*	Endangered
Colorado pike minnow	*Ptychocheillus lucius*	Endangered
Humpback chub	*Gila cypha*	Endangered

Special Aquatic Habitats

There are aquatic habitats in many of the roadless areas in Colorado that have been identified as being ecologically important as well as "rare." In particular, fens (peat-forming wetlands) are considered irreplaceable, because they have taken thousands of years to form, and contain many unique forms of flora and fauna (Winters et al. 2004). Fens act as carbon sinks, are typically produced at the toes of slopes, and are often associated with high elevation glaciated valleys. Other wetlands are also important habitats for many species and have been reduced in Colorado by as much as 50 percent of their historic extent through numerous management activities (Dahl 1990). In some areas in Colorado, conversion of riparian forest and shrub dominated ecosystems to unvegetated and grass dominated habitat has resulted in a loss of important habitat for a variety of plants and animals (Dahl et al. 1991).

Management Indicator Species

MIS are species used as indicators of the effects of management activities on specific habitat types or features and are identified in forest plans developed under the 1982 National Forest Management Act Planning Rule. Forest plans for the national forests in Colorado identify six MIS species of fish (trout), one mammal (American beaver), and an array of benthic (bottom-dwelling) macroinvertebrates (such as insects, mollusks, or crayfish); see Table 3-32. While native species would be ideal to use as MIS, aquatic biologists are faced with several problems when attempting to use native species. These issues include the fact that most native species were eliminated from most of their original range; have very general ecological requirements; do not respond directly to management activities (e.g. western white suckers); are limited in their distribution; or are not well understood and may be considered a "nuisance" in some situations (e.g. American beaver). For these reasons, non-native trout are often chosen as MIS in Colorado and meet the National Forest Management Act 1982 regulations. In addition to being well distributed and often well studied, non-native trout species represent an economic benefit to Colorado as an important game species.

American beaver was previously discussed as an MIS in the Terrestrial Species and Habitat section due to the fact that it lives on both land and in water. It is a species that plays an

important ecological role and has a major influence on aquatic ecosystems and the species of plants and animals within them (Wohl 2001). Historically, beaver dams played an even more important role in reducing the effects of flooding and increasing the extent and quality of aquatic habitats. Today, as roads encroach on numerous stream systems, beavers are often perceived as a "nuisance" as the water backed up from their dams spreads across floodplains and roads.

Table 3-32. Aquatic management indicator species for national forests in Colorado

Forest	Common name	Scientific name
Arapaho-Roosevelt	brook trout	*Salvelinus fontinalis*
	brown trout	*Salmo trutta*
	greenback cutthroat trout	*Oncorhynchus clarki stomias*
	Colorado river cutthroat trout	*Oncorhynchus clarki pleuriticus*
GMUG	all trout	(multiple species)
Manti-La Sal	benthic macroinvertebrates	(multiple species)
Pike-San Isabel	brook trout	*Salvelinus fontinalis*
	greenback cutthroat trout	*Oncorhynchus clarki stomias*
Rio Grande	Rio Grande cutthroat trout	*Oncorhynchus clarki virginalis*
	brook trout	*Salvelinus fontinalis*
	brown trout	*Salmo trutta*
	rainbow trout	*Oncorhynchus gairdneri*
Routt	common trout	(multiple species)
	American beaver	*Castor canadensis*
San Juan	cutthroat trout	(multiple species)
	brook trout	*Salvelinus fontinalis*
	brown trout	*Salmo trutta*
	rainbow trout	*Oncorhynchus gairdneri*
	American beaver	*Castor canadensis*
White River	all trout	(multiple species)
	American beaver	*Castor canadensis*
	benthic macroinvertebrates	(multiple species)

Population declines in MIS would be expected if there are limitations on the ability for populations to interact due to habitat fragmentation from roads and other activities. The MIS or sensitive species population viability would not be significantly affected on any of the national forests, assuming that appropriate mitigation and best management practices would be applied at the project level.

Inventoried Roadless Areas and Colorado Roadless Areas

Table 3-33 shows the total perennial stream miles on each national forest unit in Colorado, along with the change in those stream miles that would be under roadless area protections in CRAs compared to IRAs. There is a net decrease of 57,600 acres in CRAs from IRAs.

Table 3-33. Change in stream miles in roadless areas between the IRA and CRA boundaries, for each national forest unit in Colorado

National forest	Total stream miles in IRAs	Total stream miles in CRAs	Net difference
Arapaho-Roosevelt	493	470	-23
GMUG	1,473	1,106	-367
Manti-La Sal	13	12	-1
Pike-San Isabel	767	804	+37
Rio Grande	650	610	-40
Routt	733	725	-8
San Juan	716	722	+6
White River	910	901	-9
Total	5,756	5,350	-406

Source: Roadless Areas GIS database, May 2008

There are a high percentage of IRAs on some of the national forests containing T&E and sensitive species. This is particularly true for the Arapaho-Roosevelt; GMUG; Routt; San Juan; and White River National Forests. A relatively high percentage indicates these areas function as "strongholds" for native populations and/or are native trout reintroduction areas. There is a relatively low percentage of IRAs on the Pike-San Isabel and Rio Grande National Forests containing T&E and sensitive species. On the Pike-San Isabel this is mostly due to nearby large population centers and other land use activities that limit the ability to reestablish native greenback populations despite recovery efforts. On the Rio Grande this may be due to relatively less effort put into recovery of Rio Grande cutthroat trout compared to other native trout species.

For this programmatic level of analysis, an assumption was made that if a T&E or sensitive fish species occupies a stream within a roadless area, the activity projected as likely to occur in that roadless area would occur within that watershed where the fish population occurs. The number of perennial stream miles on each national forest was used to evaluate the change in habitat between alternatives and for analyzing potential risk to the MIS. The risk of potential impact on aquatic resources is presumed to increase in roadless areas that contain T&E or sensitive fisheries and have a likelihood of additional roads and other management activities. Appendix D of this EIS, entitled Road Construction and Tree-cutting Projections, displays the relative likelihood of new roads and tree-cutting activities in each roadless area by alternative.

Aquatic Species and Habitat: Environmental Consequences

All Alternatives

This general effects discussion provides the background for understanding the environmental consequences that are subsequently described in more detail for each alternative. It is intended to minimize the need to reiterate effects of activities associated with the roadless area management alternatives by providing a general discussion of potential effects of road construction and reconstruction, tree-cutting and removal activities on aquatic species and their habitats. The potential effects for the use of linear construction zones are short-term. They are used only for the time it takes to install a linear facility and then the disturbed area is reclaimed as prescribed in the authorization. The activities differ by alternative and would potentially affect aquatic species or habitat.

The effects of livestock grazing, recreational activities, prescribed burning, fire suppression, road maintenance, ski area operations, mining hardrock minerals, existing oil and gas leases and other authorized activities expected to continue to occur in roadless areas that do not significantly differ by alternative are not analyzed, except as part of the cumulative effects analysis at the end of this section. While large ski resorts are known to alter natural hydrological cycles and increase traffic congestion and land use activities that can impair water quality and aquatic species, the projected activities in roadless areas related to ski area development are not anticipated to vary by alternative within the analysis period, despite the differences in IRA and CRA boundaries in relation to those ski areas. Therefore, the effects of ski area developments on aquatic habitat and species in roadless areas do not warrant detailed discussion in this EIS.

The alternatives allow for development of oil and gas production on areas leased prior to the date of the rule. There is very little difference in projected oil and gas activities which include, pipelines, well heads, pumping stations, power generating stations, electrical transmission lines, fluid storage facilities, and roads, all of which can have effects on aquatic habitat and species. Alternative 3 projects only a slight increase in development and based on projections could result in an increase in potential effects to aquatic habitat and species from oil and gas development scenarios.

In all alternatives, there is a relatively small amount of ground-disturbing activity likely to occur in or close to aquatic habitat in roadless areas, and best management practices and other mitigation measures would be applied where needed to minimize impacts on aquatic habitat. As human populations continue to grow adjacent to roadless areas, there would be increasing demand for management activities on NFS lands, such as conducting wildland fire hazard reduction treatments.

Effects of Road Construction, Reconstruction and Use

The broad view of the ecological effects of roads reveals a multiplicity of effects; it also suggests that it is unlikely that the consequences of roads will ever be completely mitigated or remediated (Trombulak and Frissell 2000). Roads can degrade native aquatic (including riparian and wetland) ecosystems by altering natural drainage patterns, promoting ground-disturbing processes (e.g., mass wasting), and providing conduits for invasive, non-native organisms and pathogens. Roads have facilitated the consumptive (fishing) use of native species. The degree to which a road will negatively affect aquatic habitat is strongly associated with the specific road design, placement, construction practices, uses, and other factors. Roads can have a big influence on riparian areas and wetlands even where roads are located a distance away. While the localized effect of an individual road-stream crossing may not have a substantial adverse effect, the cumulative effect of road networks and multiple crossings increases the potential for major adverse effects to aquatic habitats (USDA Forest Service 2000b). In addition, there will always be unwanted illegal, user-created roads that must be removed.

Road-related impacts on water quality and aquatic habitat include the following (Elliot 2000, Elliot and Hall 1997, Elliot et al. 1996, Furniss et al. 1991, Morrison et al. 1995a, Waters 1995, USDA Forest Service 2000b):

- Sedimentation and organic material in aquatic systems from road surfaces or cut/fill slopes can lead to increases in turbidity and water temperature, and decreases in dissolved oxygen concentrations, which can lead to decreased fish spawning success

and alterations in the health of macroinvertebrate communities.

- Chemical contaminants entering aquatic systems from vehicle oils, grease, fuel, and antifreeze can alter water chemistry parameters such as conductivity, acidity, and alkalinity, and can negatively affect riparian and wetland plant and animal species (direct mortality or decreased fitness).
- Contaminants associated with road dust abatement treatments and de-icing of paved roads (including salts and sand) can enter adjacent aquatic and wetland ecosystems.
- Road construction and use can remove, displace, or destroy riparian and wetland vegetation ; and vehicles can crush aquatic organisms and associated plant communities.
- Road construction and use can compact riparian soils and change characteristics of riparian vegetation.
- Roads can disrupt and reroute surface and subsurface water flows, which can alter the composition and abundance of riparian and wetland plant communities.
- Road drainage features such as culverts can fragment aquatic habitats by creating barriers to all or some species life history stages.
- Road construction and use can reduce rates of primary production by algae, phytoplankton, and riparian and wetland plants.
- Road sediment input can result in a reduction or loss of preferred fish spawning substrate size classes by increasing the percentage of fine grained materials on the streambed and covering the gravels.
- Stream channel form and function can be adversely modified by roads, particularly at stream crossings. Roads adjacent to or crossing streams can affect stream channels in many ways, including altering channel geometry and profiles; altering substrate armoring at stream crossings; changing substrate size distribution at culverts and low-water fords; altering substrate embeddedness and bed aggradation from sediment input; and decreasing average pool depth and abundance.
- Roads can facilitate the spread of pathogens and diseases such as whirling disease and bacterial kidney disease in aquatic systems.
- Roads can contribute to reducing the distribution and abundance of aquatic plants and organisms due to increased fishing and collecting activities.

Another important effect from road construction and use, as well as other land management activities that differ by alternative, is the resulting increase in invasive and/or non-native plant and animal species in riparian and aquatic systems. Invasive species often cause declines in native species abundance and diversity. This includes invasive or non-native aquatic organisms (e.g. fish, amphibians, crustaceans, mollusks, and insects), which are known to be a pervasive impediment to maintaining intact natural aquatic ecosystems (Rahel 2000). Invasive plant species can aggressively out-compete native species and are known to alter stream flow and water temperature regimes; reduce vegetative groundcover; alter bank stability and increase sediment inputs; alter nutrient and organic matter inputs; and overall, alter macroinvertebrate and fish habitat and populations (Sheley and Petroff 1999). Invasive animal species are known to cause dilution of native gene pools and depletion of populations by hybridization, predation,

and competition; reduction of native populations by non-native pathogens; reduction in reproductive success in native species (e.g. crayfish consuming eggs); and disruption of food chains and alterations in nutrient cycling (e.g. change in the relative abundance of zooplankton versus phytoplankton).

Roads authorized by the Forest Service can be designed, constructed and managed to reduce or eliminate some of the negative impacts on aquatic, riparian, and wetland ecosystems listed above. Forest Service road engineering standards include requirements for reducing impacts on soil and water quality. Additional mitigation, proactive management (e.g. riparian planting) and best management practices would protect aquatic habitat and species from the direct effects of new roads.

A beneficial effect of the presence of roads in roadless areas is that they provide easier access to remote locations so that natural resource managers can collect data and implement aquatic habitat restoration projects. Roads can be closed to motorized use by the general public to prevent access for recreation uses that bring in non-native pathogens, reduce populations by fishing and introduce toxins.

Effects of Tree-Cutting and Removal Activities

The amount of tree-cutting and removal activities projected to occur in roadless areas varies by alternative and can influence aquatic habitat and species. Many trout species spawn and rear in forested watersheds, often utilizing small streams with linkages to adjacent forests (Chamberlin et al. 1991). Where these habitats are occupied by threatened and endangered trout, such as species of inland cutthroat trout, land use activities like tree harvests can have implications for their persistence. Tree-cutting with wood product removals in the roadless areas can cause a hierarchy of effects to aquatic habitat and species (modified from Chamberlin et al. 1991), such as biophysical changes in the water, energy, nutrients and sediment; structural changes in soil, vegetation, stream networks, and channel morphology; habitat changes in water depth and velocity, water quality, streambed composition, riparian vegetation, and amount of woody material in streams; and aquatic biota changes in food web integrity, abundance, and composition of producers and consumers.

Tree-cutting with removal (harvesting) activities typically involve site preparation, skid trails, landings, and temporary roads, which alter the vegetation and soil where those activities occur. Inappropriate harvest practices have been known to result in a number of negative consequences to aquatic species and habitat (Davies and Nelson 1994, Garman and Moring 1994, Hartman et al. 1996, Holtby 1988, Kedzierski and Smock 2001, Scrivner and Brownlee 1989), often due to the modification of upslope or streamside vegetation. Silviculture practices with the greatest potential for causing erosion and stream sedimentation are road construction, tractor skidding, and site preparation. These activities can contribute to surface, gully, and large mass soil movements. Negative effects from tree-cutting tend to increase when activities occur on environmentally sensitive terrain with steep slopes composed of highly erodible soils (Lee et al. 1997). Generally, as the number of acres of harvest and ground disturbance increase, soil erosion rates increase (Stednick 2000), as does the potential for other impacts.

Tree-cutting and removal activities vary widely in magnitude and intensity, and therefore in resulting consequences. Projected tree-cutting activities for fuel reduction purposes anticipated to occur in roadless areas would involve thinning and/or removing groups of dead and dying trees that are a result of insect or disease infestations and contribute to wildland fire severity.

Cutting larger acreages can affect water yield, water temperature and nutrient loading (Windell et al. 1986).

Most potential effects could be minimized or avoided by avoiding major ground-disturbing activities in or connected to water bodies, riparian areas, and wetlands. These and other Best Management Practices would mitigate potential effects to aquatic habitat and species from erosion and other water quality effects.

Tree-cutting, with or without wood product removals, when adjacent to streams, can have other effects on aquatic systems, because the activity (Chamberlin et al. 1991):

- Alters hydrologic functions; reduces the amount of precipitation captured and evaporated from the forest canopy; alters snow accumulations and the rate at which snow melts, which adds to the amount of surface runoff; alters the overall timing or magnitude of water runoff events; and can lead to channel scour and fish embryo mortality.
- Increases erosion and sediment in streams, causing reduced oxygen levels in spawning gravels, and increases the number and extent of riffles.
- Changes stream channel structure and sediment storage capacity by loss of root strength in the channel banks, removing sources of large woody debris, and altering the frequency of channel-modifying flows and sediment supply. A decrease of woody material in the stream can lead to reduced cover, loss of habitat complexity, and loss of large, deep pools critical to fish (McIntosh et al. 1994).
- Increases stream temperature by removing shade along streams; this in turn can increase the abundance of non-native warm-water species, increase susceptibility to disease, increase food production, and delay egg development for some aquatic biota.
- Reduces macroinvertebrate and fish diversity, such as through increases in stream sediment, turbidity, or temperatures (Bisson et al. 1992; Hartman et al. 1996); increases physiological stress or reduces favorable conditions for native cool-water fisheries (Barton et al. 1985).
- Changes the physical and ecological structures and functions of nearby wetlands, the effects of which can persist for decades (Batzer et al. 2000).
- Removes streamside vegetation, resulting in changes to water quality in terms of temperature, suspended sediment, and nutrients.
- Changes wetland and riparian structure and function; areas between wetlands and uplands are particularly sensitive to hydrologic changes associated with harvesting (Dube et al. 1995); harvest activities can also reduce the abundance of amphibians and other wetland fauna (Perison et al. 1997).

As was discussed with the road-related effects, tree-cutting and removal activities would similarly increase the prevalence of invasive aquatic plant and animal species, which in turn would result in declines in native species abundance and diversity.

Tree-cutting and removal activities projected to occur in roadless areas could have beneficial effects, particularly if treatments reduce the magnitude and size of severe wildland fire events in those areas. Proper planning could reduce the potential of wildfire while not having impacts

on aquatic, riparian and wetland ecosystems.

The amount of prescribed fire in roadless areas is not anticipated to substantially vary by alternative, and prescribed fire would not likely substantially affect aquatic habitat due to mitigation measures that would be applied to minimize adverse effects.

With the emphasis on use of best management practices and other protective measures in the design and implementation of tree-cutting activities, the effects can often be mitigated to some extent. Proactive management (e.g. riparian planting) and best management practices would protect aquatic habitat and species from the direct effects of tree-cutting activities. Cumulatively, however, tree-cutting activities within a watershed can have pronounced and lasting effects on aquatic habitat (Chamberlin et al. 1991).

Extent and Duration of Effects

For aquatic habitats, the effects of disturbances associated with road construction and tree-cutting could extend well beyond those areas directly affected, given the influence that upslope areas and upstream reaches have on the condition of downstream habitat (Chamberlin et al. 1991). Generally the disturbance associated with linear construction zones would not extend beyond the area directly affected due to the short-term nature of their use.

The duration of effects, or recovery time, depends on a variety of factors. Site productivity, rainfall, and length of growing season influence the rate and success of vegetation regrowth. Some of the other factors influencing the duration of physical effects on a watershed and associated stream channels include: the type, location, extent, and duration of an activity; magnitude of adverse effects; dominant hydrologic and geomorphic processes within the watershed; overall watershed condition; and effectiveness of mitigation and reclamation activities. The duration of biological effects can extend beyond the recovery time for the physical environment and can be irreversible if a species is extirpated from the watershed.

Alternative 1 – 2001 Roadless Rule

Under alternative 1, the 2001 Roadless Rule provisions would continue to provide limitations on road construction in IRAs, which constrains the feasibility of implementing future leases for oil, gas, and coal development and several other management activities within most of the IRAs. The potential for impacts on aquatic species and habitat in IRAs would be less than for the other three alternatives.

The existing roads in IRAs would continue to contribute to impacts on aquatic habitat. The main threat to T&E species, sensitive species, and MIS would be from the potential increase in invasive species associated with the use of existing roads and any new roads constructed as well as other activities that would continue to occur under this alternative.

Compared to other alternatives, there would be fewer tree-cutting and removal activities and coal operations. Tree-cutting would generally occur in areas where there are existing roads or where road construction was previously authorized. Projected linear construction zones are similar in all alternatives except for a slight increase in their use under alternative 3.

This alternative does not include 409,500 acres of unroaded lands that are outside IRAs, which would be managed according to forest plan direction. The biggest potential effect of not including those acres in IRAs that are in the CRAs would be to the wetlands and fens that may be affected by increased human activity on those acres.

The road construction and tree-cutting restrictions under this alternative would be expected to adequately protect the roadless area characteristics and the T&E species, sensitive species, and MIS found in the IRAs. On all of the national forests, there is no adverse effect on the T&E, sensitive species and MIS that occur there or on T&E species downstream. There is no adverse effect on fens, other wetlands or riparian areas. This assumption presumes that appropriate mitigation measures and best management practices would help avoid or minimize impacts from the activities allowed to occur in roadless areas under alternative 1.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

This alternative projects a higher level of road construction and tree-cutting than alternatives 1 and 4, but less than alternative 3. The upper tier acres identified under this alternative would have minimal new road construction or tree-cutting activities. Projected linear construction zones are similar in all alternatives except for a slight increase in their use under alternative 3.

In the substantially altered IRA acres located outside the CRAs, there would be a greater potential for impacts on aquatic habitat and species compared to alternative 1. No roadless rule prohibitions would apply to these areas and under this alternative, as well as under alternatives 3 and 4, they would be managed following forest plan direction. Some of these acres would likely have more new roads and associated management activities under the governing forest plans. The biggest potential effect of not including those acres in CRAs would be to the wetlands and fens that may be affected by increased human activity on those acres. The increase in activities on these acres would be expected to increase risks to individual fish populations but would not likely result in measurable declines in overall population trends on any national forest for any of the aquatic T&E species, sensitive species, or MIS.

This alternative includes 409,500 acres of unroaded lands in CRAs that are outside IRAs, which should afford greater protection from potential impacts from new roads in those additional CRA acreages compared to alternatives 1 and 3.

The effects of roads and increased vehicle traffic in the CRAs would be the same as described in the general effects, with the main risk being associated with potential increases in invasive species compared to alternatives 1 and 4. This increased risk of impact could occur in locations where there could be a higher likelihood for multiple activities and roads in the same CRA where native aquatic species exist. There would be impacts in roadless areas where invasive species are introduced, or human activity increases, or inadvertent accidental damage to aquatic habitat occurs as a result of management activities.

The risk of impacts on individual fish populations is predicted to be greater in the roadless areas where coal development activities are projected to increase compared to alternative 1, on the GMUG National Forests.

The temporary nature and protection measures placed on many of the new roads likely to be developed in CRAs would help minimize the risk of long term road-related impacts on aquatic habitat. Roads constructed under this alternative would be closed to public motorized vehicles, including off-highway vehicles, unless specifically used for the purpose for which the road was constructed or where specifically authorized, and for administrative or emergency use. Alternative 2 requires that any road construction or LCZ construction must maintain or improve existing native cutthroat trout habitat. This requirement ensures that any roads or LCZ constructed within the CRAs would be constructed in a way that maintains or improves cutthroat trout habitat over the long-term. For this reason, alternative 2 provides greater

protections for the cutthroat trout than either alternative 1 or 3.

On all of the national forests, there is no adverse effect on the T&E, sensitive species and MIS that occur there or on T&E species downstream. There is no adverse affect on fens, other wetlands or riparian areas. This assumption presumes that appropriate mitigation measures and best management practices would help avoid or minimize impacts from the activities allowed to occur in roadless areas under alternative 2. The specialist report in the EIS record contains further details for each national forest and specific roadless area.

Alternative 3 – Forest Plans (No Action)

Under this alternative, the forest plan direction related to road construction and tree-cutting activities in roadless areas varies widely for each national forest and roadless area. Information is provided in Appendix B: Forest Plan Management Area Direction and Map 5 within the map packet, regarding road construction and tree-cutting direction found in the forest plans. This alternative could potentially create more impacts on aquatic species and ecosystems compared to the other three alternatives, as the forest plans are generally less restrictive on more acres of IRAs and there are more projected activities in IRAs under this alternative. There is a slight increase in the use of linear construction zones when compared to the other three alternatives.

The effects of road construction and tree-cutting under this alternative are similar to what was previously described. The IRAs included under this alternative contain aquatic species and habitat that occur in the same areas where road construction and road-related activities are projected to occur. In these IRAs, there is an increased risk of adverse impacts on individual populations. Wetlands and riparian areas in many IRAs could be affected by the extent of projected activities.

On the GMUG National Forests, the additional coal roads and operations result in less protection to the abundant riparian areas, wetlands, and fens under this alternative, increasing the risk of impact on individual populations. An increase in future oil and gas activity under this alternative is projected. This alternative may also result in an increased risk of impacts on individual populations from increased road construction and associated oil and gas activities in locations where aquatic sensitive species occur.

If the reduction in hazardous fuels was adequate to limit harmful fires and the impacts from roads and other activities associated with these activities were fully mitigated, this alternative could produce a beneficial effect.

Overall, this alternative would result in the least population fitness of some aquatic MIS species, potentially affecting populations of aquatic T&E and sensitive species, and could further reduce wetland and riparian abundance and health.

Though there is a higher risk than other alternatives for impacts on individual threatened species habitat, wetlands, and riparian areas, there is no long-term adverse effect on T&E species, sensitive species, and MIS population trends; downstream T&E species; or wetlands and riparian areas. This assumption presumes that appropriate mitigation measures and best management practices would help avoid or minimize impacts from the activities allowed to occur under alternative 3. The specialist report in the EIS record contains further details for each national forest and specific roadless areas.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Alternative 4 contains identical prohibitions and exceptions as alternative 2; however, there are more acres identified as Colorado Roadless Area upper tier acres. A portion of these upper tier acres have been identified as being within watersheds that are currently occupied by T&E, sensitive, and MIS fish. For this reason, alternative 4 provides more protection than alternative 2. In addition, these additional acres contain stream riparian and wetland acres not included in the other alternatives. In these areas, alternative 4 would provide additional restrictions on management activities. Compared to alternative 1, these additional restrictions would reduce the risks associated tree-cutting, sale or removal or road construction and reconstruction.

On all of the national forests, there is no adverse effect on the T&E, sensitive species and MIS that occur within the areas or on T&E species downstream. There is no adverse effect on fens, other wetlands or riparian areas. This assumption presumes that appropriate mitigation measures and best management practices would help avoid or minimize impacts from the activities allowed to occur in roadless areas under alternative 4.

Aquatic Species and Habitat: Cumulative Effects

The effects on aquatic habitat and species from past, ongoing, and foreseeable future activities were considered, including all of those listed in Appendix D: Cumulative Effects Framework. Also considered was whether the effects of other activities and land uses would overlap in time and space with the effects just described for each roadless management alternative.

There are a number of cumulative effects on aquatic species and habitat from the additive influences from other human activities, such as historic settlements and ongoing land uses. The cumulative effects of management activities on native fishery resources have resulted in most of Colorado's native fish having special regulatory considerations because of their rarity (Behnke 2002). While non-native trout such as brown, brook, and rainbow appear to be thriving on most national forests in Colorado, continual change in human influences suggests that in some areas native aquatic populations may be suppressed or non-viable. Historic activities have resulted in a considerable loss of wetlands and riparian areas in Colorado; the State has lost approximately 50 percent of its natural wetlands (Dahl 1990).

Where there are more roadless area acres in close proximity to large population centers in Colorado, such as on the Arapaho-Roosevelt or Pike-San Isabel National Forests, there is a higher potential for cumulative impacts on aquatic species and habitat. The roadless areas on these forests that are close to large population centers experience a wide array of recreational, developmental, and municipal uses that affect the associated streams, wetlands, and other aquatic habitat within those areas. These various land use activities, when they occur in the same vicinity, may cumulatively limit the potential for reestablishment of threatened greenback cutthroat trout, a threatened fish species that only occurs on these two national forest units in Colorado.

When oil and gas development or coal mining occur in the same roadless areas as developed ski areas, other recreational uses, fuel reduction projects, and other land management activities, there can be cumulatively adverse impacts on aquatic habitat. This would be most likely to occur in roadless areas on the GMUG National Forests, as well as the San Juan or White River National Forests. In roadless areas on the GMUG and San Juan National Forests, unique features like fens and wetlands are relatively more abundant and therefore are more vulnerable

to cumulative effects from the many activities expected to occur over the next 15 years. Additive impacts on aquatic resources on the White River National Forest may be related to roadless area proximity to populated areas that continue to experience rapid growth. Recreation use is considered very high in several areas, with Summit County having the highest concentration of ski areas in the State. The White River National Forest contains numerous roads, including roads that cross streams. Road crossings and multiple use activities on the White River may be limiting movement of native and non-native fish throughout a considerable portion of the forest, particularly in the southern and eastern portions.

On the Manti-La Sal National Forest, the Roc Creek roadless area contains an eligible wild and scenic river based on its scenic, geologic, and hydrologic values, along with waterfalls and riparian vegetation complexes. There are several oil and gas leases in the area that may add to recreational uses and other ongoing activities to additively affect the unique riparian resources in this roadless area.

There are roadless areas on the national forests that are not adjacent to large population centers and are not expected to have oil, gas, or coal operations in the next 15 years, such as areas on the Rio Grande and Routt National Forests. Despite those expectations, there would still be a variety of human developments and land use activities that continue to increase over time and have additive effects on the streams that historically supported Rio Grande cutthroat trout or other sensitive or MIS fish, as well as riparian areas and wetlands.

Considering all past, ongoing, and projected future activities within the same watersheds as the roadless areas in Colorado, cumulative effects are clearly evident and would be likely to continue to occur.

TERRESTRIAL SPECIES AND HABITAT

This section presents the evaluation of effects of the alternatives on terrestrial (land-based) wildlife and their habitats. Terrestrial animals evaluated include birds, mammals, amphibians (frogs and toads) and terrestrial invertebrates (butterflies and snails). Specific analyses are focused on threatened and endangered (T&E) and sensitive species, management indicator species (MIS), migratory birds, big game, and their associated habitats.

Roadless areas have special importance for wildlife because they provide large blocks of habitat in which natural processes are largely allowed to occur freely and human disturbance is relatively low. A high level of security and seclusion is particularly important during periods when animals are birthing and rearing their young. Compared to more developed landscapes, a higher degree of habitat diversity and complexity and higher levels of snags and coarse woody debris are typically found in roadless areas. Roadless areas provide connectivity with other blocks of unfragmented habitat and can function as wildlife movement and dispersal corridors. Roadless areas will likely play an increasingly important role in sustaining viable populations and overall native biodiversity in the face of accelerating human population growth, associated land development, and climate change.

Terrestrial Species and Habitat: Affected Environment

There are approximately 600 species of terrestrial animals that occur within the State of Colorado. Roadless areas are considered to have high species richness (variety of species), and often harbor more threatened, endangered and sensitive species than adjacent national forest lands that have higher levels of resource development and human activities.

Climate change is affecting terrestrial and aquatic animal species and habitats across Colorado and the U.S. Average annual temperature increases due to increased carbon dioxide are affecting snowpack, peak runoff, and base flows of streams and rivers. Predictions indicate that spring snowpack will probably be less, that more precipitation will probably fall as rain rather than as snow, and that spring peak runoff will occur earlier (Backlund et al. 2008). For species such as white-tailed ptarmigan and wolverine that require cold, snowy alpine environments to survive, warmer temperatures could lead to significant decreases in available suitable habitat.

Climate change is also affecting phenology (the biology of timing of organisms), involving aspects such as animal hibernation and migration. For example, bird migration, which formerly was synchronized with maximum food availability, may now occur too late and result in lowered reproductive success.

Climate change is likely to exaggerate the scale and intensity of natural disturbances such as wildfire and beetle epidemics. Larger and more intense fires and insect outbreaks might be expected in Colorado in the future. This may affect the ability of individual members of a species to survive the direct effects of fire. While many adult vertebrate species are mobile enough to flee burning areas or seek refuge, the young born in that year are often most vulnerable to injury and mortality from fire (Smith 2000).

Terrestrial Wildlife Habitats

Roadless areas in Colorado are predominantly coniferous forests in mountainous terrain, ranging in elevation from about 7,000 to 14,000 feet above sea level. The predominant vegetation cover types are spruce-fir, aspen, lodgepole pine and Douglas-fir, with smaller

amounts of ponderosa pine and pinyon-juniper woodlands found at the lower elevations. Habitat structural stages range from grass/forb and shrub/sapling through late successional forest. Mature and old forest conditions are present on about 60% of the acres in roadless areas, although the mature lodgepole pine stands are now largely dead due to a mountain pine beetle epidemic.

Federally Listed Species and Habitats

Several sources of information were compiled to identify known and potential occurrence of threatened and endangered species in roadless areas. These included Forest Service species occurrence matrices (available at the Rocky Mountain and Intermountain Regional Offices), information available from the U.S. Fish and Wildlife Service, comments submitted by the Colorado Division of Wildlife, Colorado Natural Heritage Program databases, and professional knowledge of the Forest Service's wildlife staff.

Three federally-listed threatened or endangered species -- grizzly bear, gray wolf and black-footed ferret -- have been extirpated from Colorado. If populations of these species should become re-established in Colorado in the future, effects of land management activities on them will be evaluated at that time. Three terrestrial federally-listed species (whooping crane, piping plover, and least tern) occur in Colorado, but are not known or expected to occur in the roadless areas. These six species are not analyzed further in this document.

Six federally-listed or proposed terrestrial species are known or are likely to occur within roadless areas. Table 3-34 displays key habitat requirements for each listed species and the number of roadless areas where the species or suitable habitat is known to occur.

Critical habitat has been designated for the Preble's meadow jumping mouse and Mexican spotted owl on two national forests in Colorado. Four roadless areas on the Arapaho-Roosevelt National Forest contain critical habitat for the Preble's meadow jumping mouse; the Pike-San Isabel National Forests provides critical habitat for the Preble's meadow jumping mouse in two roadless areas, and for the Mexican spotted owl in nine roadless areas.

The yellow-billed cuckoo, Gunnison's prairie dog (Montane Significant Portion of the Range), New Mexico meadow jumping mouse, greater sage-grouse, and lesser prairie-chicken are identified as candidates for listing under the Endangered Species Act (ESA). Candidate status means that the best scientific and commercial data available suggest that a proposal for listing may be warranted, but the full review has not yet been conducted. Candidate species are included on the list of Forest Service sensitive species and are discussed, as such, below.

Table 3-34. Occurrence of threatened and endangered species or their habitat within roadless areas

Species and status (T) or (E)	Key habitat requirements	Roadless areas with T&E species occurrence or suitable habitat (# of roadless areas)
BIRD		
Southwestern willow flycatcher (E) *Empidonax trailii extimus*	Dense riparian thickets of willow, cottonwood, and other deciduous shrubs and trees about 13–23 ft. or more in height. At higher elevations, shrub willows are a major component.	4
Mexican spotted owl (T) *Strix occidentalis lucida*	In Colorado, nests in caves or on ledges in steep, narrow canyons with uneven-aged stands of mixed-conifer forests. May also use ponderosa pine, Gambel's oak and riparian woodlands. Frequent, low-intensity surface-dominated fires maintain open-canopy stands used for foraging.	32
Mountain plover (Proposed) *Charadrius montanus*	Short-grass prairie; short vegetation and often in prairie dog towns. Nest placed on bare ground.	1
INSECT		
Pawnee montane skipper (T) *Hesperia leonardus montana*	Restricted to the South Platte River drainage in Colorado; dry open ponderosa pine woodlands at 6,000–7,500 ft., sparse understory with blue grama (larval food) and prairie gayfeather (nectar). Frequent low-intensity surface fires maintain the preferred open-canopy structure.	4
Uncompahgre fritillary (T) *Boloria acrocnema*	Above timberline in patches of its larval host plant, snow willow. Most often found on cool, moist north- and east-facing slopes.	15
MAMMAL		
Canada lynx (T) *Lynx canadensis*	Spruce-fir forest (potential vegetation type) with cold winters, deep snow, and an adequate prey base of snowshoe hares. Cover types may include spruce, fir, lodgepole pine, Douglas-fir, and aspen. Dense horizontal cover is needed for snowshoe hare habitat. Maintaining habitat connectivity and linkages areas is especially important in the Southern Rockies.	307
Preble's meadow jumping mouse (T) *Zapus hudsonius preblei*	Riparian vegetation and adjacent upland vegetation up to ~7600 ft. elevation. Lush undergrowth of grasses or forbs in riparian areas and moist meadows, often with tree and shrub cover.	15

Forest Service Sensitive Species

There are 33 sensitive wildlife species that occur or are likely to occur in roadless areas, based on their known occurrence or habitat requirements. These consist of 31 vertebrate species (3 amphibians, 18 birds, and 10 mammals) and 2 invertebrate species (1 insect and 1 mollusk). Table 3-35 displays those sensitive species that are known or are expected to occur in the roadless areas in Colorado and in which national forest(s).

Inventories of sensitive species on NFS lands are incomplete, especially in roadless areas. Most of the available data are from incidental observations rather than systematic inventories, and therefore are biased against species that are cryptic, secretive, or nocturnal. Records of sensitive species within roadless areas are dominated by a few of the more conspicuous and more widely

distributed species, such as bighorn sheep, American marten, boreal owl, and northern goshawk.

Table 3-35. Sensitive animal species associated with roadless areas in Colorado

Scientific name	Common name	Habitat	National Forest
AMPHIBIAN			
Bufo boreas boreas	Boreal toad	Wetlands near ponds, lakes, reservoirs, rivers, and streams between approximately 7,500 and 12,000 ft. elevation. May be observed in other habitats during dispersal.	AR, GMUG, PSI, RG, Routt and WR
Rana pipiens	Northern leopard frog	Smaller, semi-permanent ponds with emergent vegetation; disperses along creeks and small riparian areas.	AR, GMUG, RG, Routt, SJ, WR
Rana sylvatica	Wood frog	Semi-permanent and temporary pools of natural origin and adjacent wet meadows; early fall seek hibernacula in upland forest habitat .	AR, Routt
BIRD			
Accipiter gentilis	Northern goshawk	Large tracts of mature, closed canopy, deciduous, coniferous and mixed forests with an open understory.	AR, GMUG, MLS, PSI, RG, Routt, SJ, WR
Aegolius funereus	Boreal owl	Mature, mixed stands of subalpine fir and Engelmann spruce with large nest cavities.	GMUG, PSI, RG, Routt, SJ, and WR
Buteo regalis	Ferruginous hawk	Generally in open grasslands east of the Continental Divide and shrub-steppe west of the CD; requires adequate supply of small rodents.	WR
Centrocercus minimus	Gunnison sage-grouse	Relies almost entirely on sagebrush communities; wet meadow habitats interspersed within the sagebrush type are also important.	GMUG, PSI, RG
Centrocercus urophasianus	Greater sage-grouse	Sagebrush grasslands; sagebrush overstory, and grass/forb understory without human disturbance important as breeding habitat	Routt, WR
Circus cyaneus	Northern harrier	Open wetland and adjoining upland habitats during breeding season especially needs large tracts of undisturbed habitat	WR
Contopus cooperi	Olive-sided flycatcher	Forest openings and edges in mature forests and following natural and anthropogenic disturbances, such as tree fall gaps, fire, and logging; presence of snags essential.	AR, GMUG, WR
Cypseloides niger	Black swift	Rock ledges associated with waterfalls.	AR, GMUG, PSI, SJ, RG and WR
Falco peregrinus anatum	American peregrine falcon	Cliff habitat more than 200 ft. high with ledges suitable for nesting, usually associated with river corridors, reservoirs, or lake basins.	AR, GMUG, MLS, PSI, RG, Routt, SJ, WR
Haliaeetus leucocephalus	Bald eagle	Large trees for nesting and perching near fish-bearing lakes, streams and rivers.	AR, GMUG, MLS, PSI, RG, Routt, SJ, WR

Scientific name	Common name	Habitat	National Forest
Lagopus leucurus	White-tailed ptarmigan	Alpine ecosystems at or above treeline; adjoining riparian and meadow habitats within the subalpine zone; primary winter food is willow.	AR, GMUG, PSI, WR
Lanius ludovicianus	Loggerhead shrike	Open habitats such as deserts, sagebrush, grasslands, and pastures.	WR
Melanerpes lewis	Lewis's woodpecker	Open forest (< 30 percent canopy cover) and abundant snags; preference for pine forests and for riparian cottonwoods at low elevation.	AR, GMUG, PSI, RG, Routt SJ, WR
Otus flammeolus	Flammulated owl	Open ponderosa pine or mixed conifer forests with cavities for nesting intermixed with grassy openings and dense thickets.	AR, GMUG, SJ
Picoides dorsalis	American three-toed woodpecker	Mature and over-mature coniferous forests with dead and dying trees providing insect prey.	AR, GMUG, MLS, RG, Routt, WR
Progne subis	Purple martin	Mature aspen forest with nest cavities and nearby meadows and open water.	GMUG, WR
Spizella breweri	Brewer's sparrow	Sagebrush communities dominated by big sagebrush of canopy height <1.5 m; also occurs in shrubby openings in pinyon-juniper and mountain mahogany woodlands and large shrubby parklands within coniferous forests.	WR
Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	Mid-tall prairie grasslands, upland sagebrush, and montane scrub during breeding; riparian scrub and open coniferous forests in winter.	GMUG, Routt WR
MAMMAL			
Conepatus leuconotus	Common hog-nosed skunk	Riparian areas, rocky canyonlands, piñyon-juniper woodlands, shrublands, and grasslands that contain brushy and rocky habitat	PSI
Euderma maculatum	Spotted bat	Xeric and riparian habitats in deep, narrow canyons with cliffs and rocky outcrops	MLS, WR
Gulo gulo	North American wolverine	Late spring snow in cirque basins and subalpine forests; dens in snow often associated with talus and coarse woody debris.	AR, GMUG, PSI, RG, Routt, SJ, WR
Lontra canadensis	North American river otter	Streams, lakes, and reservoirs	AR, Routt SJ, WR
Martes americana	American marten	Mesic (moist), dense coniferous forests with complex physical structure; in winter prefer mature and old-growth conifers; summer habitat use is somewhat broader; large snags, large logs, large live spruce-fir trees, and squirrel middens are important characteristics of maternal dens.	AR, GMUG, RG, Routt, SJ, WR
Myotis thysanodes	Fringed myotis	Low- and mid-elevation mines in steep river valleys, large canyons, or other sites having steep and rock terrain.	AR, GMUG, PSI, RG

Scientific name	Common name	Habitat	National Forest
Ovis canadensis canadensis	Rocky Mountain bighorn sheep	Open habitats such as alpine meadows, open grasslands, shrub-steppe, talus slopes, rock outcrops, and cliffs.	AR, GMUG, PSI, Routt SJ, WR
Corynorhinus townsendii	Townsend's big-eared bat	A wide variety of habitats from arid sagebrush and juniper breaks to high-elevation forests including caves, mines, and rock crevices.	AR, GMUG, MLS, PSI, RG, WR
Sorex hoyi	Pygmy shrew	Ssp. *montanus* in Colorado occurs in moist coniferous forest, possibly preferring late-seral stands and the edges between wet and dry forest types.	AR, GMUG, Routt WR
Vulpes macrotis	Kit fox	Desert and semiarid habitats, inhabiting mixed-grass shrublands, shrublands, and margins of pinyon-juniper woodlands.	GMUG
Vulpes velox	Swift fox	Variety of habitats including shortgrass and mid-grass prairies, plowed fields and fencerows, and sagebrush; select low-growing vegetation and relatively flat terrain, friable soils and high den potential (prairie dog towns/burrows, badger burrows), and areas near roads.	Routt
INVERTEBRATE			
Acroloxus coloradensis	Rocky Mountain capshell snail	Clean boreal lakes with rocky substrate.	Routt
Speyeria nokomis nokomis	Nokomis fritillary (or Great Basin silverspot)	Wetlands with flowing water (i.e., springs, seeps, wet meadows); abundant larval food plant (bog violet) and adult nectar sources (mostly Composites).	WR

Key to National Forest abbreviations: AR = Arapaho-Roosevelt; GMUG = Grand Mesa, Uncompahgre and Gunnison; MLS = Manti La Sal; PSI = Pike-San Isabel; RG = Rio Grande; Routt = Routt; SJ = San Juan; WR = White River.
Source: U.S. Fish and Wildlife Service and Forest Service list of federally listed species, for national forests in Colorado, April 2008 (in EIS record).

Management Indicator Species (MIS)

There are a total of 36 terrestrial animals identified as MIS by the national forests in Colorado (excluding those selected only for national grasslands). This includes 11 mammals and 25 birds. Four of the 36 MIS are listed as threatened or endangered species and are discussed in the previous section.

All of the 36 terrestrial MIS are likely to occur within one or more roadless areas. Table 3-36 displays the population and habitat trend for each terrestrial MIS, based on the latest MIS monitoring report for each national forest in Colorado, as well as the reason the species was selected as a MIS, based on each forest plan. MIS generally can be grouped as follows:

- Those that represent certain vegetation types and/or structural stages: American pipit, bald eagle, Brewer's sparrow, brown creeper, Columbian sharp-tailed grouse, golden-crowned kinglet, green-tailed towhee, hermit thrush, Lincoln's sparrow, Merriam's wild turkey, mountain bluebird, northern goshawk, pygmy nuthatch, red-naped sapsucker, vesper sparrow, Virginia's warbler, warbling vireo, Wilson's warbler, Abert's squirrel, American marten, bighorn sheep, deer mouse, elk and mule deer.

- Those that represent unique habitat features such as snags, caves, or wetlands and streams: boreal toad, hairy woodpecker, beaver, cave bats, and river otter.
- Those that respond to road density and management: elk, mule deer.
- Those that are economically important or have high public interest: black bear, elk, mallard.
- Those that are listed under the ESA: Canada lynx, Mexican spotted owl, southwestern willow flycatcher, Uncompahgre fritillary butterfly.

Table 3-36. Terrestrial management indicator species, their population and habitat trend in Colorado, and reason for selection

MIS species	AR	GMUG	MLS	PSI	RG	ROUTT	SJ	WR	Reason for selection
MAMMALS									
Abert's squirrel		D/U	U/S	I/U			S/S		Management of ponderosa pine forest (GMUG, PSI)
American marten (S)		D/U					I/S		Management of spruce-fir forest (GMUG, RG)
Beaver							I/I		Riparian habitat
Bighorn sheep (S)	D/U								Management of forest openings (AR)
Black bear							D/S		Economically important, forest generalist
Canada lynx (T)							S/S		T&E species (SJ)
Cave bats (S)								S/D	Management of cave recreation (WR)
Deer mouse							I/I		Early successional stages
Elk	S/U	S/U	S/S	I/I	D/S		S/D	D/U	Management of roads (GMUG, RG, WR), Public interest (PSI); juxtaposition of openings and forest cover (AR)
Mule deer	D/U		I/S		I/S		S/D		Habitat interspersion (AR); road density (RG)
River otter (S)							I/I		Sensitive species
BIRDS									
American pipit								U/U	Alpine grasslands (WR)
Brewer's sparrow (S)		D/U						U/U	Sagebrush shrubland management (GMUG, WR)
Bald eagle (S)							S/S		Sensitive species (SJ)
Brown creeper					I/I				Management of late succession spruce-fir forest (RG)
Columbian sharp-tailed grouse (S)							U/S		Sensitive species (SJ)
Golden-crowned kinglet	D/U					S/D			Interior forest (AR), Spruce-fir forest management (Routt)
Green-tailed							S/S		Mountain shrub communities

MIS species	AR	GMUG	MLS	PSI	RG	ROUTT	SJ	WR	Reason for selection
towhee									
Hairy woodpecker	I/U						S/S		Snag management (AR)
Hermit thrush					S/S				Forest management (RG)
Lincoln's sparrow					S/S				Riparian willow management (RG)
Mallard							I/I		Economically important, wetlands
Merriam's wild turkey		I/U					I/S		Management of oak, pinion/juniper, and ponderosa pine (GMUG)
Mexican spotted owl (T)							U/S		T&E species (San Juan)
Mountain bluebird	S/U						S/S		Openings adjacent to forest (AR)
Northern goshawk (S)		D/U	U/U			S/U	S/S		Mature and older aspen, mixed conifer, and spruce-fir forest (GMUG); lodgepole pine timber management (Routt)
Pygmy nuthatch	S/U				S/S				Late succession ponderosa pine (AR, RG)
Red-naped sapsucker		S/U							Mature aspen in riparian areas (GMUG)
Southwestern willow flycatcher (E)							U/S		T&E species (SJ)
Vesper sparrow					S/S	S/U			Rangeland residual forage and mountain grasslands (Routt, RG)
Virginia's warbler								U/U	Shrub management and shrub related species (WR)
Warbling vireo	S/U								Aspen community status (AR)
Wilson's warbler	S/U				S/S	D/U			Mountain riparian and wetland communities (AR); herbivore in riparian areas (Routt); riparian willow (RG)
AMPHIBIANS AND INSECTS									
Boreal toad (S)	D/U								Mountain riparian and wetland communities (AR)
Uncompahgre fritillary (T)							S/S		Wetland communities (SJ)

(T)(E)(S) indicate MIS that are listed as threatened (T), endangered (E), or sensitive (S) species.
Population trend and habitat trend are indicated with "I" for increasing, "D" for decreasing, "S" for stable, and "U" for unknown.
Source: MIS monitoring and evaluation reports completed for each national forest in Colorado (in EIS record).
AR=Arapaho-Roosevelt National Forests; GMUG=Grand Mesa, Uncompahgre, and Gunnison National Forests; MLS=Manti-La Sal National Forest; PSI=Pike- San Isabel National Forests; RG=Rio Grande National Forest; SJ=San Juan National Forest; WR=White River National Forest.

Migratory Birds

More than 400 species of birds have been recorded in Colorado, and over 250 species nest in the State. Because roadless areas encompass a wide variety of vegetation and range of elevations,

there is a great diversity of migratory birds that inhabit roadless areas in Colorado.

The Colorado Bird Conservation Plan identifies priority species and habitats and establishes objectives for bird populations and habitats in the State of Colorado. The roadless areas of Colorado are located within the Southern Rocky Mountains and the Colorado Plateau Physiographic Areas PA62 and PA87 (Partners in Flight 2007).

Migratory bird monitoring has been conducted annually since 1998 through Monitoring Colorado Birds, a partnership between the Forest Service, Colorado Division of Wildlife, the Rocky Mountain Bird Observatory, the Bureau of Land Management, and the National Park Service. Monitoring is conducted annually during the breeding season across Colorado. Monitoring transects were randomly located in order to sample habitats that are representative of the State (Leukering et al. 2000). Of approximately 499 (current and retired) monitoring transects in Colorado, 10 transects (two percent) exist within portions of the IRAs and five transects (one percent) exist in portions of CRAs. Originally a road-based monitoring program, it has been redesigned. Starting in 2008, of the 184 sampling units in Colorado, 44 (24 percent) occur in IRAs and 42 (23 percent) occur in CRAs.

The National Audubon Society identifies Important Bird Areas (IBA) that are vital to bird migration, breeding, and wintering. Of the 53 IBAs designated in Colorado, six are located on national forests and grasslands. Two IBAs occur in roadless areas or adjoining wilderness areas on the White River National Forest: Hanging Lake IBA in the Grizzly Creek IRA/CRA and the Alfred M. Bailey Bird Nesting Area IBA in Eagle's Nest Wilderness adjacent to the Maryland Creek IRA/CRA. The National Audubon Society has identified habitat disturbance from recreational rock and ice climbers as a potential threat to Hanging Lake IBA. The Alfred M. Bailey Bird Nesting Area IBA was designated because it is one of the most diverse mountain avian breeding sites in Colorado, with approximately 44 species of breeding birds identified. The National Audubon Society has identified habitat conversion of the surrounding forest by logging as a potential threat to this IBA.

Big Game

Big game species (ungulates -- elk, deer, moose, bighorn sheep, and mountain goats -- as well as black bear and mountain lion) are tremendously important socially and economically to the State. Colorado boasts the largest elk and mule deer herds in the United States. Hunting and fishing generate about $1 billion annually to the State's economy, with wildlife viewing contributing an additional $1.3 billion (USDI Fish and Wildlife Service and USDOC, U.S. Census Bureau 2008).

Roadless areas provide important habitats for wild ungulates. Deer fawning and/or elk calving habitat has been documented on more than 40 percent of roadless areas in the State, and about one-third contain seasonal migration corridors for big game animals.

Winter range is often the primary limiting factor for most ungulate populations. During the winter, most ungulates migrate to lower-elevation areas where the snow is not as deep. The animals utilize physiological and behavioral adaptations (e.g., lowered metabolic and activity rates) to reduce energy requirements during stressful periods of cold temperatures and deep snow. Despite this, most ungulates lose weight throughout the winter. Human disturbances, especially unpredictable or erratic occurrences, increase energy costs, for example, by simply raising the heart rate or by causing the animal to flee. This additional stress ultimately can reduce reproductive success or over-winter survival (Cole et al. 1997). More than half of the

roadless areas in Colorado provide winter range, and are important to sustaining ungulate populations.

Roadless areas also provide important summer habitat for ungulates. The quality of summer habitat has been shown to be very important to overall nutritional status. Animals that leave their summer ranges in good body condition have higher survival and reproductive rates the following spring. Road density is also an important factor in vulnerability of elk to hunters in the fall (Hayes et al. 2002).

Terrestrial Species and Habitat: General Environmental Consequences

General Wildlife Responses

This subsection provides the background for understanding the environmental consequences described in more detail in the next part of this evaluation, while minimizing the need to reiterate effects of activities common to all alternatives. A general discussion of potential impacts on animal species and their habitats from road construction and reconstruction, tree-cutting and removal activities, and oil, gas and coal resource operations is presented. The extent to which these activities would be permissible varies by alternative. The general discussion on wildlife effects is followed by a more specific evaluation of the effects of each alternative to threatened and endangered species, sensitive species, management indicator species, and migratory birds.

None of the alternatives by themselves would authorize or result in any ground-disturbing activities. The extent to which these effects could be realized depend on site-specific factors such as the type, location, timing, duration, frequency, and magnitude of the management actions. Forest plans contain objectives, standards and guidelines designed specifically to maintain or improve habitat for terrestrial animals, especially threatened and endangered species, sensitive species, and MIS. Thus, some of the potential impacts described programmatically would likely be avoided or reduced through site-specific planning and implementation.

Effects of Road Construction, Reconstruction and Maintenance

Although the amount and conditions vary by alternative, all alternatives include provisions that would allow construction, reconstruction or maintenance of roads within roadless areas under certain circumstances.

The potential impacts of roads on terrestrial species and their habitats are well-documented in the scientific literature. Based on several comprehensive syntheses on this topic (Forman et al. 2003, Wisdom et al. 2000, Trombulak and Frissell 2000, Joslin 1999), effects of roads on wildlife habitats were organized into the following categories: habitat availability and effectiveness; habitat fragmentation; spread of non-native invasive species; and human-caused disturbance and mortality.

Habitat Availability and Effectiveness

Road construction and road use can affect habitat availability. First, construction and reconstruction of roads can contribute to an immediate loss of habitat by removing existing vegetation and altering the substrate (Forman et al. 2003). Because forest roads, especially in roadless areas, tend to be narrow (approximately 12 to 14 ft. wide), their contribution to habitat loss on a landscape scale may appear minimal. However, the total extent of the landscape that is

roaded has consequences for habitat availability (Forman et al. 2003). The higher road densities that exist outside roadless and wilderness areas increase their role as refugia for terrestrial animal species.

The indirect effects of road construction and use include noise and visual disturbance that can displace wildlife by causing them to avoid suitable habitats that would otherwise be available to them. The effect of this pattern, in which the habitat nearest the road is avoided, decreases as distance from the road increases and is referred to as a reduction in habitat effectiveness (Thomas et al. 1979).

The reduction in habitat effectiveness can be substantial. With only two miles of roads open to vehicular traffic per square mile, the area affected can easily exceed half of all available elk habitat (Lyon 1983). Once the original purpose of a forest road has been satisfied, many roads have been gated under the assumption that "administrative use" would not unduly disturb elk and other wildlife. However, it has been shown that even a limited amount of administrative traffic behind closed gates is sufficient to reinforce the avoidance behavior (Lyon 1979).

Reduced habitat effectiveness due to roads has been documented for numerous ungulate species. Rowland et al. (2004) found that female elk in the Starkey Experimental Forest consistently used areas away from open roads in spring and summer. When vehicular traffic was excluded for several years, Cole et al. (2004) documented increased use of open foraging habitats by elk. Summer and autumn avoidance of roads by mule deer has been observed in arid climates (Marshal et al. 2006). The presence of poaching or hunting can exacerbate avoidance behavior and displacement of wildlife from areas adjacent to roads.

Gaines et al. (2005) found that the presence of roads reduced habitat effectiveness across all seasons for female black bears. There is some evidence to suggest that American marten may use areas adjacent to forest roads less than interior habitats (Robitaille and Aubry 2000), although Mowat (2006) did not detect selection against roads or logging in winter habitat associations of marten at a coarse scale.

Various avian species have demonstrated sensitivity to the presence of roads. In selection of nest sites, some bird species, including bald eagles (Anthony and Isaacs 1989), golden eagles (Fernandez 1993), and sandhill cranes (Norling et al. 1992), avoided areas close to roads. It was noted that even light traffic (1-12 vehicles per day) on roads associated with natural gas development appeared to alter nesting behavior (nest initiation rates and movement from leks) of female sage-grouse (Lyon and Anderson 2003).

Temporary roads present most of the same risks posed by permanent roads, although the impacts generally would be of shorter duration. Gated or temporary roads facilitate recreational uses such as camping, hiking, mountain biking, and Off-Highway Vehicle (OHV) use that can negatively influence elk, deer and bighorn sheep distributions and activities.

Road reconstruction can result in substantial changes in the kinds and amount of human uses in an area. For example, improving road surfacing or gradient to provide easy access for low clearance vehicles may increase the amount of human disturbance, traffic volume and/or speeds, resulting in increased wildlife impacts.

Fragmentation and Connectivity

Roads contribute to fragmentation of habitats in previously intact landscapes (Reed et al. 1996). As road densities increase, edge habitats increase and interior patches decrease, reducing

habitat available to species requiring interior habitats. For example, Ortega and Capen (2002) noted that densities of forest-interior dwelling birds were significantly lower in forested areas adjacent to unpaved roads. Breeding songbirds in sagebrush steppe habitat were less abundant (39-60% lower) within 100 m of dirt and gravel roads associated with natural gas extraction than in areas beyond this distance (Ingelfinger and Anderson 2004). Although traffic volume could have contributed to avoidance of habitats adjacent to roads, the authors suggested that these species could also have been responding to edge and fragmentation effects.

In addition to changing configuration and availability of interior habitats, edges created by roads can alter environmental conditions within interior habitats bordering roads, such as microclimate (e.g., increased temperatures, humidity, exposure to direct sunlight, etc) and humidity (Chen et al. 1996, Chen et al. 1993). Such changes may make these areas less hospitable to particular species (Marsh and Beckman 2004).

Fragmentation can lead to demographic fluctuations, inbreeding, loss of genetic variability, and local population extinctions (USDA Forest Service 2000b, Findlay and Bourdages 2000). Roads can function as barriers to movement of species, such as small mammals, reptiles, turtles, snails and salamanders (Trombulak and Frissell 2000, Swihart and Slade 1984, Oxley et al. 1974, Marsh et al. 2005, Baur and Baur 1990). This can result in substantial amounts of suitable habitat being unavailable to these species, as well as fragmenting populations into smaller subpopulations through loss of habitat connectivity (Shine et al. 2004). Roads have been shown to act as barriers to gene flow in a common frog (*Rana temporaria*) and can lead to significant genetic differentiation among populations (Reh and Seitz 1990). Rico et al. (2007) found that whereas individual voles and mice were observed crossing narrow highways, wide highways served as a complete barrier to movement, effectively separating populations on either side of the highway demographically. Forest fragmentation can increase the risk of local extirpations or extinctions (Noss and Cooperrider 1994).

Refugia (landscapes that are not readily subject to high levels of hunting and frequent human disturbance) are necessary for persistence of some wildlife by providing source populations that can repopulate adjacent landscapes via dispersal and emigration. Mid- to large-sized carnivores characteristically have large home ranges, make long-distance movements, and are particularly vulnerable to habitat fragmentation (Ruggiero et al. 1994). Roadless and wilderness areas serve a key role in providing refugia.

Spread of Non-Native Invasive Species

The construction of roads creates new edge habitat, and consequently, edge-dwelling species of plants and animals can be introduced into forest and grassland environments, adversely affecting interior-adapted species. Many non-native plants establish themselves preferentially along roadsides and in other disturbed habitats (Trombulak and Frissell 2000, Parendes and Jones 2000), as described in the Invasive Plants section. The establishment of these non-natives can lead to habitat loss, inter-species competition, loss of quality forage, and lowered reproductive success of native wildlife.

Non-native disease organisms also affect native animal species and their habitats. For example, local die-offs of boreal toads have occurred in Colorado from infection by the chytrid fungus (*Batrachochytrium dendrobatidis*) (Loeffler 2001). While the environmental factors causing susceptibility to this pathogen are not well understood, it is reasonable to assume that increased road access could make boreal toad populations more susceptible to exposure to the chytrid

fungus.

Human-Caused Disturbance and Mortality

In general, roads facilitate human access into areas that would otherwise be difficult to reach. Temporary roads for fuels treatment adjacent to communities would be an exception, as people, pets and other disturbances are common. The presence of people can result in both direct and indirect impacts, such as increased mortality from traffic collisions and crushing, flight behavior and increased physiological stress, increased vulnerability to hunting and recreational shooting, and decreased reproductive success.

Winter range is often the primary limiting factor for wild ungulates (such as deer, elk, pronghorn antelope, bighorn sheep). Human disturbance during winter months can result in displacement and physiological stress that lead to lowered reproduction and survival rates of wild ungulates (Freddy 1986, Freddy et al. 1986, Morrison et al. 1995b).

Large numbers of animals are killed annually on roads, including NFS roads. Amphibians and reptiles appear to be especially vulnerable to becoming road kill for a variety of reasons (Andrews and Gibbons 2005, Mazerolle et al. 2005, Vestjens 1973, USDA Forest Service 2000b). However, by gating and closing the roads to motor vehicles other than for administrative use, the impacts would be minimized.

Effects of Tree-Cutting and Removal Activities

All alternatives have provisions that would allow for tree-cutting for certain purposes. Removal of trees to reduce hazardous fuels is the primary reason this would occur within roadless areas under all of the alternatives. Tree-cutting may also be allowed to control forest insects and pathogens, to maintain or improve habitat for threatened or endangered species, for public health and safety, or for removal that is incidental to other purposes.

Activities related to tree-cutting or timber harvesting may include: road construction, reconstruction or maintenance; manually felling trees and scattering or piling the slash (small trees, tops, and limbs remaining on-site after tree-cutting); and/or use of large machines to do the cutting, masticating, chipping and/or piling. In addition, tree-cutting in roadless areas would most often be conducted in conjunction with prescribed burning. Typically the smaller understory trees (ladder fuels) would be removed and the healthiest dominant trees would be retained. All tree-cutting and removal treatments in roadless areas would comply with applicable forest plan standards and guidelines and other environmental protection requirements.

The effects of tree-cutting and removal activities on wildlife habitats are organized into the following categories: habitat availability and effectiveness; habitat fragmentation; spread of non-native invasive species; and human-caused disturbance and mortality.

Habitat Quality and Effectiveness

Tree-cutting and removal alters patch sizes, arrangement, tree species composition, and the total amount of habitat for terrestrial wildlife species. Vegetation management through tree-cutting and use of wildfire can have beneficial effects when it is designed to create or maintain appropriate forest age-class diversity and habitat mosaics (Wisdom et al. 2000, USDA and USDI 2001).

In fire-adapted ecosystems where fire suppression has altered plant species composition and the spatial arrangement, tree-cutting to reduce fuels is a tool that can be used to improve habitat

conditions and ecosystem sustainability. Thinning densely stocked conifer stands has been found to decrease the abundance of some bird species while favoring others (Hayes et al. 2003). Reynolds et al. (1992) and Wiens et al. (2006) suggest that forest thinning can be beneficial in producing and maintaining the desired conditions to sustain goshawks and their prey species.

Several studies have found that salvage logging reduces diversity and densities of cavity-nesting birds, such as the American three-toed (*Picoides dorsalis*) and black-backed woodpeckers (*P. arcticus)* (Hutto and Gallo 2006, Wesolowski et al. 2005). Decreases in primary cavity nesters may be due to either a reduction in food availability (e.g., wood-boring beetle larvae) or available nest sites, or both (Hutto and Gallo 2006).

Some species of bats appear to respond favorably to thinning in forested ecosystems if snags or caves are available for roosting (Loeb et al. 2002). Patriquin and Barclay (2003) documented differential responses of bats depending on species. For example, bat species that glean prey from surfaces did not forage in clear-cut plots, whereas aerial foragers frequented areas along the forest edges.

Opening the forest canopy can increase the production of food resources – such as acorns and berries - for black bears (Mitchell and Powell 2003) and other fructivores. However, thinning in spruce-fir forests reduces snowshoe hare populations, in turn negatively affecting Canada lynx (Ruediger et al. 2000).

Fragmentation and Connectivity

In terrestrial ecosystems, the edge effect of tree-cutting can extend substantial distances from the treated area depending on the type of treatment and extent of change to the forested environment. Research over the past two decades has shown that some species thrive at habitat edges/ecotones, while many interior forest wildlife species are negatively affected by the creation of habitat edges by vegetation management practices (or natural disturbances) (Noss and Cooperrider 1994). Edge effects include changes in air and soil temperature, wind velocity, radiation, and soil and air moisture in the adjacent forest stands (Chen et al. 1995). Furthermore, creation of edges due to tree-cutting can favor species such as cowbirds or starlings, which can out-compete the indigenous species (Rosenberg et al. 1999, Baker and Lacki 1997, Robinson et al. 1995). Whether an effect is realized, and the extent of that effect, are dependent on the severity of the forest change (e.g. clearcutting vs. thinning) and species involved.

As with roads, fragmentation from tree-cutting can create movement barriers to some species, which may isolate populations into smaller subpopulations and make them subject to inbreeding, loss of genetic variability, and local population extinctions. Amphibian species, because of their temporally and spatially dynamic populations, may be especially prone to local extinction resulting from human-caused fragmentation (Gibbs 1998). Many amphibian species have been found in lower densities in some treatment areas as compared to mature, unmanaged forests (DeMaynadier and Hunter, Jr. 1999, DeMaynadier and Hunter, Jr. 1998, Ash 1997, Petranka et al. 1993).

Spread of Non-native Invasive Species

Tree-cutting and associated ground-disturbing activities can provide favorable conditions for establishment of invasive species. Vegetation removal can also open the canopy and increase the sunlight reaching the interior forest floor, accelerating rates of spread of invasive plants.

Introduction and movement of invasive species can also be enhanced by equipment, clothing,

and other human-related transport associated with tree-cutting activities. This may include invasive plants, invasive aquatic animals (e.g., zebra mussels) and pathogens (e.g., chytrid fungus) that can also have dramatic effects on wildlife.

Human Access and Disturbance

Disturbances associated with tree-cutting activities can displace animals that previously occurred on or in proximity to the treatment locations. Felling of trees and snags can destroy the nests of birds and squirrels.

Mineral and Oil, Gas or Coal Resource Operations

Although it varies by commodity, surface use associated with the exploration and development of leasable minerals requires access, as well as linear construction zones, haul roads, open pits, facilities, power lines, pipelines, and communication sites. For example, development of geothermal energy would include exploratory drilling (some ground disturbance and access roads); if exploratory results are favorable, construction of a well pad and above-ground pipelines to a power plant would occur. As with road construction and tree-cutting, mining operations can remove or degrade habitat, increase fragmentation, facilitate new introductions, or increase the spread of non-native invasive species, increase disturbance, and increase the potential for road-related mortality of wildlife due to collisions and human access.

As alternative 1, 2, and 4 have the same projections for oil and gas development, the magnitude of these effects are similar across the alternatives. Alternative 3 projects greater oil and gas development; therefore, the magnitude of these effects is greatest under alternative 3. For coal development, alternatives 2 and 4 have similar projections and the magnitude of these effects is expected to be similar. Alternative 3 projects slightly higher projections of future coal development; the magnitude of the effects would be greatest among the alternatives. Alternative 1 has the least projections for coal development; therefore, the magnitude of these effects would be the least among the alternatives.

Linear Construction Zones

The potential effects for the use of linear construction zones are short-term. They are used only for the time it takes to install a linear facility and then the disturbed area is reclaimed as prescribed in the authorization. The activities differ by alternative and would potentially affect wildlife species or habitat.

Terrestrial Species and Habitat: Environmental Consequences

All Alternatives

Land management activities in roadless areas often cost more to plan and implement than on other NFS lands because these areas can be difficult to access or have not been the focus of past management and, therefore, have retained their roadless character. It is unlikely that roadless areas would be the primary focus of future land management activities that involve road construction, road reconstruction, or tree-cutting because of these logistical constraints. The possible exceptions to this generalization are areas that have a high priority for community wildfire protection, and areas with mineral, oil, gas or coal resources. Past and projected future land management activities in roadless areas have been and are expected to remain relatively low, which is reflected in the projected low amounts of road construction and reconstruction and tree-cutting for the alternatives.

Alternative 1 – 2001 Roadless Rule

Under this alternative, about 4.24 million acres of the 14.5 million acres of NFS lands in Colorado would be managed to maintain their roadless area characteristics, which would benefit a wide range of wildlife species. The prohibitions and permissions on road construction and tree-cutting activities in IRAs under this alternative are described in detail in chapter 2. The projected amount of new road construction, tree-cutting and linear construction zones expected in IRAs over the next 15 years is described in the Analysis Framework section of this chapter.

Based on the general prohibitions and limitations on road construction, tree-cutting and removal, and oil, gas or coal resource operations in IRAs, this alternative would provide the highest level of protection to terrestrial wildlife, including T&E species, sensitive species, MIS, and migratory bird species, compared to the other three alternatives. This is based on the scientific literature previously described, which supports the assumption that areas with low road densities, less altered or modified forest vegetation, and lower levels of human activity and ground disturbance are generally better for wildlife species and habitat conditions.

About 11% of the IRA acreage contains existing roads and developments (referred to as "substantially altered" areas). There are various reasons for this including mapping errors, inclusion of areas with oil and gas leases, and the need to provide access to private land inholdings. There are currently about 1,260 miles of existing roads within IRAs. Substantially altered portions of IRAs would continue to experience higher levels of roads, tree-cutting, and human activity than the other portions. Over time, some of the existing roads might be decommissioned, but those that allow access to private lands or infrastructure under special use permits would likely remain. Not included in the IRAs are 409,500 acres that have been identified as roadless and included in the CRAs in alternatives 2 and 4. Under alternative 1, these acres are managed according to their respective forest plans and effects are similar to those in alternative 3 on these acres.

New road construction within roadless areas would be very limited, estimated at about 11 miles/year within the IRAs with another 3 miles/year in the remainder of the analysis area under this alternative, primarily related to oil and gas operations under existing leases. Oil and gas development under existing leases is equivalent under alternatives 1, 2 and 4. Tree-cutting would also occur under very limited circumstances, estimated at about 1,200 acres/year within the IRAs and another 1,100 acres/year within the remainder of the analysis area, primarily to reduce wildfire hazard. Tree-cutting would primarily focus on protecting human communities, but could be used as a tool to enhance habitat for T&E or sensitive species, where ecological restoration is needed. Forests project three miles/year of linear construction zones within the IRAs. Projected linear construction zones are similar in all alternatives except for a slight increase in their use under alternative 3. There is no projected development on the acres within the IRAs that are currently under ski area permits (6,600 acres) in the next 15 years.

The road construction and tree-cutting allowed under the exceptions could potentially have detrimental effects, as described in the preceding subsection. However, the magnitude of this effect likely would be small, since it would be limited to small portions of roadless areas. The actual effects on wildlife would depend on the location, timing, duration, and frequency of the ground-disturbing activities, which would be designed and conducted in accordance with direction in forest plans.

Limitation of tree-cutting to "generally small-diameter trees" under alternative 1 would help maintain larger trees and would provide for more variability in forest structure. The limitations

on the type and extent of tree-cutting under this alternative would make it unlikely that tree-cutting would measurably increase habitat fragmentation, reduce habitat connectivity, or otherwise adversely affect habitat effectiveness for wildlife.

Threatened, Endangered, and Proposed Species

The Pawnee montane skipper and Mexican spotted owl could benefit from fuels treatments if they are applied to the appropriate areas and at the proper time of year. It is estimated that tree removal may include an average of about 2 acres/year to benefit threatened and endangered species, for example, by creating fire lines needed to manage prescribed fires. Road construction could adversely modify small acreages of critical habitat for these species by removing habitat from the road prism. Site-specific analysis and design could likely reduce potential impacts to these two species.

A review of the IRAs shows that no road construction or tree-cutting activities are expected in the IRAs within the planning horizon that contain known populations or habitat for the Uncompahgre fritillary butterfly or known populations or habitat for the southwestern willow flycatcher. Fuels treatments within a community protection zone are unlikely to impact the riparian willow habitat used by the southwestern willow flycatcher.

Lynx habitat occurs within most of the roadless areas, and for a number of those IRAs there is at least a low likelihood for some road construction and tree-cutting activities, primarily for the purpose of fuels treatments. Those fuels treatments that occur in the spruce-fir habitats used by lynx could reduce available snowshoe hare prey, which would adversely affect lynx. Under the forest plans as amended by the Southern Rockies Lynx Amendment, those projects would consider the recommended management guidance for lynx in their design, and would be subject to specific caps on the total acreage of fuels treatments. All forest plans include management direction to maintain lynx habitat connectivity, which would remain in effect.

It is anticipated that fuels treatments and associated temporary road construction would occur in many of the IRAs that contain the lower-elevation riparian habitats utilized by the Preble's meadow jumping mouse. It is important to avoid or minimize habitat alteration and disturbance during the short period when this species is not hibernating, and to retain down logs. These factors would be considered during site-specific project planning. In the long term, reducing the risk of uncharacteristically severe wildfires through prescribed fire or mechanical treatment would be beneficial for this species.

Fuels treatments or oil and gas resource development could occur in the lower elevation grassland habitat used by the mountain plover. However, habitat for this species likely occurs in only one IRA and impacts associated with these activities would be minimal. Prescribed burning is generally beneficial for this species.

Overall, based on the very protective guidance that would apply to the 4.24 million acres of inventoried roadless areas and the low level and intensity of road construction, tree-cutting, and oil and gas development under this alternative, the anticipated effects are mostly beneficial. There is potential for minor, local adverse effects to the Southwestern willow flycatcher, Mexican spotted owl, Pawnee montane skipper, Canada lynx, Preble's meadow jumping mouse, and mountain plover, and to designated critical habitat for the Mexican spotted owl and Preble's meadow jumping mouse. Effects are expected to be wholly beneficial for the Uncompahgre fritillary because of the higher degree of certainty of protection of its habitat under this alternative and the lack of any impacts anticipated in the foreseeable future.

Sensitive Species

Sensitive species associated with wetland, stream, lake and waterfall habitats are boreal toad, northern leopard frog, wood frog, river otter, Great Basin silverspot butterfly, Rocky Mountain capshell snail, and black swift. Road construction, in association with existing energy leases, would have the greatest potential for adverse effects. These effects could include crushing and creating movement barriers for the amphibians and the capshell snail, introducing sediment or chemicals into aquatic habitats, and providing avenues for the spread of non-native invasives and disease organisms. Because of the limited amount of road construction anticipated under this alternative, the probability of adverse effects is low.

Sensitive species associated with lower elevation coniferous forests include flammulated owl, Lewis' woodpecker, olive-sided flycatcher, bald eagle, and northern goshawk. Large diameter trees and snags are used by these species for nesting, perching, and foraging. These lower elevation forests are typically sustained by frequent low-intensity ground fires. Treatment of unnaturally heavy fuels could be beneficial to maintaining habitat for these species over time. The emphasis on removal of small diameter, rather than large diameter trees would help create favorable habitat conditions for these species. The low level of road construction and vegetation management under this alternative would have only minor effects on these species.

Sensitive species associated with subalpine conifer forests include boreal owl, three-toed woodpecker, American marten, and pygmy shrew. These forests typically have infrequent but higher intensity fires, and treatment of fuels is generally not needed to restore natural conditions. Large diameter trees, snags, down logs, and moist microclimate are important habitat components for these species. Due to the low level of vegetation treatment and road construction expected under this alternative, there is a low risk of adverse effects from these actions.

Purple martin is strongly associated with mature aspen stands. Several of the roadless areas where this species is known to occur on the Grand Mesa, Uncompahgre and Gunnison National Forests and the White River National Forest have existing oil and gas leases and developments within them. These leases hold the potential for additional development to occur, which could have local adverse effects on this species if its habitat is removed.

The white-tailed ptarmigan inhabits alpine tundra and adjoining subalpine forest where willow is present. Most fuels treatments would likely occur at lower elevations, but oil and gas development could cause impacts, although at a low level under this alternative.

Sensitive species inhabiting cliffs, caves, talus and canyonlands include peregrine falcon, bighorn sheep, spotted bat, fringed bat, Townsend's big-eared bat, wolverine, and American hog-nosed skunk. Overall, only minor disturbances to these species and their habitats would occur under this alternative.

Five sensitive species inhabit grassland and meadow habitats: northern harrier, ferruginous hawk, loggerhead shrike, and kit fox. These habitats within IRAs would largely be protected, but could be impacted by road construction associated with oil, gas or coal development or incidental to other management activities. These impacts would likely be minimal and localized.

Greater sage-grouse, Gunnison sage-grouse, Columbian sharp-tailed grouse, and Brewer's sparrow inhabit shrublands dominated by sagebrush. As with the grassland habitats, there could be some local impacts on individuals or their habitats, but effects are expected to be

minor under this alternative.

Management Indicator Species

Existing forest plans were developed with an objective to maintain or improve the population and habitat trends for MIS. This alternative could result in some positive changes in the projected population trends of MIS, and in no case would reduce the probability of maintaining viable populations of any species. There is some limited potential for habitat degradation and displacement as a result of road construction and other management activities. Due to the lower level of development in IRAs, fewer adverse impacts on habitat or species would be expected as compared with the other alternatives. Forest plan standards and guidelines would be applied as part of project design, in order to meet forest plan objectives for MIS.

Migratory Birds

The Forests would continue to adhere to requirements under the Migratory Bird Treaty Act and the Executive Order for protection of migratory birds. Project level design and implementation would evaluate potential effects to migratory birds and seek to promote their conservation.

The status and protection of IBAs within roadless areas would remain the same as the existing condition. Previous project-level environmental analysis has not identified any major threats to those IBAs from roads, road uses, or land use actions that have been authorized in those areas.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Under this alternative, about 4.19 million acres would be managed to maintain roadless area characteristics, which would benefit a wide range of wildlife species. There are 562,200 acres of upper tier under this alternative. There would be little activity on these upper tier acres. The prohibitions and exceptions on road construction and tree-cutting activities in CRAs under this alternative, including on the upper tier acres, are described in detail in chapter 2. The projected amount of new roads and tree-cutting expected in CRAs over the next 15 years is described in the Analysis Framework section of this chapter. Under this alternative, the Forest Service would offer cooperating agency status to the State of Colorado for all proposed projects and planning activities to be implemented on lands within Colorado Roadless Areas.

Under this alternative, the roadless inventory would be updated to remove about 458,800 acres that have been "substantially altered" (included under alternative 1). This alternative includes an additional reduction of 8,300 roadless acres that fall within current ski area permit boundaries (6,600 acres) or forest plan management areas that have ski area emphasis (1,700 acres). Forests project no development to occur in these 8,300 acres in the next 15 years under any alternative.

About 409,500 acres that meet the roadless criteria would be added to the inventory. The new boundaries better meet the intent of roadless area conservation and constitute an improved, higher quality portfolio of roadless areas (see letter from CDOW dated October 15, 2009 in the administrative record).

The Colorado Roadless Rule proposes exceptions to the prohibition of road construction. Roads could only to be constructed if other options were considered but found to be infeasible, and any roads constructed would have to be decommissioned and the landscape restored after the road is no longer needed. The estimated amount of new road construction under this alternative is about 16 miles/year within the CRAs, with an additional 4 miles/year in the remainder of the analysis area, of which the majority is needed to access existing oil and gas leases or for coal

mining operations.

As described previously, road construction and vehicular travel removes and fragments habitat, may reduce habitat effectiveness due to avoidance behavior, may increase wildlife mortality, and creates opportunities for invasive species introduction, establishment and spread. However, fuels treatment roads would only be located within ½ mile of the community boundaries and these areas already experience some degree of human influence.

Under this alternative, the majority of the roads constructed within CRAs would be temporary, used only for the permitted activity, and decommissioned immediately after completion of the activity. Temporary roads would be available to foot traffic, bicycles, horseback riding, etc. which can have negative effects on wildlife. In addition, unauthorized use of closed or restricted roads has historically been difficult to control and enforce. Consequently, an assumption of minimal impacts from temporary roads may not always hold true.

Alternative 2 would allow tree-cutting to reduce hazardous fuels and improve forest health, and for other incidental removals. The estimated acreage to be treated is about 5,300 acres per year within the CRAs to reduce hazardous fuels and about 500 acres per year for other purposes, for a total of about 5,800 acres/year within the CRAs. This level of treatment constitutes less than 2% of the total acres within CRAs. An additional 1,200 acres per year is projected for tree-cutting within the remainder of the analysis area, half of which would be to treat hazardous fuels. Less than 100 acres per year is projected within the CRAs to improve habitat for threatened or endangered species.

The increased ability to treat acres for forest health and fuels management under alternative 2 could improve habitats for species that inhabit early seral stages and lower elevation forests with frequent low-intensity fire regimes. Removal of diseased, dead, and down materials could have negative impacts on primary cavity nesters, although forest plan requirements for retention of snags and down logs would help limit negative effects.

There are three areas are of particular concern for wildlife habitat within the 8,300 acres that would be removed from the CRA due to being within current ski area permit boundaries or forest plan management areas that have ski area emphasis. These are: Williams Fork IRA/CRA (Loveland ski area on Arapaho-Roosevelt NFs), Game Creek IRA/CRA (Vail ski area on White River NF), and Porcupine Creek IRA/CRA (Arapaho Basin ski area on White River NF). Williams Fork is a critical connecting land bridge for large carnivores and other wide-ranging species across I-70 between the north and south parts of the State. Game Creek on the west side of Vail is a lynx linkage area (Dowd Junction), deer migration corridor, and elk winter range that is experiencing growing recreational use. The Porcupine Creek roadless area provides a critical movement area for wildlife between the Arapaho Basin and Keystone ski areas and is identified as a lynx linkage area (Loveland Pass linkage). Currently, there is no plan for development on any of the 8,300 acres. Any future development within these areas would be subject to project-level analysis that would carefully consider impacts on habitat connectivity.

Threatened, Endangered and Proposed Species

As described for alternative 1, the Pawnee montane skipper and Mexican spotted owl could benefit from fuels treatments that restore more natural conditions. There is a much higher level of tree-cutting allowed and expected to occur under this alternative, although most of the treatments would be aimed at reducing fuels surrounding cities and towns. Temporary road construction and oil, gas or coal development could remove some habitat and cause

displacement, although site-specific analysis and design would likely reduce those potential impacts.

No road construction or tree-cutting are expected in those CRAs that contain known populations or habitat for the Uncompahgre fritillary butterfly. Similarly, for all but one of the roadless areas containing habitat for the southwestern willow flycatcher, no road construction or tree-cutting are projected to occur. The one exception may be fuels treatments within a Community Protection Zone, although such treatments would be unlikely to impact the riparian willow habitat used by this species.

Most of the CRAs provide lynx habitat, and there is at least a low likelihood that some road construction and tree-cutting activities could occur in a number of those CRAs, primarily for the purpose of fuels treatments. Fuels treatments that occur in the spruce-fir habitats used by lynx could reduce available snowshoe hare prey, which would adversely affect lynx. However, those projects would be subject to the management direction provided in forest plans, as amended by the Southern Rockies Lynx Amendment, which includes acreage caps and would limit the amount of impact. All forest plans also include management direction to maintain lynx habitat connectivity, which would remain in effect.

Under this alternative, some of the lands adjacent to ski areas that are within landscape linkages for the Canada lynx, where the forest plan would allow further ski area development, are exempted from the roadless prohibitions that would otherwise apply. As discussed under alternative 1, only the 1,700 acres that are not currently permitted differ in development opportunities under this alternative than alternative 1. The 1,700 acres would require a NEPA analysis to include the acres in the ski area permit. This elevates the risk to lynx but future development would be subject to project-level analysis that would carefully consider impacts on habitat connectivity. Additionally, per the Southern Rockies Lynx Amendment, any projects would have to be designed in a way that maintains habitat connectivity.

It is anticipated that fuels treatments and associated temporary road construction would occur in many of the CRAs that contain Preble's meadow jumping mouse habitat. This species is vulnerable to habitat alteration and disturbance during the short period when it is not hibernating. It is expected that project design would attempt to avoid the low-elevation riparian habitat of this species, but that may not always be possible. Over the long term, reducing the risk of uncharacteristically severe wildfires through prescribed fire or mechanical treatment would benefit this species.

Similarly, temporary road construction could occur in the low-elevation grassland habitat used by mountain plover, but there is a low likelihood that this would occur and any impacts would be minimal. Prescribed burning is beneficial for this species.

Overall, the level of protection for the 4.19 million acres of roadless areas under the Colorado roadless rule is higher than under current forest plan direction, with a generally low level and intensity of road construction, tree-cutting, oil and gas development, and ski area development. The anticipated effects are mostly beneficial, with the potential for some minor impacts to the Southwestern willow flycatcher, Mexican spotted owl, Pawnee montane skipper, Canada lynx, Preble's meadow jumping mouse, and mountain plover, and to designated critical habitat for the Mexican spotted owl and Preble's meadow jumping mouse. Effects are expected to be wholly beneficial for the Uncompahgre fritillary because of the higher degree of certainty of protection of its habitat under this alternative and the lack of any impacts anticipated in the foreseeable future.

Sensitive Species

The effects from alternative 2 are similar to those described previously for alternative 1, although the exceptions allow higher levels of road construction and tree-cutting in areas surrounding cities and towns, for coal development, and in the 1,700 acres adjoining certain ski areas.

Sensitive species associated with wetland, stream, lake and waterfall habitats are boreal toad, northern leopard frog, wood frog, river otter, Great Basin silverspot butterfly, Rocky Mountain capshell snail, and black swift. Road construction would have the greatest potential to have negative effects on these species and their habitats. Due to the limited circumstances under which roads could be constructed, the potential for adverse impacts is low.

As described for alternative 1, fuels treatments within lower elevation conifer forests could have long-term benefits to flammulated owl, Lewis' woodpecker, olive-sided flycatcher, bald eagle, and northern goshawk.

Vegetation treatment and road construction in subalpine forests is expected to occur at a low level, and therefore there is a low risk of adverse impacts on boreal owl, three-toed woodpecker, American marten, and pygmy shrew. However, there could be local impacts on these species from increasing edge effects, fragmentation and invasive species.

Several of the CRAs where the purple martin is known to occur on the Grand Mesa, Uncompahgre and Gunnison National Forests and the White River National Forest have existing oil and gas leases with development. Additional development on existing leases may have local adverse effects on this species if the activities occur in its aspen habitat, similar to alternatives 1, 3 and 4.

The white-tailed ptarmigan inhabits alpine tundra and adjoining subalpine forest where willow is present. Most fuels treatments would occur at lower elevations. Future ski area expansion in the 8,300 acres, including the 1,700 acres that could allow more development than alternative 1, could cause some additional impacts; however, there is no projected development on any of the 8,300 acres within the next 15 years.

Sensitive species inhabiting cliffs, caves, talus, and canyonlands include peregrine falcon, bighorn sheep, spotted bat, fringed bat, Townsend's big-eared bat, wolverine, and American hog-nosed skunk. Overall, only minor disturbances to these species and their habitats would be expected.

Four sensitive species inhabit grassland and meadow habitats: northern harrier, ferruginous hawk, loggerhead shrike, and kit fox. These habitats would largely be protected but could be impacted by road construction incidental to other management activities. These impacts would be minimal and localized.

Sensitive species that inhabit shrublands include greater sage-grouse, Gunnison sage-grouse, Columbian sharp-tailed grouse, and Brewer's sparrow. Although there could be some local impacts on individuals or their habitats, effects are expected to be minor.

Management Indicator Species

Existing forest plans were developed to maintain or improve the population and habitat trends for MIS populations. Given the large acreage afforded by roadless protection under this alternative, any changes in population trends for MIS would likely be an increase above current forest plan projections.

Some adverse habitat modifications or species impacts could occur from the exceptions allowing temporary roads, tree-cutting activities, and coal resource exploration and development, as described previously. For oil and gas development, this risk would be similar to alternative 1. The risks are associated with direct habitat loss, reduction in habitat effectiveness, fragmentation, increased risk of establishment and spread of invasive species and pathogens, and human-caused disturbance and mortality.

Migratory Birds

The Forests would continue to adhere to requirements under the Migratory Bird Treaty Act and the Executive Order for protection of migratory birds. Similar to alternative 1, the status and protection of important bird areas within roadless areas would not change. There would be no increased risk to IBAs existing in roadless areas.

Alternative 3 – Forest Plans (No Action)

The prohibitions and permissions on road construction and tree-cutting activities under this alternative are described in detail in chapter 2. The projected amount of new roads and tree-cutting expected in roadless areas over the next 15 years is described in the Analysis Framework section of this chapter.

Management direction and reasonably foreseeable actions projected under the current forest plans are compared with the direction and projections that could occur within the analysis area under this alternative. This alternative projects the highest level of activity than any of the four alternatives. There are 28 miles/year of road construction projected; 16,900 acres/year of tree-cutting projected; and 4 miles/year of linear construction zones projected.

The higher levels of road construction and vegetation management under alternative 3 would allow direct habitat reduction, disturbance and fragmentation. These would negatively affect terrestrial species in the manner described in the general effects discussion. The specific location and design of these activities would influence the actual effects and would be addressed at the project level.

In contrast to the other alternatives, the roads allowed under the forest plans (alternative 3) may be permanent roads. However, based on recent trends on NFS lands in Colorado, it is likely that many of the roads would be temporary and closed to public motorized use, and would be decommissioned after completion of the activity even under alternative 3. The increased mileage of road construction would facilitate recreation uses such as hiking, biking, and horseback riding in the backcountry. This increased human disturbance could increase impacts to terrestrial species and habitat, as described in the general effects discussion.

The increased flexibility to treat fuels under this alternative would improve habitats for early seral species in some areas and in the short term. The projected treatments would be expected to reduce the potential for an uncharacteristically severe wildfire. In beetle-killed stands located in areas of high importance to T&E and sensitive species, reductions in fuel loading and wildland fire hazards could be beneficial due to the expected reduction in fire severity.

The amount of road construction associated with oil, gas, or coal resource exploration and development is predicted to be higher under alternative 3 than the other alternatives. In the long term, alternative 3 would allow the most impact on IRAs or CRAs as a result of oil, gas, or coal development.

Roadless areas within ski area permit boundaries would be managed in accordance with the

forest plan direction rather than any roadless rule prohibitions or exceptions. Because ski areas would be managed under forest plans, alternative 3 would likely have effects similar to alternative 2 on lynx habitat connectivity, deer migration corridors, elk winter range, and other habitats of concern in those areas. Project planning and design would consider maintaining the integrity of wildlife habitats and movement corridors.

The higher level of anticipated road construction, vegetation management, and other activities under alternative 3 could lead to greater impacts on key wildlife habitats. However, the current forest plans were designed to ensure that viable populations of wildlife would be maintained through time. Project analysis and design would address the location, timing, duration, and magnitude of activities to minimize any possible adverse effects.

Threatened, Endangered, and Proposed Species

Under the existing Pike-San Isabel Forest Plan, current management direction is less restrictive than the other three alternatives for all roadless areas where the Pawnee montane skipper, mountain plover, and their habitat are known to occur. For the Mexican spotted owl, all of the roadless areas on the Pike-San Isabel, GMUG, and San Juan National Forests with known occurrences or suitable habitat have less restrictive management direction under those forest plans. The management direction on the Arapaho-Roosevelt, Rio Grande, and White River Forest Plans is generally comparable to or more restrictive than alternatives 1 or 2. These three species could benefit from fuels treatments that restore more natural conditions and from the use of prescribed fire, if applied to the appropriate areas at the proper time of year. This would be allowed in many areas. Road construction could adversely modify small acreages of habitat for these species by removing habitat from the road prism. Site-specific analysis and design could likely reduce potential impacts to these two species.

A review of the roadless areas that contain known populations or habitat for the Uncompahgre fritillary shows a much less restrictive management direction under the current forest plans for the GMUG and Pike-San Isabel NFs. Generally comparable management direction is in the forest plans for the Rio Grande and White River Forest Plan, compared with the other three alternatives. Current management direction for the roadless areas containing habitat for the southwestern willow flycatcher is generally comparable to the other two alternatives, with less restrictive direction in some portions of the roadless areas. Thus, there is a somewhat higher potential for adverse impacts on these species under existing forest plans. Again, site-specific analysis and design could likely reduce potential impacts to the specific habitats utilized by these two species.

Lynx habitat occurs within most of the roadless areas, and for a number of those roadless areas there is the potential for some road construction, tree-cutting and other activities under the current forest plans. Fuels treatments that occur in the spruce-fir habitats used by lynx could reduce available snowshoe hare prey, which would adversely affect lynx. Under the forest plans, as amended by the Southern Rockies Lynx Amendment, those projects would consider the recommended management guidance for lynx in their design, and would be subject to specific caps on the total acreage of fuels treatments. All forest plans also include management direction to maintain lynx habitat connectivity, which would remain in effect.

Under the current forest plans, vegetation management and associated road construction could occur in many of the roadless areas that contain the lower-elevation riparian habitats utilized by the Preble's meadow jumping mouse. It is important to avoid or minimize habitat alteration and disturbance during the short period when this species is not hibernating. These considerations

would be examined during site-specific project planning. At the same time, reducing the risk of uncharacteristically severe wildfires would be beneficial for this species in the long term.

Overall, based on the activities allowed and projected to occur in roadless areas, alternative 3 is not likely to adversely affect any T&E or proposed species. Additionally, alternative 3 would not likely result in adverse modification of designated critical habitat for the Mexican spotted owl or Preble's meadow jumping mouse. However, there is a substantially increased risk of negative effects or adverse habitat modification on those forests with older forest plans: the GMUG; Pike-San Isabel; Manti-La Sal; and San Juan National Forests.

Sensitive Species

Potential effects on sensitive species would be higher than under the other alternatives, based on the increased level of development in roadless areas. As with any of the alternatives, project level analysis and design would likely minimize the potential impacts to sensitive species.

Sensitive species associated with wetland, stream, lake and waterfall habitats are boreal toad, northern leopard frog, wood frog, river otter, Great Basin silverspot butterfly, Rocky Mountain capshell snail, and black swift. Road construction would have the greatest potential to negatively affect these species and their habitats.

As described for the other alternatives, fuels treatments within lower elevation conifer forests could have long-term benefits to flammulated owl, Lewis' woodpecker, olive-sided flycatcher, bald eagle, and northern goshawk.

Vegetation treatment and road construction in subalpine forests could have local adverse impacts on boreal owl, three-toed woodpecker, American marten, and pygmy shrew. These impacts would be attributed to the potential for increased edge effects, fragmentation, and invasive species associated with the much higher level of development allowed within roadless areas.

Several of the CRAs where the purple martin is known to occur on the GMUG National Forests and the White River National Forest have existing oil and gas leases with development within them. There is potential for additional development to occur, which could have local adverse effects on this species if the activities occur in its aspen habitat.

The white-tailed ptarmigan inhabits alpine tundra and adjoining subalpine forest where willow is present. There is a higher potential under this alternative for adverse impacts to this species.

Sensitive species inhabiting cliffs, caves, talus, and canyonlands include peregrine falcon, bighorn sheep, spotted bat, fringed bat, Townsend's big-eared bat, wolverine, and American hog-nosed skunk. Overall, only minor disturbances to these species and their habitats would be expected.

Four sensitive species inhabit grassland and meadow habitats: northern harrier, ferruginous hawk, loggerhead shrike, and kit fox. These habitats could be impacted by road construction incidental to other management activities within roadless areas. These impacts would likely be minimal and localized.

Sensitive species that inhabit shrublands include greater sage-grouse, Gunnison sage-grouse, Columbian sharp-tailed grouse, and Brewer's sparrow. The management direction in forest plans could result in some local impacts on individuals or their habitats, but project planning and design, in accordance with the forest plan, would likely minimize the effects.

Based on the effects this alternative could have on sensitive species and habitats, alternative 3 may adversely affect individual species but would not likely result in a loss of viability or cause a trend toward federal listing of any sensitive species on the national forests in Colorado.

Management Indicator Species

Existing forest plans are designed to maintain or improve the population and habitat trends for MIS populations. This alternative would not change current direction, and therefore there would not be any changes expected in the habitat or population trends of these species.

Some local adverse habitat modifications or species impacts could occur from road construction and reconstruction, tree-cutting activities, and oil, gas or coal resource exploration and development, as described previously. The risks are associated with direct habitat loss, reduction in habitat effectiveness, fragmentation, increased risk of establishment and spread of invasive species and pathogens, and human-caused disturbance and mortality.

Migratory Birds

The status and protection of important bird areas within roadless areas differ under alternative 3 with respect to one designated IBA. The Alfred M. Bailey Bird Nesting Area IBA occurs within the Eagles Nest Wilderness Area but is adjacent to the Maryland Creek Roadless Area on the White River National Forest. As described in the Affected Environment section, this IBA provides one of the most diverse bird breeding sites in Colorado. Because the actual IBA is within the wilderness area outside of the roadless area, this potential impact would not occur directly at the IBA location. However, under alternative 3, the Maryland Creek Roadless Area may experience some timber management activities because the area would be managed for general forest products.

The Forest Service would continue to conserve migratory birds through application of forest plan management direction and project planning and design.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

The CRA boundaries are the same as alternative 2, where about 4.19 million acres would be managed to maintain roadless area characteristics, which would benefit a wide range of wildlife species. There are 2,614,200 acres of upper tier within the CRAs; over 2 million more acres than alternative 2. The projected amount of new roads and tree-cutting expected in CRAs over the next 15 years is described in the Analysis Framework section of this chapter. Under this alternative, the Forest Service would offer cooperating agency status to the State of Colorado for all proposed projects and planning activities to be implemented on lands within Colorado Roadless Areas.

Alternative 4 contains identical prohibitions and exceptions to alternative 2. The difference in the projected activities is due to the amount of acres within upper tier. Under this alternative, there are 14 miles per year of road construction projected within the CRAs and an additional 4 miles per year of road construction projected within the remainder of the analysis area. There are 1,800 acres per year of tree-cutting projected within the CRAs (1,600 are for hazardous fuels treatment). An additional 1,200 acres per year of tree-cutting is projected within the remainder of the analysis area (half of which is for hazardous fuels treatment), identical to alternative 2. As with alternative 1, less than five acres per year are projected within the CRAs to improve habitat for threatened or endangered species. The same 3 miles/year of linear construction zones are projected within the CRAs as alternative 2.

There is an increased ability to treat acres for forest health and fuels management under alternative 4 than alternative 1, but much less than alternative 2. These treatments could improve habitats for species that inhabit early seral stages and lower elevation forests with frequent low-intensity fire regimes. Removal of diseased, dead, and down materials could have negative impacts on primary cavity nesters, although forest plan requirements for retention of snags and down logs would help limit negative effects.

Threatened, Endangered, and Proposed Species

As this alternative contains more upper tier acres within Colorado Roadless areas, there is a lower risk of adverse effects to threatened, endangered, and proposed species as a result of temporary road construction and other resource management activities in these areas. However, the removal of the provision allowing tree-cutting, sales, or removal for habitat improvement of threatened, endangered, or sensitive species in the upper tier may result in a higher risk of adverse impacts for the Mexican spotted owl over the long term due to uncharacteristically severe wildfires in its lower elevation montane forest habitat. None of the CRAs that provide habitat for Pawnee montane skipper are included in the upper tier, so the effects are identical to alternative 2 for this species.

Sensitive Species

Alternative 4 would have similar effects to alternative 2. As this alternative contains more upper tier acres within the Colorado Roadless areas, there is a lower risk of adverse effects to sensitive species in these areas as a result of temporary road construction and other resource management activities. However, the removal of the provision allowing tree-cutting, sales, or removal for habitat improvement of threatened, endangered, or sensitive species may result in a higher risk of adverse impacts over the long term. These impacts would be due to uncharacteristically severe wildfires in lower elevation montane forests, shrublands and grasslands

Management Indicator Species

Given the large acreage afforded roadless protection under this alternative and the upper tier acres where little if any activity would occur, any changes in population trends for MIS would likely be an increase above current forest plan projections.

As this alternative contains more upper tier acres within the CRAs, there is a lower risk of adverse effects to management indicator species in these areas due to temporary road construction and other resource management activities.

Migratory Birds

The Forests would continue to adhere to requirements under the Migratory Bird Treaty Act and the Executive Order for protection of migratory birds. Similar to the other alternatives, the status and protection of important bird areas within roadless areas would not change.

Terrestrial Species and Habitat: Cumulative Effects

This cumulative effects analysis considers how other factors might combine with the direct and indirect effects of the alternatives just described to have an additive impact. Past, present, and reasonably foreseeable future actions were evaluated, including those described in Appendix E, Cumulative Effects.

The effects of projected activities in roadless areas that result in habitat loss or degradation,

fragmentation, disturbance, and/or increases in invasive species and pathogens were previously discussed as potential direct and indirect effects. Those are the effects that may combine with effects from other activities or land uses in or adjacent to roadless areas to result in a cumulative effect. The following discussion addresses the activities ongoing or expected in the next 15 years in the Colorado National Forests especially those adjacent to or potentially affecting roadless areas.

Increasing Human Population Growth and Development

Colorado's residential population in 2006 was 4.8 million and is expected to be 7.3 million by 2030 (Colorado DOLA State Demography Office 2007). The increased demands these residents will place on the lands surrounding roadless areas will increase the importance of the roadless areas to terrestrial and aquatic species. The higher resource demands placed on the land by a larger population could also limit options for any future protection of new roadless acres that might otherwise be identified. In light of projected future population trends, roadless areas would continue to provide some of the best terrestrial and aquatic species habitat in Colorado into the future.

The effects of population growth on wildlife are evident in the amount of habitat that has been converted to human development or fragmented by it across the State. Residential, commercial and industrial developments are built on what used to be open space. Five-acre ranchettes have replaced large tracts of private land that used to belong to ranching families. Much of that development has occurred in lower elevation areas that have historically provided habitat that allowed species, such as bears and ungulates, to prepare for and survive winter. Providing for the intact structure and function of the limited low and middle elevation roadless areas with these types of high-value, yet limited habitats, is even more important now and into the future. This human-associated encroachment has resulted in, and is expected to continue to decrease habitat availability, decrease habitat effectiveness, increase disturbance, and increase fragmentation.

Colorado's Comprehensive Wildlife Conservation Strategy provides a foundation for sustaining Colorado's wildlife and their habitats (Colorado Department of Natural Resources, Division of Wildlife 2006). The strategy provides general directions for wildlife conservation and a stimulus plan to engage partners in conservation of Colorado's wildlife resources. These efforts will increase the probability of terrestrial species habitats on non-federal land remaining stable over the long term. However, considering the growth rate of the State and the high demand for resources available in Colorado, some non-federal lands will continue to experience impacts on natural resources from urbanization and development, resource demands (for example, minerals), and recreation. Some effects that result in lower habitat quality on non-federal land may limit the potential effectiveness of habitat conservation and restoration on federal lands.

Increasing Recreation Demand

The growing population will continue to be drawn to the natural beauty, seclusion, and undeveloped nature of roadless areas in Colorado for enjoyment of outdoor recreation pursuits. Demand for additional snowmobile, hiking, mountain bike, and cross-country ski trails will continue to increase, thereby increasing the use of roadless areas. The trend in mountain bike use in particular has greatly increased in the past decade. Habitats and associated animals previously secluded and undisturbed now experience an unpredictable human presence. The physiological effects of these types of occurrences and impacts on survival have been discussed in previous sections. Recreational activities can affect the quality and quantity of habitat,

displace wildlife from core habitats, fragment habitat, and increase the establishment and spread of invasive species and pathogens. Thus, increases in recreational use could compound the effects of increased road construction and vegetation treatment for many wildlife species.

Increasing Energy Demand

Oil, gas, and coal reserves are among the valuable natural resources found within the roadless areas and surrounding lands in Colorado. The national focus on energy independence, combined with the high demand for energy, has resulted in a surge of exploration and development of those resources across the State. Many of the areas where exploration and development are occurring also provide valuable wildlife habitat and in some cases this habitat is critical to the survival of individuals and populations of species. Although most development occurs on non-federal lands, many areas are adjacent or in close proximity to NFS roadless areas. Development of non-federal lands displaces animals onto adjacent NFS lands, accentuating the need to provide effective habitat that is free from disturbance. The Mamm Peak CRA is an example of that situation; the CRA has concentrated gas field development on adjacent private and BLM lands in areas important for elk calving and winter range. Consequently, the Mamm Peak CRA, which provides very important habitat, is critical to the survival of that elk population.

The current interest in wood fiber and biofuels as economical energy sources is anticipated to increase, placing additional attention on NFS resources. It can be anticipated that harvesting wood fiber to meet increasing demand will increase as technology improves. Tree harvesting, as discussed throughout this document, may require road infrastructure, which could result in the associated impacts on wildlife discussed previously in this document.

Development of wind energy is another anticipated focus in the effort to become energy independent, and national forests are beginning to receive inquiries about tower placement. Mortality of migrating bats and a variety of birds by striking wind towers has been documented in numerous locations. Like other intrusions into previously undisturbed habitats, these structures directly remove habitat and have the potential to modify habitat effectiveness, create disturbance, and fragment landscapes, thus adding to the cumulative effect of activities in the proposed alternatives.

Some energy-related activities require pipelines to move the product off and through the national forests. Direct loss of habitat and disturbance created during construction may become permanent for above-ground structures. Most electrical transmission lines have been concentrated along corridors adjacent to roadless areas, rather than going through roadless areas.

Cumulative Effects

Based on scientific literature (Stein et al. 2000, Flather et al. 1999, Noss and Cooperrider 1994), it is possible to conclude that with or without conservation of roadless areas, biodiversity is at an increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and non-native species invasions. Maintenance of roadless areas characteristics may lessen this risk, at least in the near term (15 years).

By reducing the level of potential adverse impacts on roadless areas, some of the last relatively undisturbed large blocks of land, outside of designated wilderness areas, that contribute to species biodiversity would be conserved.

Alternative 1, when combined with other cumulative effects, would be beneficial to maintenance of biological diversity, including benefits for species habitats, populations, and landscape diversity. Alternative 1 would provide for considerably more secure habitat and protection for T&E species, sensitive species, and other terrestrial wildlife than under current direction. Conservation of roadless areas will be increasingly important with the growing population and pressures on the land in Colorado.

Alternatives 2 and 4, with their exceptions for road construction, tree-cutting, sale or removal, and coal development would be less beneficial to biological diversity than alternative 1 when combined with other cumulative effects. The upper tier acres under each of these alternatives would have almost no road construction or tree-cutting activities. Designating approximately 4.19 million acres of roadless area would result in a net benefit to T&E species, sensitive species, and other terrestrial wildlife. Although substantially altered acres are removed from the roadless inventory, an equivalent acreage of areas that are currently roadless would be added. Project-level analysis and design would minimize local effects on species.

Alternative 3, because of less restriction of land use activities in roadless areas, would pose a higher risk of affecting biological diversity, species habitats, and populations than the other alternatives. However, these effects would not be uniform across forests or roadless areas. As previously described, some forest plans place more restrictions than others on road construction or tree-cutting activities in some of their roadless areas. For those with forest plans that are less restrictive on activities within roadless areas, effects from activities outside the roadless area boundary would add to the potential adverse effects described for this alternative.

SCENIC QUALITY

Introduction

Scenery with natural-appearing landscapes enhances people's lives and benefits society (Driver et al. 1991). It is a primary reason that people choose to recreate on NFS lands, and it contributes directly to real estate values in neighboring communities and residential areas. Scenic quality is based on two definable elements, landscape character and scenic integrity. Landscape character defines particular attributes, qualities, and traits of a landscape that give it an image that makes it identifiable or unique. Scenic integrity measures the state of naturalness or disturbance created by human activities or alteration. Roadless areas inherently have high scenic quality because of the lack of human-induced disturbance.

The scenic quality of a forest is not static; it changes over time. To varying degrees, roads, tree-cutting, insect infestations, and wildland fires all affect the scenic integrity of a landscape. Managers may influence the effects of natural events to some extent by managing vegetation with silvicultural and fuels treatments. The positive effects on scenic quality resulting from reducing the effects of these events may be offset by the negative effects of road construction and vegetative treatments. Wildfire events, insect or disease infestations, avalanches, and other natural events are considered a part of a landscape's natural processes. Such events and resultant landscape changes (even if visually unappealing) are consistent with High or Very High levels of scenic integrity.

Scenery: Affected Environment

Resource management activities in roadless areas strive to achieve long-term sustainable landscape character goals within the scenic integrity objectives identified in the land management planning process using the Scenery Management System (SMS) (USDA Forest Service 1995b) or with establishment of visual quality objectives using the Visual Management System (VMS) (USDA Forest Service 1974). These visual or scenic management objectives define allowable levels of change on specific land areas.

The VMS process applies to all management activities on National Forest System lands to set visual goals and assist in final management decisions. It provides the groundwork for visual assessments that evaluate the visual resources, character types/variety classes, and sensitivity levels based on public concerns, and ultimately assigns Visual Quality Objectives (VQO). These VQO's establish degrees of acceptable alterations to the natural landscape found in various management units.

The current basis for describing scenic quality is the SMS, as described in Landscape Aesthetics (USDA Forest Service 1995b). This handbook defines a system for inventory and analysis of the aesthetic values of NFS lands and replaces the Visual Management System. The analysis evaluates how the prohibitions and exceptions for tree-cutting, sale or removal, road construction/reconstruction, and discretionary mineral activities would affect the ability to maintain or enhance the supply of high scenic quality.

The SMS identifies landscape character and scenic integrity as the basis for scenic quality. Landscape character is the overall visual impression of landscape attributes that provide a landscape with an identity and sense of place; it consists of the combination of physical,

biological, and cultural attributes that make each landscape identifiable and distinct. Similar to VQO's, Scenic Integrity Objectives (SIO) are the measure of the wholeness or completeness of the landscape, including the degree of visual deviation from the landscape character valued by constituents. Scenic integrity is a continuum ranging over five levels of integrity from Very High to Very Low. Unacceptably Low scenic integrity is not considered an objective. The following table shows a cross-walk of the SMS/SIO's and the VMS/VQO's.

Table 3-37. Scenic Integrity Objectives and Visual Quality Objectives

Scenic Quality	Visual Quality
Very High (Unaltered): refers to landscapes where the valued landscape character is intact with only minute, if any, deviations. The existing landscape character and sense of place is expressed at the highest level.	Preservation: this visual quality objective allows ecological changes only. Management activities, except for very low visual-impact recreation facilities, are prohibited.
High (Appears Unaltered):refers to landscapes where the valued landscape character appears intact.	Retention: this visual quality objective provides for management activities which are not visually evident.
Moderate (Slightly Altered): refers to landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed.	Partial Retention: management activities remain visually subordinate to the characteristic landscape when managed.
Low (Moderately Altered): refers to landscapes where the valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape but they borrow valued attributes from the surrounding landscape.	Modification: management activities may visually dominate the original characteristic landscape. However,, activities of vegetative and land form alteration must borrow from the naturally established form, line, color or texture and must remain visually subordinate to the proposed composition.
Very Low (Heavily Altered): refers to landscapes where the valued landscape character appears heavily altered. Deviations may strongly dominate the valued landscape.	Maximum Modification: management activities of vegetative and landform alterations may dominate the characteristics landscape.
Unacceptably Low: where human activities of vegetative and landform alterations are excessive and totally dominate the natural or natural-appearing landscape character.	Unacceptable Modification: overall extent of management activities is excessive or poorly related to scale of landform and vegetative patterns in the characteristic landscape.

The original VMS process was considered a visual "snap shot in time" and established acceptable levels of management activities. In comparison, the current SMS process creates a visual inventory of acceptable levels of management activities and focuses on future desired visual conditions. With the advent of GIS technology, SMS coverage mapping is recorded forest-wide. Typically, the transition from the VMS process to the SMS process occurs whenever a forest goes through their forest plan revision. Some national forests in Colorado have revised forest plans and have converted to the Scenery Management System. Other national forests are under the Visual Management System:

- Scenery Management System – Arapaho-Roosevelt NFs and Pawnee NGs, GMUG NFs, Rio Grande NF, San Juan NF, White River NF
- Visual Management System – Pike-San Isabel NFs, Routt NF, Manti-La Sal NF

Roadless areas generally do not carry evidence of management activities and currently have a high degree of scenic integrity. The scenic integrity of landscapes in these roadless areas is generally High to Very High or Retention to Preservation, which indicates a low level of landscape modification due to a lack of high intensity management activities in the past. However, some roadless areas have had extensive use, including from ski areas, cattle grazing, off-highway vehicles, timber sales, and mining. Therefore, the scenic integrity/objectives have

been modified and the resulting scenic integrity is considered Moderate/Partial Retention to Low/Modification. These substantially altered areas in inventoried roadless areas do not meet the desired scenic quality conditions for maintaining roadless area characteristics and values in inventoried roadless areas.

Scenery: Environmental Consequences

Alternative 1- 2001 Roadless Rule

The 2001 Roadless Rule is anticipated to maintain high levels of scenic integrity in the roadless areas. By maintaining the restrictions or limitations on future road construction or reconstruction and tree-cutting activities within IRAs, the scenic quality would remain substantially unaltered by future management activities, consistent with High to Very High SIOs or Retention to Preservation VQOs.

The 2001 Roadless Rule would allow road construction in limited situations. About 11 miles of road construction and reconstruction are projected to occur within the IRAs, along with an additional three within the remainder of the analysis area, over the next 15 years under this alternative. The majority of these would be temporary roads associated with existing oil and gas or coal leases. It is anticipated that the amount of change from such new road construction would have a negligible change on the current High and Very High scenic integrity in most roadless areas. In those few areas where roads are constructed, the scenic integrity could change from High to Low or Moderate.

There are existing oil and gas leases within the IRAs, as well as existing coal leases. The disturbance in these areas, which includes both road construction and tree-cutting while operations are ongoing, can be expected to have an impact on the scenic value. However, as areas are reclaimed and roads are removed, the scenic values would increase over time, commensurate with the revegetation.

The 2001 Roadless Rule would allow limited tree-cutting of generally small-diameter material for specific purposes within IRAs. About 1,200 acres within the IRAs and an additional 1,100 acres within the remainder of the analysis area are anticipated to be treated annually over the next 15 years. The intensity of change associated with such activities is not expected to create a measurable change in scenic integrity, though there could be minor localized effects. The magnitude or amount of area per project that would potentially be affected is also considered to be relatively minor, typically several hundred acres or less. Vegetation management would result in short-term changes in scenic quality. These projected activities would be spread out over very large acreages.

Based on the anticipated intensity and magnitude of change from potential vegetation management, it is anticipated that most of the current High and Very High scenic integrity within all IRAs would be retained.

Retaining the substantially altered areas and developed ski areas inside the roadless areas would allow portions of the roadless areas to continue to depart from desired roadless area characteristics and values regarding scenic quality.

The acres within the analysis area that are not within the IRAs have been identified by the forests as having roadless area characteristics and are most likely have High/Retention and Very High/Preservation scenic integrity. Where tree-cutting, sale or removal and road

construction is projected to occur, the SIO/VQOs could change on those acres from High/Retention to Moderate/Partial Retention.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Under this alternative, limiting human activities in CRAs helps minimize adverse modifications to existing scenic quality. Removing the substantially altered areas and developed ski areas from the CRAs and redefining the CRA boundaries to include areas with roadless area characteristics would increase values regarding scenic quality.

Annually, 16 miles of road construction are projected within the CRAs and an additional four miles are projected within the remainder of the analysis area. Most of these roads are temporary roads, including those temporary roads associated with existing oil and gas development and existing and future coal leases within the North Fork coal mining area. All roads would be decommissioned following the specific permitted use. It is anticipated that the amount of change from such new road construction would have a negligible change on the current High and Very High scenic integrity in most roadless areas. In those few areas where roads are constructed, the scenic integrity could change from High to Low or Moderate.

There are existing oil and gas leases within the CRAs, as well as existing coal leases. In the future, an additional 16,000 acres within the North Fork coal mining area would be available for coal leases including road construction. The disturbance in these areas, which includes both road construction and tree-cutting while operations are ongoing, can be expected to have an impact on the scenic value. However, as areas are reclaimed and roads are removed, the scenic values would increase over time, commensurate with the revegetation.

Limited tree-cutting, sale, or removal is permissible in CRAs, primarily to reduce the wildfire hazard to at-risk communities or municipal water supply systems. Annually, tree-cutting, sale, or removal is projected to occur on about 5,800 acres within the CRAs, the majority within the CPZ. Forests project an additional 1,200 acres of tree-cutting annually within the remainder of the analysis area. Tree-cutting within the CRAs, other than for the purpose of incidental, personal, or administrative uses, must maintain or improve one or more of the roadless area characteristics over the long-term.

Tree-cutting could modify scenic integrity at least in the short term, but is assumed to maintain at least a Moderate/Partial Retention level of scenic quality. In the long term, SIOs/VQOs associated with these tree-cutting treatments would result in High/Retention to Very High/Preservation scenic levels. It is likely that tree-cutting would be spread across multiple roadless areas across the State, thus reducing the potential change in any one CRA. Also, potential effects across CRAs would be moderated because priority treatment of hazardous fuels would be concentrated around communities. These treatments would minimize impacts to communities by applying SIO and VQO guidelines from forest plans.

Based on the anticipated intensity and magnitude of change from potential vegetation management, it is anticipated that most of the current High and Very High scenic integrity within all upper tier acres would be retained due to the limited activities allowed.

Removing the substantially altered areas and developed ski areas from the roadless areas would allow these areas to be managed according to forest plan direction regarding scenic quality, which may no longer reflect roadless area characteristics. However, the substantially altered acres were specifically removed because they currently do not reflect roadless area

characteristics. The additional CRA acres added to the inventory are mostly High/Retention and Very High/Preservation scenic integrity and would be retained as such due to the limited activities allowed under alternative 2 over the long term.

Alternative 3 – Forest Plans (No Action)

This alternative would incur the highest risk of increased adverse impacts to existing scenic quality. This is because this alternative allows for the most additional road construction or reconstruction and tree-cutting, sale, or removal activities in IRAs, as defined by individual forest plans. Based on the forest plan restrictions on activities within the areas analysis area, including within the IRAs, combined with topographic or economic constraints, new roads or tree-cutting activities would be projected to occur on only a small percentage of the existing roadless area acreage.

Management prescriptions similar to Wilderness/Primitive settings are likely to retain their High/Retention to Very High/Preservation SIOs/VQOs because limited activity is permitted to occur in these areas. Generally, natural processes dominate.

Annually within the analysis area, approximately 28 miles of road are projected to be constructed or reconstructed. Tree-cutting, sale, or removal is projected to occur on approximately 16,900 acres.

There are existing oil and gas leases within the analysis area, as well as existing coal leases. Under this alternative, future leasing can occur. The disturbance in these areas, which includes both road construction and tree-cutting, while operations are ongoing, can be expected to have an impact on the scenic value. However, as areas are reclaimed and roads are removed, the scenic values would increase over time, commensurate with the revegetation.

Scenic quality could be reduced in areas where road construction/reconstruction occurs. In areas with prescriptions similar to the backcountry theme, it is likely that scenic quality would not be reduced as much because these prescriptions generally encourage the use of temporary roads (short-term impact) and retention of more trees because of wildlife considerations. There may be some beneficial effects on scenic quality from silvicultural and fuels treatments that reduce the potential magnitude of natural events such as insect infestations and wildland fires. Also, potential effects would be moderated because of priority treatment of hazardous fuels around communities and by applying SIOs and VQOs guidelines from forest plans.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Under this alternative, limiting human activities in CRAs would help minimize adverse modifications to existing scenic quality. Removing the substantially altered areas and developed ski areas from the CRAs, and redefining the CRA boundaries to include areas with roadless area characteristics would increase values regarding scenic quality.

Annually, 14 miles of road construction are projected within the CRAs and an additional 4 miles projected within the remainder of the analysis area. Most of these roads are temporary roads, including those temporary roads associated with hazardous fuels treatments, existing oil and gas leases, and existing and future coal leases within the North Fork coal mining area. All would be decommissioned following the specific use. It is anticipated that the amount of change from such new road construction would have a negligible change on the current High and Very High scenic integrity in most roadless areas. In those few areas where roads are constructed, the scenic integrity could change from High to Low or Moderate.

There are existing oil and gas leases within the CRAs, as well as existing coal leases. In the

future, an additional 16,000 acres within the North Fork coal mining area is available for future coal leases including road construction. The disturbance in these areas, which includes both road construction and tree-cutting, while operations are ongoing, can be expected to have an impact on the scenic value. However, as areas are reclaimed and roads are removed, the scenic values would increase over time, commensurate with the revegetation. Those acres within the upper tier acres that have existing oil and gas leases would continue to allow development according to lease stipulations and may not provide additional scenic quality until after operations have been completed and reclaimed.

Limited tree-cutting, sale, or removal is permissible in CRAs, primarily to reduce the wildfire hazard to at-risk communities or municipal water supply systems. Annually tree-cutting, sale, or removal is projected to occur on about 1,800 acres within the CRAs, the majority within the CPZ. Forests project an additional 1,200 acres of tree-cutting annually within the remainder of the analysis area. Tree-cutting within the CRAs, other than for incidental, personal, or administrative purposes, must maintain or improve one or more of the roadless area characteristics over the long-term and would be limited to those acres outside of the upper tier.

Tree-cutting outside the upper tier acres could modify scenic integrity at least in the short term, but is assumed to maintain at least a Moderate/Partial Retention level of scenic quality. In the long term, SIOs/VQOs associated with these tree-cutting treatments would result in High/Retention to Very High/Preservation scenic levels. It is likely that tree-cutting would be spread across multiple roadless areas across the State, thus reducing the potential change in any one CRA. Also, potential effects across CRAs would be moderated because of priority treatment of hazardous fuels would be concentrated around communities that are not within the upper tier. These treatments would minimize impacts to communities by applying SIO and VQO guidelines from forest plans.

Based on the anticipated intensity and magnitude of change from potential vegetation management, it is anticipated that the most of the current High and Very High scenic integrity within all upper tier acres would be retained due to the limited activities allowed.

Removing the substantially altered areas and developed ski areas from the roadless areas allows these areas to be managed according to forest plan direction regarding scenic quality, which may no longer reflect roadless area characteristics. However, the substantially altered acres were specifically removed because they currently do not reflect roadless area characteristics. The additional CRA acres added to the inventory are mostly High/Retention and Very High/Preservation scenic integrity and would be retained as such due to the limited activities allowed under alternative 4 over the long-term.

Scenery: Cumulative Effects

Past actions and events have shaped the current landscape. The current High/Retention to Very High/Preservation scenic qualities are a reflection of the low level of active management in these areas. It is anticipated that current or planned actions and foreseeable future actions would generally retain the current High/Retention to Very High/Preservation scenic quality designations with the majority of the CRAs under any alternative.

RECREATION

Many definitions of recreation exist, each emphasizing a slightly different aspect of an enjoyable pursuit. The basic premise behind recreation is the pleasurable and constructive use of one's spare time. This sense of refreshment, relaxation, and the active pursuit of pleasure are realized through participation in recreational activities suited to individual preference.

This analysis reviews the possible changes to roadless areas available for dispersed recreation, developed recreation, and recreation special uses. The disclosed environmental consequences are based on factors such as trends in recreation use; the prohibitions and permissions for tree-cutting and road construction and reconstruction; and the availability of future roadless areas in Colorado to meet growing future demands.

Generally, the recreation characteristics of most roadless areas are either in a Primitive setting, a Semi-Primitive Non-Motorized (SPNM) setting, or a Semi-Primitive Motorized (SPM) setting. A Primitive setting describes an area with little developed infrastructure that allows non-motorized uses but may also allow mechanized uses. A SPNM setting describes an area with minimal developed infrastructure that allows non-motorized and mechanized use. A SPM setting describes an area with minimal developed infrastructure that allows for non-motorized, motorized, and mechanized uses. More developed recreational settings, including roads, trail heads, campgrounds, boat launches, and picnic areas, would be found outside of roadless areas, but would allow access to trails into roadless areas.

Dispersed Recreation: Affected Environment

Dispersed recreation is generally associated with activities that do not require constructed facilities, except for trails. Non-motorized activities (such as hiking, biking, and backcountry skiing) and motorized activities (such as snowmobiling and OHV trails use) best represent dispersed recreation. Thus, dispersed recreation is generally associated with the Primitive, SPNM, and SPM recreation settings. Roadless areas in Colorado provide opportunities for non-motorized, motorized, and mechanized dispersed recreation activities, as well as fishing and big-game hunting opportunities.

These roadless areas provide settings for dispersed recreational activities that are prohibited in designated wilderness areas and not readily available in developed or modified settings with system roads. For example, wilderness areas prohibit, with few exceptions, mechanized and motorized uses such as OHVs, mountain bikes, and snowmobiles. Within roadless boundaries, these activities are permitted on designated trails, including current and new trail construction. Wheelchair or handicapped access is allowed within wilderness areas, but is expected to be very challenging. Depending on the travel management direction for an individual roadless area, many trails within roadless areas are open to OHV use for those who are not able to access remote areas without motorized assistance.

Four of the top five activities pursued on NFS lands (viewing natural features, general relaxation, hiking, and viewing wildlife) are generally associated with dispersed recreation (USDA Forest Service 2004b). The demand for Primitive, SPNM, and SPM classes and dispersed recreation opportunities is increasing (Cordell et al. 1999a and 1999b).

Dispersed Recreation: Environmental Consequences

All Alternatives

Restrictions or limitations on future road construction or reconstruction and tree-cutting activities within roadless areas would maintain existing opportunities for dispersed recreation in a semi-primitive setting that would be substantially unaltered by future management activities.

Travel management decisions made outside this rulemaking process will have an impact on the types of motorized and non-motorized use and level of use available within roadless areas under any alternative.

Alternative 1- 2001 Roadless Rule

Alternative 1 prohibits road construction and reconstruction in IRAs except under very limited exceptions. The limited road construction and reconstruction exceptions could change the dispersed recreation opportunities within a given area. Annually, about 11 miles of road are projected to be constructed or reconstructed within the IRA boundaries. In addition, about three miles are projected to be constructed outside of the IRA boundaries but within the analysis area, over the next 15 years. This level of disturbance would not measurably change the dispersed recreation opportunities in any given area.

There are currently about 1,260 miles of road within the boundary of the IRAs. Existing road density in roadless areas may gradually be reduced over time, as more miles of road would likely be decommissioned or obliterated than constructed. Many unauthorized roads would be eliminated or naturally disappear. The associated effects would increase the semi-primitive setting and recreation opportunities from fewer roads in the long-run.

Alternative 1 prohibits tree-cutting, sale or removal, with a few exceptions. Annually, it is projected there would be about 1,200 acres of tree-cutting annually within the IRAs. In addition, it is projected that there would be about 1,100 acres of tree-cutting outside of the IRA boundaries but within the analysis area over the next 15 years. This level of activity would not measurably alter roadless area characteristics currently identified, especially over the long-term.

IRAs would continue to provide habitat for wildlife and fish; therefore, hunting and fishing opportunities would continue. Retaining the substantially altered areas and developed ski areas inside the roadless areas would allow portions of the roadless areas to continue to depart from desired roadless area characteristics and values regarding semi-primitive settings. Visitors would expect IRAs to be substantially unroaded and undeveloped. Thus, those portions of the IRAs would continue to conflict with visitor expectations.

Alternative 2 –Colorado Roadless Rule (Proposed Action)

Under alternative 2, tree-cutting, sale, or removal and road construction and reconstruction are prohibited with specific exceptions. Approximately 16 miles of roads are projected (average annual) to be constructed or reconstructed within the CRAs. The majority of roads are temporary and associated with fuel treatments within the CPZ, for existing oil and gas leases, and within the North Fork Coal mining area for coal removal. An additional 4 miles annually of road construction on the substantially altered acres is projected over the next 15 years with most of the activity occurring in SPM areas, with lesser amounts in SPNM and Primitive settings in roadless areas.

This level of road construction and reconstruction could change dispersed recreation opportunity settings in some areas from a SPM to a more roaded type opportunity; however, because the roads are decommissioned and obliterated after use, the change in the type of recreation opportunity would be temporary. There are currently 8.5 miles of road within the CRAs, with 8.0 miles identified as no longer needed, and the majority of roads projected (16 miles) would also be decommissioned after use. Those roads remaining on the system are generally associated with access to private inholdings and would not be open for public use.

Tree-cutting is projected to occur annually on about 5,800 acres within the CRAs and about 1,200 acres on the substantially altered acres that are not within the CRAs. Depending on whether the tree-cutting occurs as thinning or as removal of dead material, the projected tree-cutting on 87,000 acres within the CRAs over 15 years may change the natural appearance of some areas for a period of time until the area regenerates. A majority of this tree-cutting would be done for hazardous fuels management, and would be done within one-half mile to one and half miles from at-risk communities in more developed recreation settings. Based on this level of tree-cutting, a small percentage of the CRAs would be affected over 15 years. Dispersed recreation opportunities would not change as a result of such tree-cutting, but the feeling of remoteness may change in some locations for a period of time.

None of these activities would take place in the upper tier acres where roads and tree-cutting for fuel treatments is prohibited. So, dispersed recreation in those upper tier acres would not likely see any changes due to exceptions.

Hunting and fishing opportunities likely would not change in areas where tree-cutting and associated road construction occurs because of the dispersed nature of these activities. Some species are likely to thrive in the openings created by the tree-cuttings prior to the recovery of vegetative conditions. The use of temporary roads would limit the impact to wildlife and fish habitat because the roads would be decommissioned as soon as the use is completed. In addition, any areas which are in the upper tier would see additional restrictions in activities under alternative 2.

Alternative 3 – Forest Plans (No Action)

This alternative would incur the highest risk of change or adverse impacts to the existing semi-primitive recreation setting and opportunities. This is because this alternative allows for the most additional road construction or reconstruction, tree-cutting, and discretionary fluid and solid mineral activities in roadless areas. However, based on forest plan restrictions on activities within the IRAs, together with topographic or economic constraints, new roads or tree-cutting activities would be projected to occur on only a small percentage of the existing roadless area acreage.

Under existing forest plans, road construction and reconstruction, tree-cutting, and oil, gas, and coal activities are generally not permitted on areas with management prescriptions of Primitive, SPNM and SPM. Some tree-cutting could occur in the more developed and roaded recreation settings but would likely not be done to a degree that would change the roadless character.

Within the analysis area, approximately 28 miles of road construction is projected to occur annually. Tree-cutting is projected to occur on 16,900 acres annually. This level of road construction and reconstruction could change dispersed recreation opportunity settings in some areas from a SPM to a more roaded setting; however, if roads are decommissioned after use then the change would be more temporary in nature.

Depending on the nature of the forest plan prescription, tree-cutting on 253,500 acres over 15 years may change the natural appearance of some areas for a period of time until the area regenerates. The type of cutting would depend whether the fuels treatment need is to thin overstocked stands or to remove dead material (see Scenery section). Based on this level of cutting, a small percentage of the roadless areas would be affected over 15 years. Dispersed recreation opportunities would not change as a result of tree-cutting, but the sense of remoteness may change for a period of time.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Under alternative 4, tree-cutting, sale, or removal and road construction and reconstruction are prohibited with specific exceptions. Approximately 14 miles of roads are projected to be constructed or reconstructed within the CRAs; the majority of roads are temporary and are associated with fuel treatments within the CPZ for existing oil and gas leases, and within the North Fork coal mining area for coal development. No new road construction is projected within the upper tier acres. An additional four miles of road construction on the substantially altered acres is projected over the next 15 years, with most of the activity occurring in SPM areas and lesser amounts in SPNM and Primitive settings in roadless areas.

This level of road construction and reconstruction could change dispersed recreation opportunity settings in some areas from a SPM to a more roaded type opportunity; however, because the roads are decommissioned and obliterated after use, the change in the type of recreation opportunity would be temporary. There are currently 8.5 miles of road within the CRAs, with 8.0 miles identified as no longer needed and the majority of roads projected (14 miles annually) would be decommissioned after use. Those roads remaining on the system are generally associated with access to private inholdings and would not be open for public use.

Tree-cutting is projected to occur annually on about 1,800 acres within the CRAs and about 1,200 acres on the substantially altered acres that are not within the CRAs. Depending on whether the tree-cutting occurs as thinning or as removal of dead material, the projected tree-cutting on 27,000 acres within the CRAs over 15 years may change the natural appearance of some areas for a period of time until the area regenerates. Based on this level of tree-cutting, a small percentage of the CRAs would be affected over 15 years.

A majority of this tree-cutting would be done for hazardous fuels management, and would be done within one-half mile to one and half miles from at-risk communities in more developed recreation settings outside of the upper tier acres. The acres in the upper tier would remain in their current recreation setting, but may create concern for local communities if not being able to treat those acres would cause hazards for fire fighters or local people if a fire should occur.

Dispersed recreation opportunities would not change as a result of such tree-cutting, but the sense of remoteness may change in a few locations for a period of time. Dispersed recreation in those upper tier acres would not likely see any changes due to exceptions.

Hunting and fishing opportunities likely would not change in areas where tree-cutting and associated road construction occurs because of the dispersed nature of these activities. Some species are likely to thrive in the openings created by the tree-cuttings prior to the recovery of vegetative conditions. The use of temporary roads would limit the impact to wildlife and fish habitat because the roads would be decommissioned as soon as the use is completed.

Developed Recreation: Affected Environment

Developed recreation sites are those with constructed facilities, such as campgrounds; picnic or day-use sites; trailheads and scenic overlooks with parking areas; interpretive sites; ski areas; and visitor centers. Developed recreation sites typically provide semi-primitive motorized, roaded natural, rural, and urban Recreation Opportunity Spectrum class opportunities and settings.

While some visitors prefer dispersed recreation opportunities and settings that are farther away from the sights and sounds of people and development, others prefer settings that offer more developed amenities, such as picnic tables, trash receptacles, roads, parking lots, boat ramps, and other built features.

There are about 1,820 developed recreation sites on NFS lands in Colorado (Region-2 INFRA-Recreation Facilities database, April 2008). Most of these sites are along roads that provide motorized access to the public. None of the roadless areas in Colorado contain developed recreation sites, except for portions of developed ski areas. However, access roads, campgrounds, and trailheads along the outer boundaries of many of the roadless areas provide public services and entry points into the roadless areas.

Developed Recreation: Environmental Consequences

All Alternatives

The effects on developed recreation opportunities in roadless areas do not substantially differ among the alternatives being evaluated in this document. Thus, the effects are described for all four alternatives at once.

Developed sites may be built adjacent to roadless areas in order to facilitate specific demands for recreation activities within the area. However, aside from trail construction (motorized and non-motorized), developed recreation sites would generally not be constructed within roadless areas under alternatives 1, 2 or 4. Under these alternatives, developed recreation sites could be developed in the analysis area acreage that is not within the roadless area boundaries for those alternatives, depending on forest plan direction or the upper tier restrictions.

Roads projected to be constructed in a roadless area for the foreseeable uses identified for each alternative would not be expected to remain open for public vehicle travel (see Analysis Framework). Therefore, there would be no measurable increase in motorized road access for recreation opportunities within roadless areas under any alternative. However, under alternative 3 there would potentially be additional opportunities for development of recreational sites or facilities within IRAs in accordance with forest plan direction. In addition, there would potentially be additional opportunities for development of recreational sites or facilities within the analysis area for all four alternatives on acreage not within the particular alternative's roadless area boundaries.

Recreation Special Uses (not including Ski Areas): Affected Environment

Recreation special use authorizations consist of permits, leases, or other written instruments that administratively authorize a broad range of commercial recreational activities, both motorized and non-motorized, in dispersed and developed recreation settings. Special use authorizations, usually permits, are issued for almost every type of outdoor recreational activity and facility, and can occur in every ROS class setting, from primitive to urban.

Visitors to national forests frequently turn to tourism providers to facilitate their recreation experience, which may come in the form of lodging, rental equipment, or outfitters and guides. Recreation special use permits are used by Forest Service managers to authorize commercial operators to provide desired services on NFS lands. Generally, aside from existing developed sites, little infrastructure is needed for the permitted activity, with the exception of hut systems.

Those operating under a special use permit help visitors enjoy high quality recreation experiences as an extension of the Forest Service's mission. These services allow people with limited time and skills or experience to safely participate in various activities.

There are about 1,390 recreation special use permits currently authorized within NFS lands in Colorado (Region-2 INFRA-SUA database, April 2008). These permits include outfitters and guides for hunting, fishing, rafting, backpacking, sightseeing, jeep tours, day hiking, ATV tours, and educational tours, as well as hut systems, educational camps, resorts and lodges, recreation events, and other activities. Outfitter and guide permits account for about 75 percent of all the recreation special uses on NFS lands in Colorado and a portion occur within roadless areas.

Recreation Special Uses (not including Ski Areas): Environmental Consequences

All Alternatives

There is little difference among alternatives with respect to recreation special use authorizations in roadless areas, because limitations on road construction and tree-cutting under any alternative would not be likely to affect the ability to obtain or use a recreation use authorization.

In general, recreation special use permits allow for commercial operations of activities that require the use of facilities (such as huts, resorts, shelters) and activities not requiring facilities (such as outfitters and guides). Because alternatives 1, 2, and 4 do not allow for road construction or reconstruction to facilitate recreation activities within the boundaries of the roadless areas, the special use authorizations in IRAs or CRAs would be limited to uses that do not need new roads. Under alternative 3 in IRAs and all alternatives in the analysis area acreage that would be managed in that alternative under the forest plan direction only, recreation use authorizations could include activities facilitated by new roads. Currently, there are no such road developments for recreation special uses projected to occur under any alternative.

Developed Ski Areas: Affected Environment

Developed ski areas are all of the areas authorized under the Ski Area Permit Act of 1986 and that have constructed facilities on NFS lands. This analysis evaluates effects of the alternatives on developed ski area recreation opportunities and experiences.

Ski resorts are one of the major land use authorizations permitted on NFS lands in Colorado. Nationally, there are 134 resorts operating on national forests that receive an estimated 30 million or more skier visits per year (National Ski Areas Association 2009). Colorado has the highest number of ski areas under permit on national forests (22 areas listed in Table 3-38) and the highest number of annual skier visits on national forests of any state, with 12.56 million skier visits for the 2006–07 season. Skiers spend approximately 2.6 billion dollars annually in the State, which is one third of annual tourist dollars spent. All ski areas operating under permit on National Forest System lands in Colorado have been withdrawn from mineral entry.

Table 3-38 Colorado ski areas on National Forest System lands

	Ski area	National forest
1	Arapahoe Basin	White River
2	Aspen Highlands	White River
3	Aspen Mountain	White River
4	Beaver Creek	White River
5	Breckenridge	White River
6	Buttermilk	White River
7	Copper Mountain	White River
8	Crested Butte	Grand Mesa, Uncompahgre, and Gunnison
9	Durango Mountain Resort	San Juan
10	Eldora	Arapaho-Roosevelt
11	Keystone	White River
12	Loveland	Arapaho-Roosevelt
13	Monarch	Pike- San Isabel
14	Powderhorn	Grand Mesa, Uncompahgre, and Gunnison
15	Ski Cooper	White River; and Pike-San Isabel
16	Ski Sunlight	White River
17	Snowmass	White River
18	Steamboat	Routt
19	Telluride	Grand Mesa, Uncompahgre, and Gunnison
20	Vail	White River
21	Winter Park	Arapaho-Roosevelt
22	Wolf Creek	Rio Grande

Ski areas not listed are not within National Forest System lands, or not operational.

During the 2005–2006 season, the number of skier visits in the United States hit an all-time record of 58.8 million visits, up 3.3 percent from the previous season and up two percent from the previous record set in 2002–2003 (RRC Associates 2006). With the population growth in many of the key western ski states, the rising ski area visitor trend is projected to continue into the foreseeable future.

The settings, experience, and activities usually associated with ski areas are more representative of developed settings for recreation opportunities. Some NFS lands adjacent to developed ski areas in Colorado are roadless and fall into the semi-primitive non-motorized, or semi-primitive motorized settings. This means that if ski areas expand into roadless areas, it may affect adjacent national forest roadless area characteristics and move these areas into the more

developed end of the settings in the winter. Summer use in and around ski resorts is also growing, which may also push the recreation setting in the summer into the more developed end of the spectrum.

The IRAs and CRAs differ in whether they include ski areas, and those differences are described under alternatives 1, 2 and 4 in the Environmental Consequences section. Appendix F contains maps showing the ski areas that occur in roadless areas.

Developed Ski Areas: Environmental Consequences

All Alternatives

For any project to be authorized within a ski area under any alternative, the project must be consistent with the allocation in the existing forest plan direction, have Forest Service acceptance of a Master Development Plan, and have completed a site-specific NEPA analysis of that specific project.

Alternative 1 – 2001 Roadless Rule

By maintaining the restrictions on future road construction or reconstruction and tree-cutting, sale, or removal activities within IRAs, opportunities for ski area development and expansion of some ski areas would be limited. In other ski areas this alternative would have no effect on developed ski area recreation in the 15-year planning time frame.

Currently, 6,550 NFS acres are within IRAs and were under a ski area permit prior to the final date of this rule. In these areas, road construction and tree-cutting activities are allowed to continue according to master ski area plans (see Table 3-39).

Ski areas on NFS lands in Colorado that are not listed here do not contain roadless acres within their permit boundary, or are not currently operating.

In the case of Loveland Ski Area and Durango Mountain Resort, the forest plan allocation for the ski area is larger than the existing permit area. Under alternative 1, no road construction or reconstruction would occur outside the existing permit boundary established prior to the date of this rule; including those areas that have been allocated under forest plans.

Some people may perceive a conflict in having permitted ski areas available for development within IRAs. However, ski area development can occur without road construction. Over-the-snow construction of lift towers can be accomplished in some locations; similarly, tree-cutting, sale, or removal can be completed over snow to clear ski trails and runs without the construction of roads. Therefore, it is possible that ski area expansion into IRAs under alternative 1 may occur without road construction in areas that are not currently under permit.

Under alternative 1, although there would be limitations on future ski area expansion, backcountry skiing would continue to be enjoyed by those users who prefer roadless opportunities.

Table 3-39. Permitted ski area acreage in the IRAs prior to date of Rule

National Forest Ski Area(s)	Roadless Area(s)	Total Ski Area Acres Permitted prior to date of rule
Arapaho-Roosevelt National Forests		
Loveland	Bard Creek, Mount Sniktau	1,370
Winter Park	Vasquez Adjacent Area	30
Grand Mesa, Uncompahgre, and Gunnison National Forests		
Crested Butte	Gothic	900
Pike-San Isabel National Forests		
Ski Cooper	Mad Creek DB & DB1	560
Routt National Forest		
Steamboat Springs	Long Park	180
White River National Forest		
Arapahoe Basin	Porcupine Peak	1,050
Aspen Mountain	McFarlane	50
Beaver Creek	Meadow Mountain A, B	510
Breckenridge	Tenmile	150
Buttermilk	Burnt Mountain	50
Copper Mountain	Ptarmigan Hill	720
Snowmass	Burnt Mountain	80
Vail	Game Creek	900
TOTAL		6,550

Acres rounded to nearest 10 acres. Totals may not add due to rounding.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Under this alternative, ski areas that are permitted or allocated by forest plans are not included within CRAs boundaries. Therefore, road construction or reconstruction and tree-cutting, sale, or removal in those ski areas (outside CRAs) would be allowed as prescribed in the forest plans, ski area master plans, and project-level NEPA documents. The ski resorts and their associated roadless acres are displayed in Table 3-40. Individual maps comparing permit and allocation boundaries with IRA and CRA boundaries are also available in Appendix F of this document.

In the future, if the Forest Service authorizes a ski permit boundary to expand into a CRA, road construction could not occur on those CRA acres. However, like alternative 1, ski area development could occur without road construction. It would be permissible to cut trees where incidental to the implementation of a permitted ski area management activity not otherwise prohibited in a CRA, such as to create a new ski run. Such ski area expansions without road construction could take place in upper tier acres as well as in regular CRA acres.

Table 3-40. Ski area acreage in the IRAs but not included in CRAs

National Forest Ski Area(s) [1]	Colorado Roadless Area(s)	Ski Area Permitted Acres [2]	Additional Ski Area Allocation Acres [3]	Total Ski Area Acres Excluded from CRAs
Arapaho-Roosevelt National Forests				
Loveland	Bard Creek, Mount Sniktau	1,370	1,620	2,990
Winter Park	Vasquez Adjacent Area	30	0	30
Grand Mesa, Uncompahgre, and Gunnison National Forests				
Crested Butte	Gothic	900	0	900
Pike-San Isabel National Forests				
Ski Cooper	Mad Creek DB & DB1	560	0	560
Routt National Forest				
Steamboat Springs	Long Park	180	0	180
San Juan National Forest (Draft Revised Forest Plan)				
Durango Mountain Resort	San Miguel	0	903	904
White River National Forest				
Arapahoe Basin	Porcupine Peak	1,050	0	1,050
Aspen Mt	McFarlane	50	0	50
Beaver Creek	Meadow Mountain A, B	510	0	510
Breckenridge	Tenmile	150	0	150
Buttermilk	Burnt Mountain	50	0	50
Copper Mountain	Ptarmigan Hill	720	0	720
Snowmass	Burnt Mountain	80	0	80
Vail	Game Creek	900	0	900
TOTAL		**6,550**	**1,710**	**8,260**

Acres rounded to nearest 10 acres. Totals may not add due to rounding.
[1]Not all ski areas on NFS lands in Colorado are listed here because they either do not contain roadless acres within their permit or allocation boundary or are not currently operating.
[2]Ski area permit acres within IRAs where permit acres authorized prior to [effective date of Colorado Rule].
[3]Acres allocated in forest plans to ski area management that adjoin permitted ski areas but are outside the current permit boundary.
Note: Expansion of Durango Mountain Resort is included within the draft revised forest plan for San Juan National Forest, draft preferred alternative. There are 90 IRA acres that would be excluded from the CRA acres.

The ski areas listed in Table 3-40 could have some increase in development of ski area facilities under alternative 2, because of the number of ski areas outside CRAs where road construction and tree-cutting, sale, and removal would be governed by forest plan direction. As areas allocated under a forest plan are not included within the CRA boundaries, there is potential for further development and expansion, compared to alternative 1, of an additional 1,710 acres.

Alternative 2 would have a positive impact on the developed ski area recreation resource by removing some of the limitations to constructing ski area facilities imposed by the inability to construct roads and cut trees. Additionally, the authorization of roads in developed ski areas

would facilitate the implementation of required ski area vegetation management plans to improve forest health, remove hazard trees, and manage fuel hazards associated with the current mountain pine beetle epidemic affecting lodgepole pine within developed ski areas. This potential increase in road construction and tree removal is not certain.

If road construction and tree removal are authorized in these developed ski areas and a decision is made to expand the permit boundary at Durango Mountain Resort and Loveland Ski Area, there would likely be a change of the ROS from semi-primitive non-motorized to semi-primitive motorized or roaded natural within those areas. Such a project would require a subsequent NEPA environmental analysis.

Alternative 3 – Forest Plans (No Action)

The 8,300 acres within existing permitted ski area boundaries and those areas allocated in forest plans to ski area management would be managed the same in this alternative as in alternatives 2 and 4 because they have been excluded from CRAs. Future development of these acres would require additional NEPA environmental analysis.

This alternative would allow additional ski area expansion or development needing road construction in the analysis area. This would not be allowed under alternatives 1, 2 and 4 if the proposed development is within the alternatives' roadless areas.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

The effects for alternative 4 are the same as described under alternative 2. This is due to the fact that the permitted ski area acres are removed from Colorado Roadless Areas. In the upper tier, including the expanded upper tier, ski area expansion could occur without road construction.

Recreation: Cumulative Effects

Generally, the most popular forms of outdoor recreation are activities that can be enjoyed without traveling far from home, do not require the purchase of additional gear, and do not require specialized skills to enjoy (Cordell and Overdevest 2001). The outdoor recreation activities with the highest growth in the past 20 years nationally include birding, day hiking, backpacking, snowmobiling, outdoor concerts/plays, walking for pleasure, camping in developed sites, canoeing or kayaking, running or jogging, downhill skiing, and swimming in natural waters (Cordell et al. 2004). These activities generally take place at developed recreation facilities or require a constructed road or trail to facilitate the activity. It is expected that regardless of the activity, participation in outdoor recreation would continue to increase on public lands (Cordell et al. 2004).

WILDERNESS

In 1964, Congress established the National Wilderness Preservation System, composed of federally owned areas designated by Congress as "wilderness areas" (P.L. 88-577). A wilderness is recognized as an area "where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Wilderness areas generally appear to be affected by the forces of nature; have opportunities for primitive and unconfined recreation; are of sufficient size (typically greater than 5,000 acres) to be managed as wilderness; and contain other ecological, geological, scientific, educational, scenic, or historical values. Wilderness areas are managed to protect natural conditions and primeval character; motorized equipment and transport, development, and commercial enterprise are prohibited.

As part of the forest planning process, potential wilderness areas are identified (FSH 1909.12, chapter 70) using a three-step process: (1) identifying lands that satisfy the definition of wilderness found in section 2c of the 1964 Wilderness Act; (2) evaluating lands as to their wilderness potential; and (3) reviewing and approving wilderness recommendations. Generally, inventoried roadless areas serve as the pool for potential wilderness areas.

This analysis evaluates the effects from the prohibitions on designated wilderness, recommended wilderness, and wilderness characteristics.

Wilderness: Affected Environment

The National Wilderness Preservation System was established in 1964 to preserve and protect a portion of the undeveloped Federal lands in their natural condition. Across the United States there are more than 110 million acres designated as wilderness within approximately 760 areas. There are a total of 36 designated wilderness areas in Colorado comprising 3,200,000 acres (Table 3-41). Congress has the sole authority to designate wilderness.

Wilderness character is often used to describe a wilderness area. Wilderness character is defined as untrammeled, natural, undeveloped, and having opportunities for solitude or primitive and unconfined recreation (Landres et al. 2005).

As defined in Landres et al. (2005), untrammeled means wilderness is essentially unhindered and free from modern human control or manipulation. Natural means wilderness ecological systems are substantially free from the effects of modern civilization. Undeveloped means wilderness is essentially without permanent improvements or modern human occupation. Outstanding opportunities for solitude or a primitive and unconfined type of recreation means wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge. These attributes are used to measure the potential consequences of the prohibitions of each alternative on the wilderness resource. However, the Wilderness Act does not constrain projects proposed adjacent to wilderness boundaries because of the mere presence of wilderness. The effects from projects adjacent to wilderness areas should not be the sole reason for deferring or declining a project proposal.

Table 3-41 lists the existing wilderness areas in Colorado, as well as their size and the year they were established. Several of the wilderness areas have been enlarged by subsequent wilderness legislation. Information regarding the year individual legislation establishing the wilderness areas follows the table.

Table 3-41. Existing Wilderness Areas in Colorado (acres are rounded to nearest thousand)

Wilderness	Acres	Year Created
Buffalo Peaks	43,000	1993
Byers Peak	8,000	1993
Cache La Poudre	9,000	1980
Collegiate Peaks	167,000	1980
Comanche Peak	67,000	1980
Eagles Nest	133,000	1976
Flat Tops	235,000	1975
Fossil Ridge	33,000	1993
Greenhorn Mountain	22,000	1993
Holy Cross	123,000	1980
Hunter-Fryingpan	82,000	1978
Indian Peaks	78,000	1978
James Peak	14,000	2002
La Garita	129,000	1964
Lizard Head	42,000	1980
Lost Creek	120,000	1980
Maroon Bells-Snowmass	181,000	1964
Mount Evans	75,000	1980
Mount Massive	28,000	1980
Mount Sneffels	17,000	1980
Mount Zirkel	160,000	1964
Neota	10,000	1980
Never Summer	21,000	1980
Platte River	743	1984
Powderhorn	14,000	1993
Ptarmigan Peak	13,000	1993
Raggeds	65,000	1980
Rawah	73,000	1964
Sangre de Cristo	227,000	1993
Sarvis Creek	45,000	1993
South San Juan	159,000	1980
Spanish Peaks	19,000	2000
Uncompahgre	100,000	1980
Vasquez Peak	13,000	1993
Weminuche	489,000	1975
West Elk	176,000	1964
TOTAL	3,200,000	

Five Colorado wildernesses were established with the signing of the Wilderness Act of 1964 (P.L. 88-577); La Garita, Maroon Bells-Snowmass, Mt. Zirkel, Rawah and West Elk Wildernesses. Since 1964, several subsequent stand-alone Wilderness Acts and two State-wide Wilderness Acts have been enacted. In the 1980s, the Colorado Wilderness Act established 15 new wilderness areas (P.L. 96-560) and the 1993 Colorado Wilderness Act enlarged many of the existing wildernesses and added 12 new wilderness areas (P.L. 103-77). In 2009, the Omnibus Public Lands Act was signed into law, which enlarged the Indian Peaks Wilderness by 1,000 acres.

Wilderness: Environmental Consequences

All Alternatives

Effects on designated wilderness areas depend on the prohibitions and exceptions for tree-cutting and road construction and reconstruction that could affect one of the wilderness attributes: untrammeled, natural, undeveloped, opportunities for solitude, or opportunities for primitive and unconfined recreation. None of the alternatives would directly affect existing wilderness because the management direction would not apply to designated wilderness areas. Therefore, there would be no effects on the untrammeled, natural, undeveloped, or primitive and unconfined recreation opportunities within a wilderness area. However, activities permitted in roadless areas contiguous or adjacent to designated wilderness could affect opportunities for solitude and could affect the scenery as viewed from a wilderness area. The degree of effect would depend on the frequency, duration, extent, and type of activity that occurs.

All alternatives may have direct affects on wilderness character attributes, especially solitude and scenic values, and the ability for roadless areas to be recommended wilderness designation in the future. Roadless areas are the reservoir of undeveloped lands from which future wilderness designations are considered. Each roadless area is evaluated during the forest planning process to determine if it provides wilderness characteristics and whether or not it should be recommended for wilderness. Areas not recommended for wilderness could still be considered for wilderness by Congress. Impacts on the area's inherent wilderness character, its undeveloped nature, its naturalness, its natural ecosystem forces, and the opportunity to provide primitive and unconfined recreation would detract from future consideration of the area as wilderness.

Alternative 1 – 2001 Roadless Rule

In general, alternative 1 prohibits tree-cutting and road construction in IRAs and therefore, reduces the potential risk of impacts to adjacent wilderness areas. Where tree-cutting or road construction is permitted under exceptions near or adjacent to existing wilderness, there may be effects on wilderness depending on the scenic value of view-shed, distance from wilderness boundary, and natural drainage. Such activities would impact any future recommendations for wilderness areas.

Those unroaded acres not included as IRAs would continue to be managed according to their respective forest plan direction. In some cases, that would be consistent with protecting wilderness character, but in others, activities including road construction and tree-cutting may be allowed. Appendix B provides a summary of the management of the unroaded acres under alternative 1.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

In general, alternative 2 prohibits tree-cutting, road construction, and LCZs in CRAs, reducing the risk of impacts to adjacent Wilderness areas. Where tree-cutting or road construction is permitted under exceptions near or adjacent to existing wilderness, there may be effects on wilderness depending on the scenic value of view-shed, distance from wilderness boundary, and natural drainage. Such activities, especially those within a CPZ and those associated with coal activity, could impact future recommendations for specific wilderness areas. Activities within the CPZ may impact areas adjacent to Wilderness areas, affecting scenery and noise of

those traveling within the Wilderness.

Those unroaded acres that are not included as IRAs but are included as CRA would be managed as roadless areas in alternative 2, and are likely to be more consistent with future wilderness designation than general forest plan direction.

For those acres included as upper tier in alternative 2, they would also be more consistent with future wilderness designation than either alternative 1 direction or general Colorado Rule direction due to the additional restrictions on activities.

Alternative 3 –Forest Plans (No Action)

In general, alternative 3 allows more tree-cutting and road construction than alternatives 1, 2 or 4, reducing potential wilderness eligibility on the impacted acres.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

In general, alternative 4 would preserve potential wilderness eligibility more than alternatives 2, and 3 due to the amount of upper tier acres.

Wilderness: Cumulative Effects

All alternatives may compromise wilderness character and the untrammeled attribute of wilderness from (1) overall increased population growth to the State of Colorado, (2) increased highway and secondary roads allowing more vehicular traffic to areas near existing wildernesses, and (3) adjacent private lands that may be developed in the future and (4) increased recreation use in the nearby wildernesses.

Alternative 3 would potentially allow more roads for oil and gas leases. In addition, NFS lands outside the analysis area and non-NFS lands may have increased road construction for oil and gas activities in the future. If so, these lands may have a cumulative effect on wilderness and roadless areas nearby.

Colorado Roadless Areas are managed under a variety of management prescriptions in existing forest plans. Implementation of the 2001 Roadless Rule or the Colorado Roadless Rule would help establish a uniform approach to managing these areas. Because many Colorado Roadless Areas are adjacent to wilderness areas, large tracts of land would remain essentially unroaded and undeveloped. In the past, roadless areas were managed as a bank for future resource development or special designation. If these areas were managed for their own inherent values, there could be less pressure to designate these lands as wilderness or as other special designations to shield the land from development. The Colorado Roadless Rule may reduce controversy and result in more stability by recognizing those roadless areas with important wilderness character and those portions of roadless areas where multiple types of recreational use could occur.

Recommended Wilderness Areas

Recommended Wilderness: Affected Environment

Recommended wilderness areas are lands identified as having undeveloped character and wilderness potential through forest planning. During forest planning, the current undeveloped lands within a forest are assessed using the three-step process to determine if they should be

recommended to Congress for the inclusion in the National Wilderness Preservation System.

Recommended wilderness areas are managed to maintain wilderness character and values until such time as Congress acts upon the Agency recommendation or a different Agency recommendation is made. Roadless areas that are recommended for wilderness have management prescriptions that protect the wilderness character of the area, but these areas are not managed as wilderness.

Table 3-42 identifies the currently recommended wilderness areas in Colorado by existing forest plan direction. Several of the older forest plans have no recommended wilderness acres because congressional actions have added those areas to the Colorado Wilderness system. In the future, when these forest plans are revised, additional recommended wilderness acres will likely be identified.

Table 3-42. Acres of Recommended Wilderness

Recommended Wilderness by National Forest	Acres	Year of Current Forest Plan
Arapaho-Roosevelt		1997
Comanche Peak Adjacent Area Unit D	1,000	
Comanche Peak Adjacent Area Unit F	1,000	
Comanche Peak Adjacent Area Unit G	3,000	
Mount Evans Adjacent Area Unit A	500	
GMUG		1983
No recommended wilderness	0	
Manti-La Sal		
No recommended wilderness in Colorado	0	
Pike-San Isabel		1984
No recommended wilderness		
Rio Grande		1996
No recommended wilderness	0	
Routt		1998
No recommended wilderness		
San Juan		1993
No recommended wilderness	0	
White River		2002
Assignation Ridge	12,000	
Eagles Nest - addition	1,000	
Flattops - addition	2,000	
Holy Cross - addition	8,000	
Hunter Fryingpan - addition	4,000	
Ptarmigan Peak - addition	3,000	
Raggeds - addition	2,000	
Red Table	50,000	
Total Recommended Wilderness Acres in Colorado	**87,500**	

Acres are rounded to the nearest thousand acres.

Recommended Wilderness: Environmental Consequences

Alternative 1 - 2001 Roadless Rule

Under the exceptions permitted by alternative 1, road construction and reconstruction and tree-cutting could occur in areas recommended for wilderness through specific project planning or the forest planning process. However, this is unlikely to happen as existing plans generally exclude tree-cutting and road construction activities in recommended wilderness, unless a site-specific amendment was completed. Alternative 1 would not directly affect any of the recommendations made in forest plans for recommended wilderness areas.

Alternative 2 - Colorado Roadless Rule (Proposed Action)

Roadless areas are managed under a variety of management prescriptions in existing forest plans. Implementation of alternative 2 with all 562,200 upper tier acres would help establish a uniform approach to managing areas already identified in forest plans and draft forest plans as being recommended for wilderness. Any changes to that direction would require a rule-making effort.

Alternative 3 - Forest Plans (No Action)

Under the existing plans, about 87,500 acres are recommended for wilderness (table 3- 43). Areas recommended for wilderness would be managed to protect and preserve existing wilderness character. Hence, they prohibit road construction and reconstruction, tree-cutting, or discretionary mineral activities. Recommendations for wilderness designation would be reviewed during the next round of forest planning, typically every 10 to 15 years.

Alternative 4 - Colorado Roadless Rule with Public Proposed Upper Tier

Roadless areas are managed under a variety of management prescriptions in existing forest plans. Implementation of alternative 4 with 2.6 million acres in the upper tier would establish a uniform approach to managing over half the CRA acres. Any changes to that direction would require a rule-making effort.

Recommended Wilderness: Cumulative Effects

During future forest planning, roadless lands would be reexamined and evaluated for their wilderness potential. To the extent that these lands are not affected by development activities, they will be available for future consideration as wilderness. Because of the limited expected development activities across all alternatives in the next 15 years, a majority of the roadless areas should continue to exhibit wilderness characteristics into the future.

OTHER DESIGNATED AREAS

Congressionally Designated Protection Areas – Affected Environment

In addition to existing wilderness and Forest Plan recommended wilderness, six Congressionally Designated Protection Areas (CDPAs) have been established on three forests in Colorado by the 1980 and 1993 Colorado Wilderness Acts and the James Peak Wilderness and Protection Area Act of 2002 (P.L. 107-216). The CDPAs total 165,000 acres (see Table 3-43). Each protected area has special provisions in legislative language that clarifies specific management, as outlined in Table 3-44. Five of the six CDPAs in Colorado prohibit tree-cutting and road construction; James Peak Protection Area allows tree-cutting for limited purposes.

Table 3-43. Congressionally Designated Protection Areas in Colorado

National Forest	Congressionally Designated Protection Areas	Date and Public Law	Acres	Special Provision
Arapaho-Roosevelt	Bowen Gulch Protection Area	1993, Public Law 103-77	10,700	Prohibits timber harvesting (sec 6(d)), new road building (sec 6(f)) and withdrawal of mineral entry (sec 6(c)). Allows motorized travel on established routes (sec. 6(g)) during periods of adequate snow cover. Mechanized travel shall be permitted (sec. 6(f)).
Arapaho-Roosevelt	James Peak Protection Area	2002, Public Law 107-216	16,000	Allows for timber cutting for fuel treatment, control of fire, and insect and disease control projects. No road building is allowed.
GMUG	Fossil Ridge Recreation Management Area	1993, Public Law 103-77	39,800	Prohibits timber harvesting (sec 5(d)), new road building (sec 5(f)) and withdrawal of mineral entry (sec 5(c)). Allows motorized travel on established routes (sec. 5(g)).
GMUG	Tabeguache Area	1993, Public Law 103-77	17,000	Prohibits timber cutting or road building. Withdrawal of mineral entry (sec. 9(b)), managed to maintain presently existing wilderness character and potential inclusion in the National Wilderness Preservation System (sec. 9(3)).
GMUG	Roubideau Area	1993, Public Law 103-77	20,000	Prohibits timber cutting or road building. Withdrawal of mineral entry (sec. 9(b)), managed to maintain presently existing wilderness character and potential inclusion in the National Wilderness Preservation System (sec. 9(3)).
San Juan	Piedra Area	1993, Public Law 103-77	63,000	Prohibits timber cutting or road building. Allows motorized use (snowmobiles) and motorized trail maintenance on Trail 535 (sec. 9(4)).

Congressionally Designated Protection Areas — Environmental Consequences

All Alternatives

Similar to the congressionally designated wilderness areas, the CDPAs are not included in roadless areas being analyzed in this EIS. There would be no difference in management of these CDPAs under any of the alternatives as none of the alternatives would directly affect any CDPAs.

However, there could be indirect effects of the projected activities that vary by alternative on the characteristics in adjacent CDPAs. These effects would be similar to the effects of each alternative on adjacent wilderness. The main difference is that the Fossil Ridge Recreation Area, James Peak Protection Area, and Bowen Gulch Protection Area allow some motorized and mechanized travel and some other activities. Thus, increases in noise and human activities in adjacent roadless areas would not be expected to significantly detract from the values for which those areas were designated. The other three CDPAs, the Tabeguache Area, the Roubideau Area, and the Piedra Area are managed more similarly to wilderness and may be indirectly affected by increases in noise and human activities in adjacent roadless areas. The indirect impact would be minimal under alternative 1, and minimal under alternatives 2 and 4, except in the CPZ, and greatest under alternative 3, based on the relative amounts of road construction and tree-cutting.

Congressionally Designated Wild & Scenic Rivers – Affected Environment

Colorado has only one congressionally designated river, the Cache la Poudre River on the Arapaho-Roosevelt National Forest west of Ft. Collins, Colorado. The river was designated by Congress as a Study River in 1975 and recommended for wild and scenic designation in 1986 (P.L. 99-590). The designation protects 61 miles of river under Forest Service administration in the following classifications: 16 miles of Wild classification and 45 miles as Recreation classification. No road construction or tree-cutting are allowed in the wild corridor. In the recreation section of the wild and scenic river corridor, some roads and other activities may occur as long as the outstandingly remarkable values remain protected

Congressionally Designated Wild & Scenic Rivers – Environmental Consequences

All Alternatives

None of the alternatives would directly affect the stretch of the wild and scenic river corridor classified as wild, because the statute designating the river is more restrictive than any of the alternatives. Because the law does not allow activities that would degrade those values for which the river corridor was designated, and the law's restrictions take precedence over regulations and forest plan direction, none of the alternatives would directly affect the wild and scenic values in this corridor.

However, as described for wilderness and other congressionally designated areas, activities allowed to occur on surrounding roadless area acres may indirectly affect the values associated with the wild river designation. Alternative 1 would have the least potential to affect wild river

values in that river corridor; alternatives 2 and 4 would increase the potential to affect those values; and alternative 3 would have the highest potential to affect those values.

Congressionally Designated Trail, Continental Divide National Scenic Trail – Affected Environment

Congress enacted the National Trails System Act (P.L. 90-543) on October 2, 1978, which established a nationwide trail system and designated the Appalachian Trail and Pacific Crest Trail. The act describes national scenic trails "will be extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass."

Congress amended the National Trails System Act with Public Law 95-625, on November 10, 1978, to establish and designate the Continental Divide National Scenic Trail (CDNST) which traverses approximately 800 miles through Colorado along the Continental Divide. The Comprehensive Plan for the CDNST, amended on September 28, 2009, describes that the nature and purposes are to provide for high-quality scenic, primitive hiking and horseback riding opportunities and to conserve natural, historic, and cultural resources along the CDNST corridor. Under forest plan direction, the trail is managed to provide for primarily primitive and semi-primitive non-motorized recreation opportunities and settings, and a scenic integrity level of high to very high. The direction would be followed under any of the four alternatives. Information can be found within the Colorado Roadless Area Profiles located at www.roadless.fs.fed.us. Specific CDNST information is found at www.online at http://www.fs.fed.us/cdt.

Other Congressionally Designated Trails – Environmental Consequences

All Alternatives

None of the alternatives would directly affect the scenic values for which the CDNST was designated because management direction contained in the statutes associated with this designated trail overrides any existing forest plan direction or rule.

Potential indirect impacts on the high to very high scenic values along this trail corridor could vary by alternative depending on the amount of road construction or tree-cutting within view of the CDNST. Among the alternatives, alternative 1 would have the least potential to affect those scenic and other values along the CDNST from adjacent land management activities because this alternative projects the least amount of road construction and tree-cutting activities. This is followed by alternative 4, alternative 2 and alternative 3 with the highest potential to affect scenic and other values due to the highest level of projected activities.

Administratively Designated Areas – Affected Environment

Administratively designated areas are those designated by the Secretary of Agriculture or a designated officer, such as the Chief of the Forest Service, a regional forester, or a forest supervisor. There are two types of administratively designated areas in the analysis area: research natural areas (RNAs) and special interest areas (SIAs).

Research Natural Areas

The RNAs in Colorado form a long-term network of ecological reserves designated for non-manipulative research, education, and the maintenance of biodiversity. The RNAs are selected to preserve a spectrum of relatively pristine areas that represent a wide range of natural variability within natural ecosystems and environments and may have special or unique characteristics of scientific importance. The desired condition for RNAs is to maintain natural conditions by allowing ecological processes to prevail with minimal human intervention. There are RNAs within roadless areas on seven of the eight national forests in Colorado; there are none on the small portion of the Manti-La Sal National Forest that occurs in the Colorado.

Table 3-44 lists the RNAs on each national forest fully or partially within a roadless area, along with the roadless area name.

Table 3-44. Research natural areas within roadless areas

National forest	Research natural area	IRA	CRA
Arapaho-Roosevelt	Boston Peak Fen	Green Ridge West	Green Ridge West
Arapaho-Roosevelt	Mt. Goliath	Mt. Evans Adjacent Area	Mt. Evans Adjacent Area
Arapaho-Roosevelt	Lone Pine	North Lone Pine	North Lone Pine
Arapaho-Roosevelt	North St. Vrain	North St. Vrain RNA, North	North St. Vrain
GMUG	Gothic	Gothic Mountain	Gothic
Pike-San Isabel	Hurricane Canyon	East Pikes Peak	Pikes Peak East
Rio Grande	Finger Mesa	Pole Mountain/Finger Mesa	Pole Mountain/Finger Mesa
Rio Grande	Mill Creek	Crestone	Crestone
Routt	Kettle Lakes	Kettle Lakes	Kettle Lakes
San Juan	Williams Creek	Williams Creek White Fir	Graham Park
White River	Main Elk Creek	Elk Creek B	Elk Creek B
White River	Hoosier	Hoosier Ridge	Hoosier Ridge
White River	Battlement Mesa	Housetop Mountain	Housetop Mountain

Management direction for specific RNAs differs among the various national forests. Table 3-45 lists the management direction in each forest plan concerning road construction and tree-cutting in RNAs.

Table 3-45. Research natural area forest plan direction

National Forest	Tree-cutting	Road construction or reconstruction
Arapaho-Roosevelt	No tree-cutting	Roads prohibited
GMUG	No tree-cutting	Roads restricted; generally, physical improvements, such as roads are not permitted
Pike-San Isabel	No tree-cutting	Roads restricted; generally, physical improvements, such as roads are not permitted
Rio Grande	No tree-cutting	Roads restricted; prohibit motorized and mechanized use except when necessary for research or educational access
Routt	No tree-cutting	Roads prohibited
San Juan	No tree-cutting	Roads restricted; generally, physical improvements, such as roads are not permitted
White River	No tree-cutting	Roads restricted; prohibit motorized and mechanized use except when it provides necessary access for scientific, administrative, emergency, or educational purposes

For all forests, the forest plan direction for RNAs does not allow tree-cutting. Under all alternatives, the forest plan direction must be followed; therefore, there would be no tree-cutting allowed in RNAs under any alternative. Although there is some variability in forest plan direction for road construction in RNAs, no road construction in RNAs is projected to occur in roadless areas under any alternative. There are no oil, gas, or coal leases within the RNAs, and no mining sites or other land uses that are subject to reserved or outstanding rights. There would be no difference in effects between alternatives.

Special Interest Areas

The SIAs are identified in the forest plans for each national forest. SIAs are designated for their unique or outstanding botanical, geological, historical, paleontological, cultural, scenic, recreational, zoological (species or habitat diversity), or other significant values. The SIAs may be managed as interpretive sites for public recreation or education and may be relatively small or fairly large.

The desired condition in SIAs is to maintain or restore the natural or near-natural conditions and protect the significant values for which the SIA was established. Losses of vegetation in SIAs as a result of insect-disease outbreaks or wildland fires are generally accepted. If activities are allowed in SIAs, they usually must maintain or restore the natural conditions and protect threatened, endangered, or sensitive species habitat and the values of the SIA. Generally, roads and facilities may be constructed in SIAs to enhance the values for which the SIA was designated, for interpretive or educational purposes, or to correct resource damage.

There are 23 SIAs within all or portions of roadless areas on six of the eight national forests in Colorado; they do not occur in roadless areas on the Manti-La Sal or the Pike-San Isabel. Table 3-46 lists the SIAs on the six national forests where they occur in all or portions of a roadless area.

Table 3-46. Special interest areas within roadless areas

National Forest	Special interest area	IRA	CRA
Arapaho-Roosevelt	James Peak	James Peak	James Peak
Arapaho-Roosevelt	Homestead Meadows	Lion Gulch	Lion Gulch
Arapaho-Roosevelt	Grays Peak	Mt. Sniktau	Mt. Sniktau
Arapaho-Roosevelt	Niwot Ridge	Indian Peaks Adjacent Areas	Indian Peaks Adjacent Areas
Arapaho-Roosevelt	Arapaho National Recreation Area	Indian Peaks Adjacent Areas	Indian Peaks Adjacent Areas
GMUG	Ophir Needles	Ophir Needles	Not in a CRA
GMUG	Slumgullion Slide	Cannibal Plateau	Cannibal Plateau
GMUG	Alpine Tunnel	Romley	Mirror Lake
Rio Grande	Bachelor Loop	Wason Park	Wason Park
Rio Grande	Blowout Pass	Wightman Fork/Upper Burro	Wightman Fork/Upper Burro
Rio Grande	Devil's Hole	Alamosa River	Alamosa River
Rio Grande	John Charles Fremont	Deep Creek/Boot Mountain	Deep Creek/Boot Mountain
Rio Grande	Wagon Wheel Gap Watershed Experiment Station	Snowshoe Mountain	Snowshoe Mountain
Routt	California Park	Sugarloaf North and South, Nipple Peak North and South, and Shield Mountain	Sugarloaf North and South, Nipple Peak North and South and Shield Mountain
Routt	Black Mountain	Sugarloaf South	Sugarloaf South
Routt	Little Snake	Elkhorn	Elkhorn
Routt	Windy Ridge	Barber Basin	Barber Basin
Routt	Teller City	Never Summer South	Never Summer South
San Juan	Falls Creek Archaeological Area	Not in IRA	Hermosa
White River	Main Elk Creek	Elk Creek B	Elk Creek B
White River	Porcupine	Tenderfoot Mountain	Tenderfoot Mountain
White River	Independence Pass	North Independent B	North Independent B
White River	Colorado Midland Railroad	Wildcat Mountain C	Wildcat Mountain C
GMUG	Alpine Tunnel	Romley	Mirror Lake
Rio Grande	Bachelor Loop	Wason Park	Wason Park

Management direction for SIAs differs among the various forests. Table 3-47 summarizes the management direction for road construction and tree-cutting in SIAs for the forest plans with SIAs in roadless areas.

Although there is some variability in forest plan direction in SIAs, no road construction or tree-cutting activities is projected to occur in SIAs under any alternative. There are no oil, gas, or coal leases within the SIAs, and no mining claims, federal highways, or other developments in SIAs subject to reserved or outstanding rights. There is no difference between the four alternatives.

Table 3-47. Special interest area forest plan direction

National forest	Road construction or reconstruction	Tree-cutting
Arapaho-Roosevelt	Roads restricted; new facilities may be constructed to enhance the values for which the SIA was designated, for interpretive or educational purposes or to correct resource damage; most SIAs are non-motorized	Tree-cutting restricted
GMUG	Roads restricted	Tree-cutting prohibited; prohibit any direct habitat manipulation
Rio Grande	Roads restricted; Recreation Opportunity Spectrum class is semi-primitive motorized; developed facilities must meet management objectives	Tree-cutting prohibited
Routt	Roads generally allowed but only under some specific circumstances; construct new roads only when consistent with SIA values, such as interpretation or education, or to meet other resource objectives such as oil and gas leasing	Tree-cutting generally not restricted except for regulated commercial timber purposes; use only those vegetation management practices necessary to meet specific resource objectives of maintaining or restoring the values for which the SIA was established
San Juan	Roads restricted; develop transportation system only to enhance cultural resource interpretation or maintenance opportunities	Tree-cutting restricted; allow tree removal only for such purposes as public safety, improvement of aesthetics, insect and disease control, ruins research and maintenance, ruins reconstruction, or wildlife habitat improvement
White River **2.1 Management Area**	Roads restricted; regulate motorized and mechanized travel where necessary to protect the values for which the individual area was proposed or established; long-term maintenance of roadless area characteristics emphasized	Tree-cutting restricted; allow vegetation management practices necessary to meet specific resource objectives of maintaining the values for which the individual area was proposed or established; long-term maintenance of roadless area characteristics emphasized
White River **3.1 Management Area**	Roads restricted; construct new roads only when necessary for interpretive or educational purposes or to correct resource damage from existing roads; long-term maintenance of roadless area characteristics emphasized	Tree-cutting restricted; allow vegetation manipulation when necessary to reduce fuel loads, maintain or restore natural conditions, or enhance other values for which the individual area was proposed or established; long-term maintenance of roadless area characteristics emphasized

Administratively Designated Areas - Environmental Consequences

All Alternatives

None of the alternatives project any road construction or reconstruction, or any tree-cutting activities within the RNAs or SIAs. Thus, there would be no difference in effects predicted to occur in roadless area RNAs or SIAs under any of the alternatives.

Under all alternatives, roads may be constructed in RNAs and SIAs in roadless areas if necessary to meet statutory obligations or reserved or outstanding rights (described in chapter 2, Alternatives Considered in Detail section). However, none of those types of activities currently occur in the RNAs or SIAs, and none are foreseeable in the next 15 years.

Under alternative 3, road construction could potentially occur in the future in RNAs or SIAs in roadless areas, where it is not entirely prohibited. Some forest plans allow roads or facilities to be constructed in RNAs or SIAs, although the values for which the area was established would need to be maintained. Road construction and tree-cutting (other than for incidental uses) would be unlikely to occur in those particular areas, in order to protect the special values for which these areas are administratively designated. As there are no direct or indirect effects to RNAs or SIAs expected within the roadless areas under any alternative, there would be no potential for cumulative effects.

ROADLESS AREA CHARACTERISTICS

Roadless Area Characteristics: Affected Environment

As discussed and described in chapter 1, there are nine roadless area characteristics identified and defined in the 2001 Roadless Rule and referred to in the proposed Rule. Roadless area characteristics are resources or features that are often present in or characterize roadless areas. These resources and features are:

1. High quality or undisturbed soil, water, and air;
2. Sources of public drinking water;
3. Diversity of plant and animal communities;
4. Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land;
5. Primitive, semi-primitive nonmotorized and semi-primitive motorized classes of dispersed recreation;
6. Reference landscapes;
7. Natural appearing landscapes with high scenic quality;
8. Traditional cultural properties and sacred sites; and
9. Other locally identified unique characteristics.

In an increasingly developed and fragmented landscape, large unfragmented tracts of land become increasingly important for the very resources and features described in the roadless area characteristics. Of all management activities, tree-cutting, sale or removal and road construction/reconstruction generally have the greatest likelihood of altering and fragmenting roadless areas, resulting in the loss of these nine characteristics. The exceptions in each alternative of this proposed rule and the acres to which they apply are different. This analysis focuses on the effects of each alternative on roadless area characteristics.

Other activities may also compromise roadless area characteristics; such as, oil and gas pipelines or electrical power lines. Alternatives 2 and 4 contain specific prohibitions on the use of linear construction zones and the location of oil and gas pipelines, electrical power lines, and telecommunication lines within CRAs; whereas alternatives 1 and 3 do not. Under alternatives 1 and 3, these features would only be prohibited if their development would not meet a desired future condition in the forest plan.

When considering the nine roadless area characteristics, each individual roadless area is unique. The Colorado Roadless Areas are described in the Roadless Profiles found on the following web site: www.roadless.fs.fed.us. These profiles describe each roadless area and the roadless area characteristics within each CRA. A table in Appendix A and each CRA profile contain a cross-walk between the IRAs and the CRAs in order to display the overlap and differences between the CRA and IRA boundaries and roadless area characteristics.

Roadless Area Characteristics: Environmental Consequences

Alternative 1 - 2001 Roadless Rule

The substantially altered acres within the IRAs have lost some of their roadless area characteristics; approximately 11% of the total IRA acres. Tree-cutting would continue to occur on

these acres under this alternative. Due to the limited projected tree-cutting, sale or removal and road construction or linear construction zones there would be limited impact beyond the substantially altered areas; likely less than 1% of additional acreage would be impacted by this alternative within the next 15 years, including those lands under an existing oil, gas or coal lease. Most of the IRA acres that currently exhibit high quality roadless area characteristics would retain those into the future. Approximately 4% of the 409,500 that are not within the IRAs under this alternative have tree-cutting projected within the next 15 years and would lose some of their roadless area characteristics under this alternative.

Alternative 2 - Proposed Colorado Roadless Rule (Proposed Action)

In this alternative, with the restrictions on tree-cutting, sale or removal, road construction, and linear construction zones, about 98% of the 4,186,000 acres within the CRAs are not projected to have ground disturbing activities and are likely to retain their existing roadless area characteristics over time. The 458,800 acres that are already substantially altered within the IRAs that are not within the CRAs would likely continue to have reduced roadless area characteristics, depending on land management plan direction. Approximately 4% of the substantially altered acres have projected tree-cutting in the next 15 years.

Future activities within CRAs could have potential effects on the undeveloped and natural qualities of roadless area characteristics; however, such acreage is expected to be limited in any specific area and the temporary roads are required to be decommissioned after use including those for oil, gas, and coal leases. Short-term roadless area characteristics could be negatively impacted but through restoration activities and time, roadless area characteristics would be protected over the long-term within the CRA's. Such activities are unlikely to affect natural ecosystem forces or opportunities for primitive and unconfined recreation.

Alternative 3 - Forest Plans (No Action)

Some existing forest plan management prescriptions limit tree-cutting, sale or removal and road construction or reconstruction. There are 13% of the IRA acres (541,700) and 13% the CRA acres (532,400 acres) that prohibit or largely limit tree-cutting, sale or removal and 6% of the IRA acres (258,500 acres) and 6% the CRA acres (257,300 acres) that have forest plan language prohibiting road construction or reconstruction. Many of the acres where road construction is restricted are the same acres where tree-cutting, sale or removal is limited. There is no specific forest plan language limiting the use of linear construction zones or the placement of oil and gas pipelines, electrical power lines or telecommunication lines within the roadless areas.

In considering the entire analysis area for all alternatives (4,653,100 acres), approximately 10% are substantially altered by past management activities. With the projections, up to an additional 5% may lose some of their roadless area characteristics within the next 15 years. Approximately 85% of the total acres within the IRAs and CRAs would retain their existing roadless character into the future under this alternative.

Alternative 4 - Colorado Roadless Rule with Public Proposed Upper Tier Acres

The effects would be similar to alternative 2, but because there are more upper tier acres with less activity, more than 99% of the 4,186,000 acres within the CRAs are likely to retain their existing roadless area characteristics over time. The 458,800 acres that are already substantially altered within the IRAs that are not within the CRAs would likely continue to have reduced roadless area characteristics, depending on land management plan direction. Approximately 4%

of the substantially altered acres have projected tree-cutting in the next 15 years.

Roadless Area Characteristics: Cumulative Effects

Colorado Roadless Areas are managed under a variety of management prescriptions in existing forest plans. Implementation of the 2001 Roadless Rule or the Proposed Colorado Roadless

Rule would help establish a uniform approach to managing these areas over the long term. Because many CRAs are adjacent to wilderness areas, large tracts of land would remain essentially unroaded and undeveloped.

Future forest plan revisions or amendments can further restrict tree-cutting, sale or removal or road construction or reconstruction beyond the limitations in the alternatives. In addition, forest plans would continue to allow or restrict a range of other activities on these lands. The upper tier acres identified in alternatives 2 and 4 cannot be changed, either the identified acreage or the prohibitions, by a forest plan revision. The Colorado Roadless Rule would need to be modified for a change to occur in the upper tier acreage and direction.

In the past, roadless areas were managed as a bank for future resource development or special designation. The Agency anticipates that future proposed project activities in an individual roadless area that may affect roadless area characteristics through tree-cutting, sale or removal or road construction and other development activities would still see intense public scrutiny, administrative appeals, and in some cases, legal challenge. However, the Agency believes that changes to individual roadless areas would be incrementally small, changing a portion of the area and not the entire area, and would be infrequent and often short-term. Short-term impacts under all alternatives include temporary road construction that would be required to be decommissioned after use and ultimately roadless area characteristics would be restored within the IRAs or CRA's.

REFERENCE LANDSCAPES

This section addresses the effects of alternatives on changes in opportunities to use roadless areas as reference landscapes. One of the nine roadless area characteristics is the ability for roadless areas to be used as reference landscapes. Reference landscapes contribute to the body of knowledge about the effects of forest management activities over long periods of time and on large landscapes, providing comparison areas for evaluation and monitoring.

Reference Landscapes: Affected Environment

Roadless areas in Colorado currently provide a natural setting, or baseline, that may be useful as a comparison to study the effects of more intensely managed areas. Widespread interest exists in obtaining information about large-scale ecological patterns, processes, and management activities (Bormann et al. 1999). Issues such as viability of wide-ranging animals, watershed cumulative effects, and restoration of fire dependent ecosystems, require research and monitoring at large scales to significantly address this interest. Roadless areas enable monitoring of long-term environmental issues, including climate change; and provide the opportunity to gain an improved understanding of the effect of past events on the landscape. Roadless areas in Colorado provide large areas for the long-term study of trends in ecosystem conditions.

Reference Landscapes: Environmental Consequences

All Alternatives

Retaining roadless area acreage would provide reference landscapes for long-term study where comparisons of natural settings are needed. Where additional road construction, tree-cutting, oil and gas or coal development activities are projected to occur in roadless areas, the quality of those roadless areas as natural setting reference landscapes would be, at least in the short term, degraded or lost. Where a range of management treatments are needed to be applied and tested, only alternative 3 would allow this activity.

Alternative 1- 2001 Roadless Rule

Average annual projections of activities in IRAs under this alternative are minimal relative to the 4.24 million roadless acres (see Analysis Framework section) and most acreage could serve as a natural setting for comparison. The IRAs that contain substantially altered acreages and developed ski areas currently provide minimal value as natural setting reference landscapes. The newly identified roadless acreage, not within IRA's could potentially be degraded under this alternative.

Alternative 2- Colorado Roadless Rule (Proposed Action)

Average annual projections of activities in CRAs under this alternative are minimal relative to the 4.19 million roadless acres (see Analysis Framework section). Most of the areas within the CRAs and particularly the upper tier acres would have little to no activity and be retained as natural setting reference landscapes. The substantially altered acres and other IRA acres not included in CRAs would not add to or subtract from the value of the CRAs as natural setting reference landscapes but could serve as areas where management treatments could be applied and tested.

Alternative 3- Forest Plans (No Action)

Average annual projections of activities in IRAs under this alternative are marginal relative to the 4.24 million roadless acres (see Analysis Framework section). Those areas where there would be no management activities would continue to serve as natural setting reference landscapes. The individual forest plan direction would offer the greatest flexibility to allow for additional activities within roadless area to continue various experiments and comparisons through time, activities that would be prohibited in alternatives 1, 2, and 4.

Alternative 4 –Colorado Roadless Rule with Public Proposed Upper Tier

The effects on reference landscapes of alternative 4 are similar to alternative 2, but with the greater number of acres in the upper tier with more restrictions on tree-cutting, sale and removal and road construction, there would be larger acres intact to serve as natural setting reference landscapes. There would be less acreage within this alternative where management activities could be applied and tested other than the substantially altered acreage that is not within the CRAs.

Reference Landscapes: Cumulative Effects

This evaluation considered the past, ongoing, and foreseeable activities that are likely to have effects on roadless areas and influence their value as reference landscapes. Refer to Appendix E, the cumulative effects, for a description of those actions and associated effects most relevant to this EIS.

Most of the roadless areas border congressionally designated wilderness or similarly designated areas (e.g. protection areas, as described in the Other Congressionally Designated Areas and Trails section). Cumulatively, this adds to the total acreage that can be used for large scale research and monitoring, using these combined areas as natural setting reference landscapes.

Residential populations are continuing to expand along the borders of roadless areas, which is detracting from their value as reference landscapes. Human land use activities, particularly recreation activities including some illegal motorized use, are expected to continue to become more prevalent in portions of some roadless areas that are within those wildland-urban interface zones. This cumulatively would result in fewer roadless area acres being suitable as reference landscapes for research and monitoring of natural ecological processes. The cumulative effect would be most evident under alternative 3, where the least amount of roadless area acreage would be available in the long term as a reference landscape representing natural ecosystem processes.

CULTURAL RESOURCES

Introduction

Cultural resources, also known as heritage resources, refer to areas, sites, buildings, art, architecture, memorials, and objects that have scientific, historic, or cultural value. They link people to their cultural history, provide insight into how people lived in the past, and reveal past and ongoing relationships between people and the natural world. Many of the nation's cultural resources are located on public lands, with NFS lands containing more than 330,000 known sites.

Traditional cultural properties and sacred sites are also considered cultural resources and may exist within roadless areas in Colorado. Traditional cultural properties are places, sites, structures, districts, or objects that are historically significant in the beliefs, customs, and practices of a community. Sacred sites are places that are determined sacred by virtue of their established religious significance to or ceremonial use by an Indian religion. Past consultations with tribes and rural communities in Colorado indicate that certain tribes and ethnic groups have some specific traditional use areas within the roadless areas. Members of the various Ute Tribes are known to use some roadless areas in Colorado for traditional plant gathering and hunting. Because of cultural sensitivities and the desires of traditional tribal practitioners, exact areas for these types of activities often are not publicly disclosed. Evaluating the existence and significance of traditional cultural properties and sacred sites requires consultation with tribal members who possess traditional knowledgeable of specific areas. Traditional cultural properties and sacred sites have not yet been extensively inventoried on NFS lands, especially in roadless areas.

The Forest Service inventories and takes actions to protect historic properties in accordance with the National Historic Preservation Act, Archaeological Resources Protection Act, Executive Order 11593 (Protection and Enhancement of the Cultural Environment), Executive Order 13007 (Indian Sacred Sites), and other related legal requirements. Effects from federal activities on traditional cultural properties are considered under the National Historic Preservation Act. When the Forest Service authorizes actions on NFS lands, the agency must assess the potential effects of those actions on historic properties and seek ways to avoid or minimize adverse effects. Inventories and evaluations of effects of land management activities on cultural resources are completed during analysis of the proposed site-specific activities; measures are designed to avoid or minimize harm to those resources. If human remains are discovered before or during project implementation on NFS lands, the Forest Service consults with culturally affiliated tribes and takes appropriate actions, in accordance with the Native American Graves Protection and Repatriation Act. Federal agencies are to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and are to avoid adversely affecting the physical integrity of such sacred sites when practicable.

The Forest Service stabilizes and restores cultural resource sites that have been damaged or neglected, interprets sites for public education, and provides sites for public use and enjoyment through historic cabin rentals. It is important to maintain the integrity of and sometimes interpret cultural resource sites for future generations. NFS lands contain many of the best-preserved heritage sites that remain in the United States, in some of the least disturbed natural settings. These sites provide opportunities for Americans to learn about their cultural heritage (USDA Forest Service 1999). Heritage tourism is one of the fastest growing sectors of the

tourism industry, and it is ranked among the top two or three reasons that people take vacations (USDA Forest Service 1999).

Cultural Resources: Affected Environment

Of the more than 30,000 cultural resource sites on NFS lands in Colorado, more than 17,600 (approximately 59 percent) are either considered significant and eligible for inclusion or listed on the National Register of Historic Places (NRHP), or their significance is unknown and they are managed as though eligible for inclusion on the NRHP. Of the 30,000 sites identified on NFS lands in Colorado, more than 1,400 are currently known to exist within IRAs and more than 1,200 are currently known to exist within CRAs in Colorado. Many of these cultural resource sites are eligible for inclusion on the NRHP. Sites include historic, prehistoric, and traditional cultural properties. Additional cultural resources undoubtedly exist within these roadless areas but have yet to be discovered or documented (data obtained from the USDA Forest Service Region-2 INFRA-heritage database 2008).

The laws, regulations, and executive orders previously listed, along with several others, require the Forest Service to consult with federally recognized tribes, based on a unique government-to-government relationship and trust responsibility. There are two resident tribes in Colorado, both retaining some of their traditional land base as reservations via a series of treaties, agreements, and laws. The Ute Mountain Ute and Southern Ute Tribes (consisting originally of the Weeminuche, Capote, Tabeguache, and Mouaches Bands)—each a "domestic sovereign" nation—have reserved some specific off-reservation hunting rights in Colorado and retain inherent aboriginal rights throughout their traditional territory. Many other tribes located outside Colorado maintain tribal interests, including aboriginal and ceded territories, and retain inherent aboriginal rights within the State.

Cultural Resources: Environmental Consequences

All Alternatives

All alternatives require compliance with existing laws and regulations; therefore, before any management actions take place the standard process for considering effects would be conducted as required by the implementing regulations for the National Historic Preservation Act. In most cases, a cultural resource inventory would be conducted. Impacts would be avoided or mitigated. Tribal consultation is an integral part of the planning process for management actions; as well as consultations with the State Historic Preservation Officer and other interested parties.

Forest Service land management practices have the potential to affect buried or surface remains of archaeological sites, historic sites, and sites of traditional or religious importance to tribes. Whenever roads or other facilities are constructed, there may be a variety of associated impacts on cultural resources that affect the integrity of those sites. The risk of adverse impacts from authorized activities in roadless areas would be relatively low in all alternatives based on projections of activity levels.

Fires can damage historic and prehistoric buildings and structures, culturally modified trees, artifacts, features, and other surface remains. By removing vegetation, fires expose sites and make them more vulnerable to erosion damage and vandalism. Recreation activities, ongoing permitted activities, and ongoing authorized activities can impact cultural resources; these

activities do not vary by alternative.

Impacts on tribal governments and tribal practices from the Colorado roadless rulemaking process are not expected because of consultation requirements with individual tribes. The Forest Service has been consulting with Colorado-affiliated tribes regarding this proposed rulemaking action and analysis process. Concerns raised by some tribes regarding tribal land uses and access in roadless areas do not vary by alternative. If access or land ownership adjustments are proposed in the future, additional tribal consultation and analysis is required before a decision is made.

Alternative 1 – 2001 Roadless Rule

Alternative 1 would result in the lowest risk of adverse effects on cultural resources from ground-disturbing activities. The effects and adverse impacts are minimized on historic landscapes, potential sacred sites, and traditional cultural properties. With the minimal amount of human development or land use activities, there would be little affect to traditional uses by tribes or rural communities, such as traditional gathering of plants, hunting, fishing, or spiritual practices that may occur in roadless areas. This alternative would provide for maintenance of the current condition of cultural resources in the roadless areas.

Alternative 1 provides less opportunity to the public for heritage tourism or educational and interpretive opportunities except for the substantially altered acres that are roaded within the IRAs and where new roads could occur within the analysis area outside of the IRA's under this alternative. There would be a slightly greater risk of experiencing negative impacts to cultural resources from wildland fires with less tree-cutting projected for community protection, which pose a risk of adverse effects on cultural resources. There may be small, localized impacts from a number of ongoing activities, although the magnitude of human activities in roadless areas would continue to be much lower than on other NFS lands.

Alternative 2 - Colorado Roadless Rule (Proposed Action)

This alternative maintains a number of prohibitions and limitations on development activities in roadless areas. Compared to the other alternatives, alternative 2 would result in a higher risk of adverse impacts on cultural resources from ground-disturbing activities than alternative 1. The effects and adverse impacts on historic landscapes, potential sacred sites, and traditional cultural properties, traditional uses by tribes or rural communities, such as traditional gathering of plants, hunting, fishing, or spiritual practices are minimal. Overall, alternative 2 would provide for satisfactory maintenance of the current condition of cultural resources in the roadless areas.

Alternative 2 would provide a slight potential increase in heritage tourism and interpretation opportunities compared to alternative 1 in the substantially altered acres not within the CRAs because additional road construction could occur. By allowing for more treatments for hazardous fuels, this alternative would also reduce the risk of roadless areas experiencing high-severity wildland fires, which can cause adverse effects on cultural resources. There may be small, localized impacts from a number of ongoing activities, although the magnitude of human activities in roadless areas would continue to be much lower than on other NFS lands.

Alternative 3 – Forest Plans (No Action)

Compared to the other alternatives, alternative 3 would result in the highest risk of adverse impacts on cultural resources from ground-disturbing activities. Potential impacts on traditional

uses by tribes or rural community groups would also be higher under this alternative. There would be more potential for damage or loss of cultural resources. Overall, it is expected that activities authorized under alternative 3 would continue to provide for satisfactory maintenance of the current condition of cultural resources in the roadless areas.

Alternative 3 would provide the greatest opportunity to increase heritage tourism and interpretation, compared to the other three alternatives. By allowing for more treatments for hazardous fuels purposes, this alternative would also reduce the chance of roadless areas experiencing high-severity wildland fires, which can cause adverse effects on cultural resources. There may be small, localized impacts from a number of ongoing activities, although the magnitude of human activities in roadless areas would continue to be lower than on other NFS lands.

Alternative 4 - Colorado Roadless Rule with Public Proposed Upper Tier

This alternative maintains a number of prohibitions and limitations on development activities in roadless areas; increased prohibitions in the upper tier acres. Compared to the other alternatives, alternative 4 would result in a lower risk of adverse impacts on cultural resources from ground-disturbing activities than alternatives 2 or 3. The effects and adverse impacts on historic landscapes, potential sacred sites, and traditional cultural properties, traditional uses by tribes or rural communities, such as traditional gathering of plants, hunting, fishing, or spiritual practices are minimal. This alternative would provide for maintenance of the current condition of cultural resources in the roadless areas.

Alternative 4 would provide a slight potential increase in heritage tourism and interpretation opportunities compared to alternative 1 in the substantially altered acres not within the CRAs by allowing additional road construction. By allowing for treatments for hazardous fuels in the CRA acres that are not upper tier, on these acres there is a reduced chance of roadless areas experiencing high-severity wildland fires, which can cause adverse effects on cultural resources. There may be small, localized impacts from a number of ongoing activities, although the magnitude of human activities in roadless areas would continue to be much lower than on other NFS lands.

Cultural Resources – Cumulative Effects

Given the widespread destruction of cultural resources located on private lands and the rapidly growing interest in heritage tourism nationwide, cultural resources on NFS lands is likely to become more valuable in the future. Potentially there could be an increase in hazardous fuels treatments due to the bark beetle epidemic in Colorado and an increase in oil and gas development, as well as other energy-related activities such as geothermal leasing on adjacent lands surrounding roadless areas. These activities would contribute to an overall increase in ground-disturbing activities and alteration of natural and cultural landscapes, which in turn would add to potential for damage to cultural resources.

LANDS - SPECIAL USE AUTHORIZATIONS

Introduction

The Forest Service issues special use authorizations (SUAs) for third party owned facilities located on National Forest System (NFS) lands. These SUAs include temporary permits, permits, term permits, leases and easements. All of these require some type of access to the facility for operation and maintenance. The facilities may need some incidental tree removal periodically for continued safe operation, or under certain emergency conditions. There are also SUAs issued for access to private and other ownerships. Recreation-related permits are discussed separately in the recreation section of the EIS.

Lands Special Use Authorizations: Affected Environment

There are approximately 140 different types of lands uses that can be authorized on NFS lands. In Colorado, there are approximately 3,900 lands SUAs issued to individuals, business entities, State and local governments and other federal agencies. Uses include, but are not limited to, roads, reservoirs, weather stations, snotel sites[29], communication sites, railroads, service buildings of all types, electric transmission and distribution lines, telecommunication facilities (copper phone and fiber optic lines), oil and gas pipelines, ditches and other water conveyance structures. The authorized uses provide a variety of products to individuals and the general public throughout the United States and can impact NFS lands.

As private land is developed adjacent to and on inholdings within NFS land, demand for authorization for uses has grown. The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) requires the agency to provide for access to inholdings based on the reasonable use and enjoyment of the property. Proposed SUAs adjacent to private land may include: water systems, wells, fences and access roads to support and enhance the activity on private lands.

Proponents for any SUA are required to submit a proposal, with an explanation of the purpose and need for the project or facility; a justification for the need for use of NFS lands; the public need for and benefit from the facility; and the appropriateness of the use for that particular management area, based on the forest plan, or other planning documents. The FS accepts only proposals for facilities where the proponent has satisfied the criteria that they are not able to accomplish the use on non-NFS lands (FSH 2709.11, chapter 10, 12.32a – Appropriate use of National Forest System Lands; 36 CFR 251.54(e) (5) (i) and (ii)).

Lands Special Use Authorizations: Environmental Consequences

All Alternatives

It is important to note that all discussions about future use and occupancy of IRAs and CRAs are purely speculative. Proposals for third party use and occupancy on NFS all come from outside the agency. The agency recognizes the increased oil and gas leasing activity, and so anticipates need for future transportation of product. The agency recognizes current increased growth in the rural west in and around the National Forests, and anticipates proposals for additional access and facilities for those developed lands. Going hand in hand with that

[29] *Automated system of snowpack and related climate sensors*

expansion, is the need for more municipal water. The agency sees many communities expanding their municipal watershed areas, and including more NFS lands in their municipal watershed. This could result in less access for traditional lands use authorizations, and infringe more on roadless areas. The agency recognizes current trends for exploration of renewable energy sources, and anticipates proposals for siting of those facilities on NFS lands. Siting of renewable facilities on NFS lands necessitates connection to the national power grid with existing or additional electric power lines. But trends and anticipation do not necessarily equate to action on the part of individuals or companies. Many entities would prefer to avoid locating facilities on NFS, and certainly outside of roadless areas, but for some facilities, that is nearly impossible. Linear facilities in particular, often have no other options. And for existing holders of water conveyance system SUAs, expansion of those facilities to meet a growing need necessitates continued work with the agency, and work on the facility as it is currently located—no matter if it is in a roadless area or not. Projections are highly speculative and they are summarized in Tables 3-4 and 3-8. Due to the speculative nature of the projections for the reasons outlined above, differences among alternatives are discussed qualitatively, based on restrictions and exceptions under the different alternatives.

No alternative revokes, suspends or modifies any permit or other legal instrument authorizing the occupancy and use of NFS lands prior to the effective date of the rule. Third party owned facilities that are authorized by SUA all require some type of access; however, it is not necessarily road access. Existing SUAs that authorize roaded access will continue to authorize roaded access and allow construction or reconstruction of roads under all alternatives. Authorized access roads are constructed to minimum standards, based on site specific analysis and resource conditions.

Future authorization of any land use under an SUA varies by alternative. In most cases, roaded access for all facilities could be allowed for health, safety and emergency reasons that without intervention could cause the loss of life or property. In alternatives 2 and 4, these must be temporary roads and could not be constructed in the upper tier acres.

This section of the EIS analyzes the following land SUA facilities: oil and gas pipelines from sources located outside of roadless areas, electric power lines and telecommunications facilities, water conveyance structures, and a fourth category of all other land uses (including renewable energy facilities such as wind and solar). Oil and gas pipelines are assumed to be co-located with roads for existing leases within roadless areas and are analyzed in the oil and gas section of this EIS (Table 3-17).

Forest plan direction that discourages or restricts the location of certain SUA facilities is followed in all alternatives and does not vary by alternative.

Oil and Gas Pipelines from Sources Located Outside of Roadless Areas

There are existing oil and gas leases within and on lands adjacent to IRAs and CRAs. Pipelines are a necessary component of infrastructure for production and transportation of natural gas and fulfillment of lease rights. Construction or reconstruction of pipelines for existing leases within roadless areas varies slightly by alternative and are assumed to be co-located with roads (see Table 3-17).

Agency policy reflects Bureau of Land Management (BLM) policy that recognizes authorized oil and gas pipeline construction does not require a road-- the area of disturbance for the installation of the pipeline is considered a linear construction zone. This analysis follows that

policy and all pipelines located within roadless areas from sources outside of roadless areas are constructed or reconstructed using linear construction zones; as dictated by pipeline direction in each of the four alternatives.

Alternative 1- 2001 Roadless Rule

There is no rule language limiting the use of linear construction zones and no rule language limiting the location of future oil and gas pipelines in IRAs from sources outside of IRAs. Within the limits of forest plan direction, oil and gas pipelines can be constructed in IRAs from oil and gas leases located outside of IRAs using linear construction zones. Forests project 0.7 miles of LCZ annually to construct oil and gas pipelines from sources outside of roadless areas and project no LCZ miles in the analysis area outside of the IRAs.

There is no restriction on future oil and gas pipelines under this alternative on the roadless acres newly identified and added to alternatives 2 and 4.

Alternative 2 – Proposed Colorado Roadless Rule (Proposed Action)

Construction of an oil and gas pipeline from a source or sources located exclusively outside of a CRA is prohibited after the [effective date of the rule] unless they connect to infrastructure within a CRA and the Regional Forester determines such a connection would cause substantially less environmental damage. Once it is determined that the pipeline would be located in a CRA, a linear construction zone can be used for its construction with a determination by the Regional Forester. The upper tier acres follow this same direction.

If it is determined that the pipeline would not be located within a CRA, the decision may necessitate longer routes, and larger pipelines to increase capacity for the future. This may have an economic effect on the proponent and all other agencies involved because of limited siting locations.

Alternative 3 – Forest Plan Direction (No Action)

This alternative is the same as alternative 1 where LCZs are not limited.

Alternative 4 – Proposed Colorado Roadless Rule with Public Proposed Upper Tier

This alternative is the same as alternative 2.

Electrical Power Lines and Telecommunication Lines

Electrical power lines and telecommunication lines currently are located in IRAs and CRAs. The agency will continue to receive proposals as energy sources are identified and developed. These energy sources need to be connected to the electrical grid.

Alternative 1- 2001 Roadless Rule

There is no rule language limiting the location of future electrical power lines and telecommunication lines in IRAs or limiting the use of linear construction zones for their construction, reconstruction or maintenance. If uses are authorized in IRAs in the future, there is no provision for road construction for the construction, operation or maintenance of electrical power lines or telecommunication lines. Within the limits of forest plan direction, electrical power lines and telecommunication lines could be constructed in IRAs using linear construction zones.

If roaded access would be necessary the route would be required to be located outside IRAs. Relocation outside an IRA would result in increased construction and operation and maintenance costs for the proponent. Higher costs would ultimately be borne by the utility customers. Relocation outside an IRA could also cause greater environmental impacts if the route is significantly longer than it would have been if routed through the IRA.

Alternative 2 – Proposed Colorado Roadless Rule (Proposed Action)

Electrical power lines and telecommunication lines would only be authorized within CRAs if a Responsible Official determines there is no opportunity for the project to be implemented outside of a CRA without causing substantially greater environmental damage. Once it is determined that the location would be within a CRA, the Regional Forester must determine a linear construction zone can be utilized for the construction, reconstruction, or maintenance of existing or future authorized electrical power lines or telecommunication lines. The upper tier acres follow this same direction.

If roaded access would be necessary the route would be required to be located outside CRAs. Relocation outside a CRA would result in increased construction and operation and maintenance costs for the proponent. Higher costs would ultimately be borne by the utility customers. Relocation outside a CRA could also cause greater environmental impacts if the route is significantly longer than it would have been if routed through the CRA.

Alternative 3 – Forest Plan Direction (No Action)

Other than forest where plan direction discourages or restricts the location of certain SUA facilities or restricts road construction, electrical power lines and telecommunication lines can be constructed through IRAs. Roaded access or linear construction zones can be used. This can benefit the proponent and the consumer by placing the electrical power line or telecommunication line in the most economically viable location for connection to the electrical grid.

Alternative 4 – Proposed Colorado Roadless Rule with Public Proposed Upper Tier

This alternative would have the same effects as alternative 2.

Water Conveyance Structures

As water needs increase throughout the country and drought cycles continue, holders are asking for authorization to expand and enlarge existing reservoirs and water conveyance structures. The agency also anticipates an increase in proposals for new reservoirs and the associated water conveyance systems on NFS lands in Colorado, including roadless areas. The location of water conveyance structures is only limited by forest plan direction and does not vary by alternative. What does change by alternative is how the water conveyance structures are constructed, reconstructed or maintained. Three of the alternatives allow for road construction for at least some of the future water conveyance structure SUAs. All of the alternatives allow for linear construction zones for at least some of the future water conveyance structure SUAs.

Alternative 1- 2001 Roadless Rule

If uses are authorized in IRAs in the future, there is no provision for road construction for the construction, operation or maintenance of water conveyance SUAs. Linear construction zones are not prohibited under this alternative so conceivably, any water conveyance structure could be constructed in an IRA under this alternative.

If roaded access would be necessary, future water conveyance structures could not be located in IRAs. Not allowing roaded access to future proposed uses could cause public hardships or greater environmental damage to land outside of an IRA (i.e. higher customer rates, longer and more expensive construction of the linear facility, etc.).

Alternative 2 – Proposed Colorado Roadless Rule (Proposed Action)

If uses are authorized in CRAs in the future, the Regional Forester would be required to determine if road construction and linear construction zones are allowed. Water uses are limited to authorized water conveyance structures operated pursuant to a pre-existing water court decree [as of the effective date of the rule]. In the upper tier acres, only linear construction zones could be used..

If roaded or linear construction zone access would be necessary for future water conveyance structures that do not currently have a pre-existing water court decree, they could not be located in CRAs. This could cause public hardships (i.e. higher customer rates, longer and more expensive construction of the linear facility, etc.) if the alternate location outside of CRAs proved to be more expensive or had more environmental effects.

For currently authorized and future authorized water conveyance structures operated pursuant to a pre-existing water court decree, roads would be allowed. This would be beneficial to the proponents for these new facilities because it does not limit their most modern means of construction, operation and maintenance.

Alternative 3 – Forest Plan Direction (No Action)

Other than forest plan direction that discourages or restricts the location of certain SUA facilities or restricts road construction, water conveyance structures can be located in IRAs. This can benefit the proponent by placing the water conveyance structure in the most feasible and economically viable location.

Alternative 4 – Proposed Colorado Roadless Rule with Public Proposed Upper Tier

This alternative is the same as alternative 2. There are many more upper tier acres in this alternative than alternative 2. Water conveyance structures in the upper tier acres can only use linear construction zones for their construction, reconstruction or maintenance.

All Other Land Uses

As alternative energy sources are explored, proposals for wind energy testing and eventual build out, and solar facilities may become more prevalent. To date proposals for wind, solar, and geothermal development have focused on NFS lands adjacent to private land that is already being developed on ridge tops and on the National Grasslands. Subject to forest plan direction, special use authorizations for wind and solar facilities could be allowed under all alternatives though unlikely under alternatives 1, 2 and 4. Depending on the alternative, road construction to these facilities may or may not be allowed. Depending on the alternative, a linear construction zone may or may not be allowed for the construction or maintenance of these facilities.

Alternative 1- 2001 Roadless Rule

If uses are authorized in IRAs in the future, there is no provision for road construction for the construction, operation or maintenance of SUAs. Linear construction zones are allowed under this alternative. Some SUAs may be able to be constructed or periodically maintained using a linear construction zone as opposed to a road. If roaded access would be necessary, there will be

economic issues for proposed uses that would normally have been located in or near IRAs, if now their route would need to be located outside IRAs and that relocation increased construction and operation and maintenance costs. Not allowing roaded access to future proposed uses could cause public hardships or greater environmental damage (i.e. higher customer rates, longer and more expensive construction of the linear facility, etc.) if there were additional economic or environmental effects outside of an IRA. However, by not allowing additional land uses in IRAs some of the roadless area characteristics may be preserved.

Alternative 2 – Proposed Colorado Roadless Rule (Proposed Action)

Alternative 2 does not allow for roaded access or linear construction zones for any other future uses. This would necessitate siting all new facilities outside of CRAs if they would require motorized roaded or linear construction zone access for construction, operation and maintenance. This would limit options for siting, and could cause economic issues for the proponent by limiting options, and environmental concerns for the public and the agency. Not allowing additional land uses in CRAs may preserve some of the roadless area characteristics.

Continued avoidance of CRAs for certain authorized third party uses necessitates siting in areas adjacent to the CRAs. Allowing additional facilities outside of CRAs may conflict with visual and noise objectives for the individual CRA. Site specific NEPA analysis for these uses would allow for mitigation for potentially conflicting adjacent uses.

Alternative 3 – Forest Plan Direction (No Action)

Forest plans may allow for all these uses, and the associated road construction or linear construction zones. Forest plans are normally silent on linear construction zones, and do not specifically prohibit them. If not allowed under the current forest plan management direction, the Plan may be amended if necessary, with site and project specific NEPA.

Alternative 4 – Proposed Colorado Roadless Rule with Public Proposed Upper Tier

This alternative is the same as alternative 2.

Lands Special Use Authorizations: Cumulative Effects

Continued population growth, more need for municipal, agricultural and domestic water, development and sale of inholdings, subdividing of long time historic ranch lands, push for domestic, renewable, and low-carbon energy sources and the need for connection of those sources to electrical grids, need to get products to market via pipelines, power lines, telecommunication lines and roads all may affect management of NFS both within and adjacent to IRAs and CRAs.

Overall environmental cumulative effects of allowing roaded access to certain described uses, and prohibiting roaded access to other similar uses may simply limit siting options and environmentally preferable locations that exist within IRAs and CRAs. Economically, alternatives 1, 2 and 4 limit options for proponents which may make any future proposal more expensive to implement and operate. Socially, benefits and drawbacks exist, depending on social values. Another key factor to remember is that all of these uses, no matter where they are proposed or are currently located on NFS, trigger some type of site specific NEPA analysis for changes to existing uses or proposed new uses. Site specific analysis identifies design criteria, Best Management Practices, and monitoring for construction, operation, and maintenance which is appropriate for that use and location. Those measures are all required through the SUA that authorizes the use and occupancy.

LIVESTOCK MANAGEMENT

Livestock grazing is authorized on lands identified through agency planning processes to be suitable and capable for such use. Management of livestock grazing in roadless areas is based on site-specific analysis, allotment management plans, permit requirements, and forest plan management direction, in accordance with statute, regulations, and agency policies.

Livestock Management - Affected Environment

Livestock grazing is managed in portions of many of the roadless areas, as displayed in Table 3-48. In addition to actively grazed allotments (lands allocated to grazing management), there are a number of vacant allotments where there is no current grazing permit in effect but where livestock grazing may be permitted in the future. Permitted livestock may include cattle, sheep, or other kinds of livestock such as horses.

Table 3-48. Rangeland and Livestock Management Acres (3,446,167 acres in Analysis Area)

Forest	Allotment Status	IRA/CRA Common	CRA Not IRA	IRA Not CRA
Arapaho-Roosevelt	Active	40,585	322	1,544
	Vacant	83,710	757	1,168
GMUG	Active	690,928	106,078	252,431
	Vacant	36,821	2,712	17,972
Manti-La Sal	Active	7,230	449	3,853
	Vacant	0	0	0
PSICC	Active	136,894	60,080	28,351
	Vacant	0	0	0
Rio Grande	Active	376,700	2,477	10,620
	Vacant	47,910	308	777
Routt	Active	366,122	1,365	9,085
	Vacant	44,066	105	1,139
San Juan	Active	234,141	53,354	61,110
	Vacant	207,559	38,080	14,426
White River	Active	400,148	2,603	3,220
	Vacant	97,236	817	914
Total R2 Colorado	Active	2,252,748	226,728	370,214
	Vacant	517,302	42,779	36,396
	All	2,770,050	269,507	406,610
% of Total Allotment Acres		80.4%	7.8%	11.8%

GMUG = Grand Mesa, Uncompahgre, and Gunnison. PSICC = Pike-San Isabel, Cimarron, Comanche. Totals may not add due to rounding.

Livestock grazing use in roadless areas occurs on open grasslands, meadows, riparian areas, shrublands, and to a lesser degree in forested areas containing sufficient herbaceous (grassy or non-woody) understory vegetation. More than 70 percent of the roadless areas are dominated by forest cover types where there is less forage than in grass and forb cover types available for livestock grazing. Roadless areas contain relatively small portions of open grasslands, meadows, and other expanses of herbaceous or shrubby vegetation. Thus, authorized livestock grazing use occurs less extensively in the roadless areas than many other portions of the

National Forests and National Grasslands in Colorado.

Livestock management is an important traditional and cultural use of NFS lands, including roadless areas. In addition, proper management of livestock grazing plays a critical role in rangeland ecosystem health and sustainability, offering potential beneficial effects such as maintaining soil quality, biodiversity, wildlife forage habitat, water retention and release processes, and some visual and recreational qualities. On the other hand, depending on the timing, location, and intensity of permitted livestock grazing, this use can result in detrimental impacts on the abundance and diversity of native plant communities; soil, water and riparian conditions; wildlife and fisheries habitat features; and visual and recreational resources.

Livestock Management - Environmental Consequences

All Alternatives

Tree-cutting, sale or removal and road construction/reconstruction activities that differ by alternative can affect rangeland vegetation. Those activities can also effect the proper management of livestock in the roadless areas. However, those who have grazing permits (permittees) for allotments in roadless areas have been able to effectively manage their livestock in those areas over long time periods without the necessity of additional roads. Permittees typically rely on pack and saddle stock to manage the livestock and maintain their range improvement structures. In specific instances, a permit may include authorized use of motorized vehicles to access specific locations for specific needs associated with their permit. Such access would not require construction of a road, but would allow time-specific, over-ground motorized access to an area. Rangeland management personnel on the National Forests in Colorado do not foresee a need for additional roads in roadless areas in support of livestock grazing management in those areas over the next 15 years under any alternative.

The limited roads available in most roadless area grazing allotments can cause increases in operating costs for permit holders because of the increased costs of transporting livestock and allotment management materials into unroaded portions of the allotment. However, most permit holders operating in these areas have already factored in these costs and are accustomed to operating under the given conditions and restrictions in roadless areas. For some permittees, the added costs of operating in roadless areas are offset by lower costs associated with operating in other more roaded areas outside the roadless areas. Roads can also increase livestock management costs because they increase the potential for the public to leave livestock gates open, cut fences, damage water developments, harass or harm livestock, or disrupt grazing systems.

In general, the more potential for road construction, tree-cutting, and related management activities in roadless areas, the greater potential there may be for the detrimental effects on livestock grazing management (such as leaving gates open, cutting fences, etc.). The alternatives allow road construction in roadless areas for specific purposes, and they all limit road construction for other purposes. Within the analysis area under any of the alternatives, there is limited road construction projected. The road construction is distributed across the analysis area. Under all alternatives, the roadless areas would be expected to continue to contain significantly lower road densities than adjacent NFS lands, excluding wilderness areas.

Under all alternatives, new roads would generally be closed to public motorized access, and most of those roads would be closed and decommissioned after the road is no longer needed for

authorized uses. Although increases in road miles under any alternative could potentially increase unauthorized public motorized use, illegal public use of single-use roads in the analysis area would not be likely to occur extensively or frequently in any specific grazing allotment. Therefore, under any alternative, there would be a low likelihood that the projected new roads would significantly affect authorized livestock management use. There may be a slightly higher risk of road-related impacts on livestock grazing management under alternative 3, because of the higher number of projected road miles under that alternative, but this difference from the other alternatives is not significant.

Tree-cutting, sale or removal activities in roadless areas and in the analysis area, as well as various fuel management activities, vary by alternative, affecting from approximately 2,300 to 16,900 acres per year. The tree-cutting, sale or removal is distributed through the analysis area under each of the alternatives. Tree-cutting activities have the potential to disturb livestock and alter their distribution patterns, as well as the potential for fences to be cut or gates to be left open. Immediately after some forest management treatment projects, livestock grazing may be restricted from the disturbed areas that are being reseeded and revegetated. However, recent tree-cutting activities, such as for fuel reduction treatments, have not typically resulted in significant adverse impacts on grazing management in the treatment area.

Tree-cutting activities tend to open forest canopies, which leads to increases in the abundance of forage vegetation for livestock and grazing wildlife species. The prescribed burning that often follows tree-cutting for hazardous fuels usually results in further increasing the growth and abundance of herbaceous forage vegetation. In addition, if forest treatments in roadless areas reduce the severity and size of a wildland fire, the treatments would likely have beneficial effects in protecting fences and other livestock grazing management facilities in the treated area. Overall, the agency has found that forest management activities to reduce fuel accumulations can be conducted in a manner that is compatible with permitted livestock grazing, although some permit adjustments are sometimes needed.

While alternative 3 would pose the highest potential for adverse impacts on livestock grazing management, there would be no substantial difference in risk to livestock operations under any of the alternatives. Under all alternatives the risk would be low for the potential tree-cutting activities to result in significant adverse impacts on livestock management.

Livestock Management - Cumulative Effects

Other public land use activities that occur in the analysis area would have similar effects on livestock grazing operations in those allotments that are within roadless areas. For example, motorized and non-motorized recreation activities have a similar potential for incidences of leaving gates open, cutting fences, harassing or killing livestock, and other effects previously described. Recreational use, along with oil, gas, and coal activities, are expected to increase over the next 15 years, which would increase potential risks to livestock operations. However, human activity in roadless areas would likely continue to be less frequent and less extensive compared to activities on more intensively managed lands outside roadless areas. Thus, overall, those other activities in roadless areas that are not expected to differ by alternative would not substantially affect ongoing or future livestock operations that are authorized in the roadless areas.

Climate change may also impact livestock grazing. Some climate projections indicate increasing drought, which can impact water availability for livestock and forage production. In addition,

drought may provide opportunities for the establishment of invasive plant species, which can also reduce forage production. Some projections indicate that there may be increasing wildfires, which can pose dangers to livestock. However, the aftermath of fires may see increased forage production due to increased sunlight and nutrients to ground vegetation.

Because of the low risk of measurable direct and indirect effects of the alternatives on permitted livestock operations, and the low magnitude and frequency of other activities in roadless areas likely to substantially alter permitted livestock operations, no significant cumulative effects would be anticipated under any of the alternatives.

ABANDONED MINES AND PUBLIC SAFETY

Abandoned Mines and Public Safety: Affected Environment

Colorado's abandoned mine land inventory database shows a total of 21,880 abandoned mine features including holes, dumps, and associated facilities occurring on Colorado NFS lands with 4,229 (19%) of these occurring within the analysis area (Colorado Division of Reclamation Mine and Safety 2008 and 2009 USFS-AMLI data). This can be further broken down to 1,694 holes ranging from small prospect pits to open shafts and adits, 940 waste and tailings dumps of varying sizes, and 1,595 structural features such as head frames and ore bins. More than one feature may exist at any one site, and therefore, these total features should not be confused with total sites.

Within the IRAs there are 3,266 total features and within the CRAs are 2,887 total features. Overall, the IRAs in alternatives 1 and 3 include 379 more abandoned mined land features than do alternatives 2 and 4 due to the inclusion of the substantially altered acres. The Forest Service inventory of abandoned mines on NFS lands is an ongoing process where more sites may still be identified than are reclaimed, and therefore, the number of abandoned mine sites within roadless areas in Colorado may increase.

Abandoned mines, quarries, and other mineral sites that pose human health, environmental, or safety risks may require some type of reclamation or mitigation. If the sites exist and are releasing, or have the potential to release, a hazardous substance, they would require some type of response action under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (P.L. 96-510, Stat. 2767; 42 U.S.C. 9601, 9603, 9607, 9620) (CERCLA) (USDA Office of Inspector General 1996). This act addresses emergency response, site remediation and spill prevention. The Forest Service has authority for CERCLA enforcement on NFS lands under Executive Order 12580, sec. 2(j). An Engineering Evaluation/Cost Analysis (EE/CA) or remedial investigation/feasibility study (RI/FS) would include provisions for proposed road construction if needed for CERCLA response actions, consistent with the National Contingency Plan, 40 CFR Part 300.

Also, inventoried roadless areas may contain sites that require some type of reclamation to resolve violations of the Clean Water Act.

It is common for an abandoned mine to have a road in place from initial development of the mine. Some road reconstruction may be needed to improve access to the mine itself to accomplish reclamation goals. However, the road improvements are only temporary, as closing and reclaiming the mine roads is integral to achieving the overall reclamation goals of the abandoned mine land program.

Abandoned Mines and Public Safety: Environmental Consequences

All Alternatives

All alternatives allow construction or reconstruction of roads needed to conduct a response action under CERCLA or to conduct a natural resource restoration action under CERCLA, Oil, and Hazardous Substance Liability – Sec. 311 of the Clean Water Act, or the Oil Pollution Act.

Therefore, under all alternatives, the Forest Service will continue to respond to CERCLA violations that are encountered at abandoned mines within roadless areas in Colorado. Construction or reconstruction of temporary roads for this activity would be permissible. The exact number of identified sites that may result in CERCLA violations is not known until site specific assessments are completed.

It is expected that most non-CERCLA environmental issues at abandoned mines can be addressed by means that do not require road construction or reconstruction.

SOCIAL VALUES

Introduction

The social implications of roadless area management in Colorado are of interest to local residents surrounding the roadless areas, users of roadless areas, and people throughout the country who value or are interested in roadless area resources. Policy decisions that influence the management of roadless areas attempt to balance the wide variety of uses and values individuals hold for national forest resources. It is unlikely that any alternative selected in this process would satisfy the needs of all those interested in management of roadless areas in Colorado. Each alternative entails a compromise between people's competing uses and values of roadless areas.

This section includes a description of counties and state-wide demographics and trends within Colorado, environmental justice considerations, and potential impacts by alternative on various interest groups and their values.

Social Values: Affected Environment

Demographic information describes the social and economic conditions and trends of human populations in specific geographic areas. It allows the decision maker and public to understand how population trends influence or are influenced by public land management.

The population variables considered in this analysis include population and growth trends, age composition, racial diversity, and poverty level. Where possible, explanations of trends that are not typical for Colorado are provided. Otherwise, trends are assumed to reflect some preference or response to natural, physical, or political frameworks, and would be expected to continue in the future.

Population numbers and composition can influence the ability of the area to absorb or adapt to changes as well as change the demands locals have for forest products and opportunities. It is important to consider any potential changes within the context of trends or changes that are occurring outside of Forest Service control, for example the movement of retirees into Colorado or changes in preferred recreational activities.

Colorado Populations and Growth Trends

There are 64 counties in Colorado. Table 3-49 highlights the 41 counties with roadless area acres, including inventoried roadless area (IRAs) and Colorado roadless areas (CRAs), and the percentage of NFS acres within each county in roadless areas. Counties without roadless area acres are not included in the analysis. Of the 41 counties with roadless area acres, 16 counties have 35 percent or more of the NFS lands within the county in roadless areas. In Moffat, Las Animas, and Mesa counties, over half of the NFS lands in the county are within roadless areas. There are fewer total acres of CRAs based on adjustments of CRA boundaries compared to IRA boundaries. However, in Dolores, Jefferson, Las Animas, Montezuma, Montrose, Ouray, Park, Pueblo and San Miguel Counties there are more total CRA acres than IRA acres; due to the unroaded areas outside IRAs that were included in CRAs (refer to Appendix A, IRA and CRA acres and names).

Table 3-49. Colorado counties with IRA and CRA acres

County	National Forest System lands	IRA acres, alternatives 1 and 3	Percent of NFS acres that are w/in IRAs	CRA acres, alternative 2	Percent of NFS acres that are w/in CRAs
Archuleta	430,000	125,500	29%	109,400	25%
Boulder	138,000	22,600	16%	22,000	16%
Chaffee	457,000	180,000	39%	189,600	41%
Clear Creek	175,000	62,800	36%	59,000	34%
Conejos	301,000	65,700	22%	64,000	21%
Costilla	1,000	-	-	500	50%
Custer	162,000	60,900	38%	75,200	46%
Delta	192,000	85,300	44%	77,900	41%
Dolores	335,000	69,700	21%	88,800	27%
Douglas	142,000	57,500	40%	61,800	44%
Eagle	596,000	231,000	39%	229,900	39%
El Paso	101,000	12,000	12%	22,200	22%
Fremont	100,000	43,200	43%	48,500	49%
Garfield	516,000	85,400	17%	85,400	17%
Grand	572,000	182,500	32%	185,400	32%
Gunnison	1,276,000	501,900	39%	398,400	31%
Hinsdale	559,000	133,100	24%	125,500	22%
Huerfano	141,000	47,200	33%	51,200	36%
Jackson	333,000	60,500	18%	59,900	18%
Jefferson	105,000	27,400	26%	29,000	28%
La Plata	404,000	191,700	47%	199,400	49%
Lake	162,000	53,900	33%	55,900	35%
Larimer	648,000	154,800	24%	152,400	24%
Las Animas	22,000	13,300	60%	14,900	68%
Mesa	548,000	288,200	53%	283,900	52%
Mineral	525,000	207,000	39%	202,300	39%
Moffat	42,000	28,200	67%	28,100	67%
Montezuma	257,000	40,900	16%	52,200	20%
Montrose	327,000	21,900	7%	33,200	10%
Ouray	132,000	11,600	9%	21,500	16%
Park	650,000	132,900	20%	170,300	26%
Pitkin	496,000	104,700	21%	104,800	21%

County	National Forest System lands	IRA acres, alternatives 1 and 3	Percent of NFS acres that are w/in IRAs	CRA acres, alternative 2	Percent of NFS acres that are w/in CRAs
Pueblo	33,000	9,500	29%	17,600	53%
Rio Blanco	359,000	169,700	47%	169,600	47%
Rio Grande	280,000	87,600	31%	86,600	31%
Routt	583,000	222,100	38%	215,000	37%
Saguache	932,000	304,900	33%	231,200	25%
San Juan	174,000	62,200	36%	68,900	40%
San Miguel	177,000	18,600	11%	21,800	12%
Summit	313,000	59,100	19%	57,000	18%
Teller	125,000	14,100	11%	17,400	14%
TOTAL	13,885,000	4,249,000	31%	4,186,000	30%

Totals may not add due to rounding
Source – County data is from USDOC Census Bureau, 2000 census. Roadless area data is from the GIS roadless areas database, April 2008

In general, the population within Colorado has been increasing since 1900. Colorado saw rapid growth in the 1980s and early 1990s. More recently, the rate of growth has leveled off, but the population is still increasing. Figure 3-1 shows the population trend for Colorado from 1900 to 2000 and then projected through 2030.

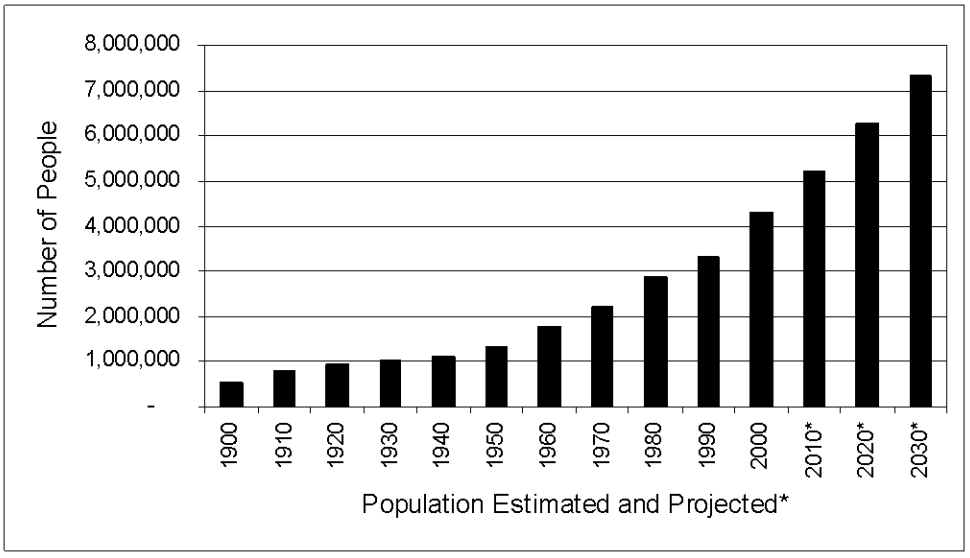

Figure 3-1. Colorado estimated population from 1900 to 2000 and projected for 2010 to 2030
**Source: State of Colorado, Division of Local Affairs - State Demography Office Website, 4/11/08*

Overall, Colorado's population increased about 2 percent between 2000 and 2005, from about 4,338,800 to 4,718,600, and is expected to continue growing at 2 percent until 2020 when growth slows slightly to 1.6 percent. Within the counties with roadless area acres in them, Archuleta, Chaffee, Custer, Delta, Douglas, Eagle, Garfield, Grand, Lake, Mesa, Montrose, Park, San Miguel, and Summit counties are projected to have higher growth rates than the State average, but the trend is similar in that growth will continue and begin to decline between 2015 and 2020. Reasons for the growth in Colorado include the oil and gas boom on the western slope as

well as the continued influx of retirees into the State (Colorado Department of Local Affairs, State Demography Office 2008).

Age Composition

Figure 3-2 highlights the age distribution estimates for Colorado for 1990 and 2000 and projections to 2030. As with the national trend of the aging baby boomers, Colorado is expecting a significant increase in the over 65 age category beginning in 2010. The Colorado Demography Office is predicting that between 2000 and 2030, Colorado's population of people 65 and above will triple in size from 400,000 to 1.2 million (Colorado Department of Local Affairs, State Demography Office 2010). This growth is greater than would be expected merely from the aging of Colorado's current population, indicating that retirees from outside Colorado will be moving to the State. It is expected that this retiree population will be an economic driver, creating between .3 and .4 jobs per person over 65. The majority of these jobs would be service oriented or within the health care industry.

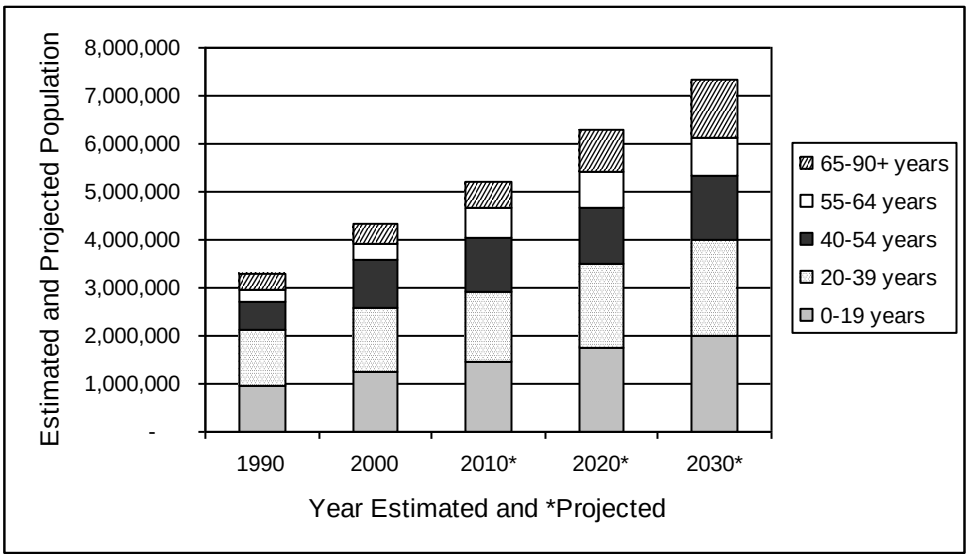

Figure 3-2. Colorado population by age, estimated for 1990 and 2000, projected for 2010 to 2030
Source: State of Colorado, Department of Local Affairs - www.dlg.oem2.state.co.us/demog/, 4/11/08

The recession that began in December 2007 has slowed economic growth in Colorado and has slowed some of the expected flow of retirees into the State. But as the nation and Colorado continues to regain economic health, the retiree trends are expected to return to previous rates.

Racial Diversity

Racial diversity is displayed for the current population in Colorado and projected through 2030 in Figure 3-3. Overall, Colorado has limited diversity relative to the entire U.S. However, the trend in Colorado, as with the national trend, is toward more racially diverse populations. The State average is not reflective of many individual counties in Colorado. Counties in the southern San Luis Valley, as well as many counties on the western slope, have significantly higher Hispanic populations than the State average.

In some cases, demands for resource opportunities in roadless areas may change over time as the numbers of different racial and ethnic groups increase in communities around national forests. Different ethnic groups often have different ways of recreating on or using public lands.

Current Forest Service management and assumptions about how people use the national forest is likely to change as the population surrounding the forest changes. For example, limits on group sizes and numbers of vehicles allowed within developed sites may not be reflective of larger family gatherings that some people desire to hold on public lands (Chavez 2000, Chavez 2005).

The following discussion of environmental justice includes more specific information on racial diversity, as well as the poverty level for each county with roadless area acres (roadless area counties).

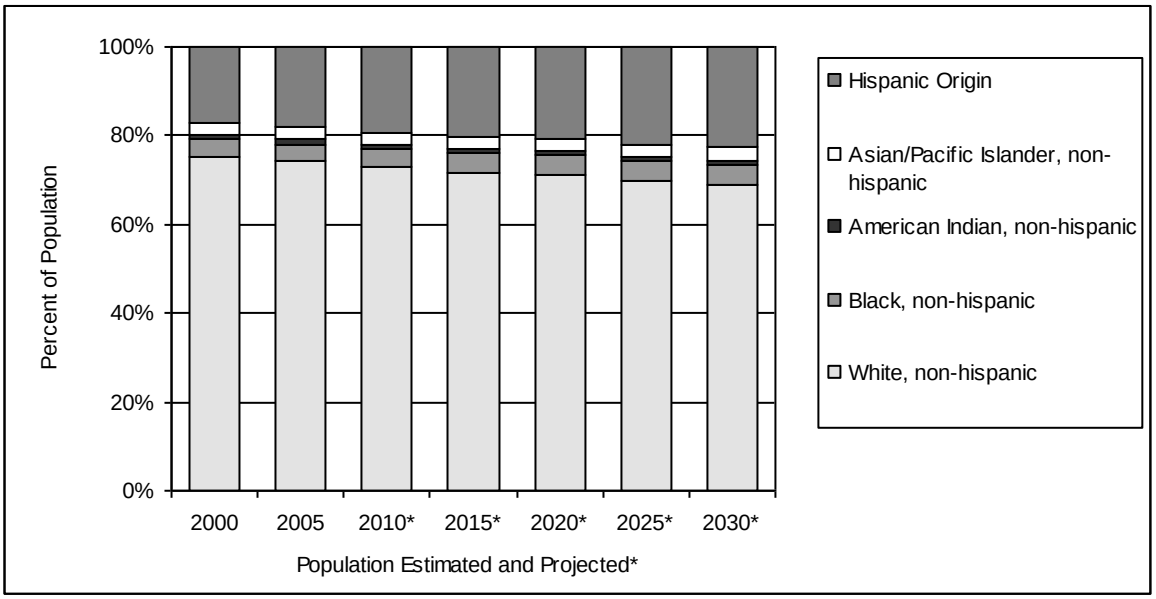

Figure 3-3. Colorado population by racial group estimated for 2000 to 2005 and projected for 2010 to 2030

**Source: State of Colorado, Department of Local Affairs - State Demography Office Website 4/11/08*
For more detailed information, Appendix G social and economic data tables, includes maps displaying demographic information for all counties in Colorado.

Environmental Justice

Executive Order (EO) 12898 directs federal agencies to focus attention on the human health and environmental conditions in minority and low-income communities. The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Table 3-50 was developed from 2000 Census Bureau data. It highlights the minority group composition of the roadless area counties compared to Colorado State statistics. A minority population exists if the minority population of the affected area exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (Council on Environmental Quality 1997). The table shows that Alamosa, Eagle, Huerfano, Lake, Las Animas, Pueblo, Rio Grande, and Saguache Counties have minority

populations larger than the State average, and Conejos and Costilla County in the San Luis Valley have the largest minority populations. Table 3-50 also displays the percent of individuals living below the poverty level by county and by State, and displays the percentage of households that heat with wood as their primary heat source, which is another low income indicator. In some areas of the State, the percentage of households heating with wood is an important factor to consider when looking at potential impacts of Forest Service actions because many low income families gather and use wood as their primary source of affordable heat.

Table 3-50. Environmental justice statistics for roadless area counties in Colorado

State/ County	2000 population	Percent Black or African American	Percent American Indian, Alaska Native	Percent Asian, Native Hawaiian, other Pacific Islander	Percent some other race	Percent two or more races	Percent Hispanic or Latino, any race	Percent below poverty level	Percent heat with wood
Colorado	4,301,261	3.7%	0.7%	2.3%	0.1%	2.8%	17.1%	9.3%	1.0%
Alamosa	14,966	1.0%	2.3%	1.0%	20.3%	4.2%	41.4%	21.3%	5.3%
Archuleta	9,898	0.4%	1.4%	0.3%	7.0%	2.6%	16.8%	11.7%	9.0%
Boulder	291,288	0.9%	0.6%	3.1%	4.7%	2.2%	10.5%	9.5%	0.5%
Chaffee	16,242	1.6%	1.1%	0.5%	4.2%	1.7%	8.6%	11.7%	6.5%
Clear Creek	9,322	0.3%	0.7%	0.4%	1.0%	1.2%	3.9%	5.4%	4.8%
Conejos	8,400	0.2%	1.7%	0.2%	21.5%	3.6%	58.9%	23.0%	11.1%
Costilla	3,663	0.8%	2.5%	1.1%	29.5%	5.2%	67.6%	26.8%	12.2%
Custer	3,503	0.4%	1.1%	0.3%	0.7%	1.6%	2.5%	13.3%	6.8%
Delta	27,834	0.5%	0.8%	0.3%	4.3%	1.8%	11.4%	12.1%	6.7%
Dolores	1,844	0.1%	2.0%	0.4%	0.6%	1.7%	3.9%	13.1%	8.6%
Douglas	175,766	1.0%	0.4%	2.6%	1.4%	1.9%	5.1%	2.1%	0.3%
Eagle	41,659	0.3%	0.7%	0.9%	10.8%	1.9%	23.2%	7.8%	1.9%
El Paso	516,929	6.5%	0.9%	2.8%	4.7%	3.9%	11.3%	8.0%	0.3%
Fremont	46,145	5.3%	1.5%	0.6%	1.2%	1.8%	10.3%	11.7%	2.2%
Garfield	43,791	0.4%	0.7%	0.5%	6.5%	1.8%	16.7%	7.5%	2.7%
Gilpin	4,757	0.5%	0.8%	0.9%	1.5%	1.9%	4.2%	4.0%	9.6%
Grand	12,442	0.5%	0.4%	0.8%	2.0%	1.1%	4.4%	7.3%	6.6%
Gunnison	13,956	0.5%	0.7%	0.6%	1.4%	1.7%	5.0%	15.0%	7.6%
Hinsdale	790	0.0%	1.5%	0.3%	0.4%	0.5%	1.5%	7.2%	14.8%
Huerfano	7,862	2.7%	2.7%	0.5%	9.4%	3.7%	35.1%	18.0%	4.4%
Jackson	1,577	0.3%	0.8%	0.1%	1.5%	1.3%	6.5%	14.0%	4.8%
Jefferson	527,056	0.9%	0.8%	2.4%	3.2%	2.2%	10.0%	5.2%	0.5%
Lake	7,812	0.2%	1.3%	0.4%	18.0%	2.6%	36.1%	12.9%	4.8%
La Plata	43,941	0.3%	5.8%	0.5%	3.9%	2.3%	10.4%	11.7%	5.9%
Larimer	251,494	0.7%	0.7%	1.6%	3.4%	2.2%	8.3%	9.2%	0.7%
Las Animas	15,207	0.4%	2.5%	0.6%	10.0%	3.8%	41.5%	17.3%	2.9%
Mesa	116,255	0.5%	0.9%	0.6%	3.7%	2.0%	10.0%	10.2%	1.7%
Mineral	831	0.0%	0.8%	0.0%	0.1%	2.2%	2.0%	10.2%	19.4%
Moffat	13,184	0.2%	0.9%	0.4%	3.2%	1.8%	9.5%	8.3%	2.0%
Montezuma	23,830	0.1%	11.2%	0.3%	4.3%	2.4%	9.5%	16.4%	8.9%
Montrose	33,432	0.3%	1.0%	0.5%	5.7%	2.5%	14.9%	12.6%	6.7%
Ouray	3,742	0.1%	0.9%	0.4%	0.5%	1.7%	4.1%	7.2%	9.2%
Park	14,523	0.5%	0.9%	0.4%	1.2%	1.8%	4.3%	5.6%	8.8%
Pitkin	14,872	0.5%	0.3%	1.2%	2.4%	1.3%	6.5%	6.2%	2.8%
Pueblo	141,472	1.9%	1.6%	0.7%	12.9%	3.4%	38.0%	14.9%	0.6%
Rio Blanco	5,986	0.2%	0.8%	0.3%	2.0%	1.7%	4.9%	9.6%	3.7%
Rio Grande	12,413	0.3%	1.3%	0.2%	21.4%	2.8%	41.7%	14.5%	6.9%
Routt	19,690	0.1%	0.5%	0.5%	0.7%	1.3%	3.2%	6.1%	4.5%

State/ County	2000 population	Percent Black or African American	Percent American Indian, Alaska Native	Percent Asian, Native Hawaiian, other Pacific Islander	Percent some other race	Percent two or more races	Percent Hispanic or Latino, any race	Percent below poverty level	Percent heat with wood
Saguache	5,917	0.1%	2.1%	0.5%	23.0%	3.1%	45.3%	22.6%	7.6%
San Juan	558	0.0%	0.7%	0.5%	0.7%	0.9%	7.3%	20.9%	11.1%
San Miguel	6,594	0.3%	0.8%	0.8%	3.4%	1.1%	6.7%	10.4%	7.8%
Summit	23,548	0.7%	0.5%	0.9%	4.0%	2.1%	9.8%	9.0%	2.7%
Teller	20,555	0.5%	1.0%	0.7%	0.9%	2.0%	3.5%	5.4%	6.3%

Source: USDOC Census Bureau, 2000 census; For more detailed information, Appendix G, social and economic data tables, includes maps displaying demographic information for all counties in Colorado.

The State had about 9 percent of the total population living below the poverty level in 2000. Alamosa, Conejos, Costilla, Saguache, and San Juan counties all had individual poverty rates of 20 percent or higher in 2000. In addition, Conejos, Costilla, and Saguache Counties also had higher levels than the State average of households heating with wood. The aforementioned counties are within the southern San Luis Valley in southern Colorado, and have historically seen lower income levels and higher minority populations than the rest of Colorado.

Within the southern San Luis Valley, many rural Hispanic families continue to live in traditional ways on lands farmed by their ancestors. Many families operate outside the cash economy, relying on access to public lands for resources they need. Their uses include subsistence hunting and gathering, gathering wood for heating and cooking, grazing small herds of domestic animals under permit, and gathering traditional cultural products (Romero et al. 2001).

Civil Rights

A civil rights impact analysis was completed for this proposed rulemaking process and approved by the WO Civil Rights Department. The document is available in the EIS record and summarized here.

The Colorado Roadless Proposed Rule and EIS have been reviewed and analyzed to ensure compliance with Departmental Regulation (DR) 4300-4, Civil Rights Impact Analysis; 7 CFR 15d, Nondiscrimination in Programs and Activities Conducted by the United States Department of Agriculture DR 1512-1 Regulatory Decision-Making requirements and to identify actual or potential adverse effects based on race, sex, national origin, age, and disabilities.

Purpose of a Civil Rights Impact Analysis (CRIA)

The CRIA describes the civil rights implications of policies, actions or decisions that will affect the USDA workforce or federally conducted or assisted programs and activities. The CRIA provides information about the potential adverse effects of a decision, program, or activity; how and to what degree the effects would be demonstrated; and whether the originally planned policy, action, decision, program, or activity should be modified or otherwise changed if possible to ensure increased benefits or more effective outcomes.

The CRIA helps to advise USDA policy makers, managers, and administrators about whether the action or decision would have the effect of unintentionally or otherwise illegally discriminating against USDA customers based on race, sex, national origin, age, and disabilities. Also, the CRIA serves to advise USDA policy makers, managers, and administrators of the effectiveness of decisions as related to ensuring efficient, appropriate allocation or distribution of goods and services in a manner that ensures compliance with all the laws, rules and regulations under which USDA must operate.

USDA Civil Rights Policy

The Civil Rights Policy for the USDA, Departmental Regulation 4300-4 dated May 30, 2003, states that the following are among the civil rights strategic goals; (1) Managers, supervisors, and other employees are held accountable for ensuring that USDA customers are treated fairly and equitably, with dignity and respect; and (2) equal access is assured and equal treatment is provided in the delivery of USDA programs and services for all customers. This is the standard for service to all customers regardless of race, sex, national origin, age, or disabilities.

Colorado Roadless Rule CRIA

Disparate impact, a theory of discrimination, has been applied to the Colorado Roadless Rule in order to determine if there are negative effects that may unfairly and inequitably impact beneficiaries of program development, administration, and delivery. The objectives of this review and analysis are to prevent disparate treatment and minimize adverse Civil Rights impacts that may have caused an effect of discrimination against minorities, women or persons with disabilities and to ensure compliance with all Civil Rights statutes, Federal regulations, and USDA policies and procedures.

The Colorado Roadless Rule CRIA, using USDA Forest Service Civil Rights and Social/Economic direction, Executive Order 12989, Council of Environmental Quality National Environmental Policy Act direction and required analysis within the FEIS, sought to determine whether:

- all minorities, women and persons with disabilities are provided the same opportunities to participate in the Colorado Roadless rulemaking process;
- all minorities, women and persons with disabilities are provided the same or improved opportunities to access information about or have access to roadless areas as managed under the Colorado Roadless Rule.

The CRIA revealed no adverse effects associated with the Colorado Roadless rulemaking process or the final rule on the participation of any persons or groups based on race, sex, national origin, age, or disabilities. The process was open to the participation of all individuals or groups. There were no known barriers at the public meetings;

- all were open to the public,
- all were advertised locally through Forest networks, and
- all meeting facilities were accessible to the public including persons with disabilities.

Under all four alternatives, there would be no difference in opportunities for women, minorities, or persons with disabilities.

Social Values and Interests

Social concerns are broad and complex enough that they do not constitute a single issue that can be easily measured and addressed. Generally, the values people hold with respect to forest resources are the measures used to assess if alternatives will have positive or negative impacts on various individuals or groups. There are many definitions of value; for this analysis it is assumed that we can understand forest values, such as biological diversity, recreation, or subsistence, by understanding what is important to people (USDA Forest Service 2003b).

Forest values represent the importance and worth that people have assigned to Colorado roadless areas. Table 3-51 lists, in alphabetical order, major categories of forest values that individuals may hold for any forest resource or opportunity. People can hold multiple values

for the same resource, or may hold very separate values for specific places or experiences. The same place or roadless area will have different values for different people.

Table 3-51. Examples of forest values

Forest value	Description of why people hold this value
Aesthetic	Value the forest because of the scenery, sights, sounds, smells, etc.
Biological diversity	Value the forest because it provides a variety of fish, wildlife, plant life, etc.
Cultural	Value the forest because it is a place to practice and pass down wisdom, knowledge, and traditions
Economic	Value the forest because it provides timber, minerals, oil/gas/coal, or tourism opportunities (for outfitters/guides)
Future	Value the forest because it allows future generations to experience the forest as it is now
Historic	Value the forest because it has places and things from natural and human history that are important
Intrinsic	Value the forest in and of itself, just to know it exists, no use is needed to gain value
Learning	Value the forest because one can learn about the environment through scientific observation or experimentation
Life sustaining	Value the forest to produce, preserve, clean, and renew air, soil, and water
Recreation	Value the forest because it provides a place for outdoor recreation activities
Spiritual	Value the forest for sacred, religious, or spiritually special places, and for providing a feeling of reverence and respect for nature
Subsistence	Value the forest because it provides necessary food and supplies to sustain life for individuals
Therapeutic	Value the forest for physical and/or mental health

Source: Brown and Reed 2000, page 243

Conflicts can occur when individuals or groups hold different forest values for the same resource or place. It is difficult to measure forest values, so specific information is limited, yet it is differences in values that create resource management conflicts. Resolving issues resulting from conflicting forest values is a political problem and cannot be corrected by simply counting or measuring the values more rigorously (USDA Forest Service 1995a). The debate about roadless area conservation reflects the broader question of how demands for the many values that national forests and grasslands provide should be met. Much of the public comment during the 2001 Roadless Rule development was rooted in the more fundamental issues of how NFS lands should be managed and how to balance commodity and non-commodity values. Those issues are discussed at length in the 2001 Rule FEIS and associated specialist report (http://roadless.fs.fed.us/documents2.shtml).

The values and interests included in this analysis are based on the many responses to comments the public has provided during the 2001 Roadless Rule comment periods, the 2006 Colorado Task Force public hearings, the 2007 Colorado Rulemaking Notice of Intent comment period, and the comment period for the Draft Environmental Impact Statement. The identified values and interests are not based on a random sample; people who chose to respond to a Forest Service comment period are self-selected. By focusing on those who commented, the analysis focuses on those people who hold strong values regarding roadless area resources.

This analysis centers on nine broad categories of roadless values/interests, based on the comments received. The categories, defined in Table 3-52, are used to display the differences between alternatives, and do not define specific individuals or groups.

Several assumptions underlie this analysis:

- People make choices or reflect their preferences based on what is important to them (Kleindorfer et al. 1993).

- An individual may hold one or more of the values/interests in roadless areas described in this section. Consequently, the impacts of the alternatives on specific individuals may be cumulative, mixed, or singular, depending on how many different values the individual holds. For example, a person may hold values similar to those of the preservation category when considering wildlife habitat, but may hold values similar to the non-motorized recreation category when considering access to recreational opportunities.
- Management actions within roadless areas that are inconsistent with people's forest values are perceived by them as threatening and undermining to their values.
- The ability of forest users to continue to engage in current or future use of roadless area lands and to maintain the quality of their experience is tied to the ecological health of the natural resources found there.
- The majority of uses occurring in roadless areas begin with developed infrastructure outside of the roadless area (road, trailhead, campground, boat ramp, etc.).

Table 3-52. Forest value/interest categories used for Colorado roadless area analysis

Value/Interest category	Defined for Colorado roadless area analysis
Conservation	Values the balancing of roadless area management between management of resources for various land uses and areas where natural processes dominate.
Industry access	Values commercial activities such as timber, oil and gas development, mining, coal extraction, utilities, and other uses where appropriate in roadless areas. Values future access as needed to facilitate continued resource development and support for resource jobs and income.
Preservation	Values roadless areas for the natural processes and opportunities provided without additional management or infrastructure development. Much of the value is in knowing roadless areas exist and are protected from future development, rather than associated with actual use or visitation.
Recreational use – motorized	Values focus on maintaining current motorized use of roadless areas for recreational opportunities, as well as, where appropriate, increasing backcountry motorized opportunities in the future, which may be trails/single track rather than roads.
Recreational use – non-motorized	Values maintaining or expanding non-motorized opportunities in roadless areas. There is some division in this category between those interested in mechanized use (mountain bikes) and those who would like to limit access to hiking and horses. Overall the desire is for quiet/non-motorized experiences in roadless areas.
Roaded access	Values gaining access via roads to the forest, including roadless areas. For some, driven by need or disability, the desire for roaded access is due to the inability to get into the forest without the road system. For others, roaded access is the preferred method of travel, and the travel itself is the recreational experience.
Tourism (including ski resorts)	This category is another commercial interest, but capitalizes on the roadless area as a natural amenity that attracts customers to the area for leisure activities. Scenery is of concern to this category, but the value of road construction depends on the types of experiences the operation is providing.
Wilderness	Values roadless areas as land that can be included within the wilderness system in the future. This category focuses on future primitive and protected wilderness experiences and wilderness resources.
Wildland-urban interface	This category is specific to those activities in WUI (community protection zone per alternatives 2 and 4) or areas identified in a CWPP that overlap in roadless areas where fuel treatments are desired to reduce wildland fire hazards. This category values reducing wildland fire hazards for houses and communities. This category does not focus on individuals living within the WUI.

Social Values: Environmental Consequences

All Alternatives

None of the alternatives would change the demographic conditions and trends described in the affected environment. The increasing and changing population growth, along with changes in age and racial diversity, would have some impacts on NFS lands in terms of the types of resources and opportunities people demand from their public lands. The effects of increasing demands for the resources in roadless areas are discussed in other sections of this EIS.

Public comments revealed strong support for roadless protection from individuals and groups who view the highest value of roadless areas in Colorado to be maintained through preservation/non-development, as well as strong support for roadless management from individuals and groups who view a balanced management approach that allows some development and extractive uses to be the best use of the roadless areas.

Each of the four alternatives differs in the balance points between key conflicting values. Effects on values and interests are described in terms of the nine key categories outlined in Table 3-52. The analysis presented by alternative below uses public comments for each category to describe the potential effects of and differences between the four alternatives.

Alternative 1 – 2001 Roadless Rule

In terms of environmental justice indicators, the southern San Luis Valley appears to be an area where access to NFS lands is important for families to maintain their rural lifestyle. Alternative 1 would not allow additional road construction, but would not close or limit use of existing roads in roadless areas (substantially altered areas), so fuel wood gathering from an existing road system could continue. It is likely the local district would continue to plan vegetation management projects along existing road systems, so future fuel wood would likely be available. If the majority of these projects were for community wildfire protection, families interested in gathering fuel wood would have a short commute to those project areas. The actual availability of fuel wood is dependent on district ranger decisions, but fuel wood would likely be available in the future. Using public comments received on the DEIS, the impacts of alternative 1 on the nine categories of social values and interests are as follows.

Conservation. In the conservation balance between land use management and allowing natural processes to dominate, this alternative offers a limited ability to actively manage forest resources now and in the future, focusing more heavily on allowing natural processes to dominate. While the limitation on road construction could prevent future resource damage, the majority of land use management within the IRAs would also be limited. The newly identified roadless acres that are not within IRAs could be actively managed under this alternative as allowed by forest plan direction.

Industry Access. The potential economic impacts to industry access into roadless areas are considered specifically in the Economic Values section of this analysis. Because of limited road construction exceptions, alternative 1 limits future commercial activity such as timber harvest, and coal and oil/gas extraction. Some limited timber harvest may occur in the substantially altered acres as well as within the newly identified roadless areas that are not IRAs where harvesting is allowed by forest plan direction. The majority of IRA acres would remain roadless with restrictions on activities thereby limiting future commercial activity.

Preservation. Limits on future activity will maintain the majority of acres in IRAs in their current condition, allowing natural processes to take place. Some tree-cutting, and existing

roaded access would continue on substantially altered acres which would detract from roadless area characteristics. Depending on forest plan direction, there may be tree-cutting and road construction in the newly identified roadless acres that are not within IRAs which could detract from roadless area characteristics. None of the IRA acres would have the additional restrictions provided for upper tier acres.

Recreational use – motorized. Any additional road construction in IRAs under alternative 1 would be limited and likely not change the current level of roaded access. Overall, forest travel management decisions may have more impacts on motorized travel than a roadless rule. There would be no impact on off-road motorized recreation use within IRAs. The newly identified roadless areas that are not within IRAs could for provide opportunities for road construction for motorized recreational use in the future.

Recreational use – non-motorized. Similar to the motorized category, the forest travel management decisions will have a greater impact on the non-motorized recreation use than a roadless rule. None of the IRA acres would have the additional restrictions provided for upper tier acres.

Roaded access. This alternative is the most restrictive for this category in terms of the exceptions, but does not include the additional restrictions on road construction provided on upper tier acres. Even though the majority of roads constructed under any alternative would likely be closed to public motorized use, alternatives 1, 2 and 4 all limit the possibility for future NFS roads within roadless areas. The newly identified roadless areas that are not within IRAs could continue to provide new roaded access according to forest plan direction. As with the recreational use categories, the travel management plans will have a greater impact on roaded access than a roadless rule.

Tourism. The impacts on tourism parallel those of the recreational categories. Tourism operations that focus on motorized opportunities on roads would continue to operate on existing roads or on new roads constructed in the newly identified roadless areas that are not within IRAs and use existing access points and motorized trails. New roads constructed under exceptions in the rule may or may not be closed to motorized use by the general public. Non-motorized tourism opportunities may be enhanced by limitations on new roads and tree-cutting to although the additional restrictions provided for upper tier acres would not be in place. Specific to the ski industry, alternative 1 may limit future expansions into IRA acres surrounding existing permit boundaries.

Tourism operations of all kinds in Colorado use the scenery on NFS lands to advertise. Alternative 1 would continue to limit additional road construction and tree-cutting in roadless areas which may maintain scenery. However, with recent beetle epidemics, much of the scenic quality of NFS lands will be altered inside and outside roadless under any alternative.

Wilderness. No wilderness is recommended and no activities are allowed that would change the current status of a recommended wilderness. For future wilderness potential, alternative 1 is viewed by some groups as the best alternative, although the additional, more wilderness-like restrictions provided for upper tier acres would not exist under alternative 1. Projected road construction and tree-cutting levels under this alternative would generally be less than under the other alternatives. Alternative 1 would allow use and maintenance of existing roads and some tree-cutting, sale or removal within substantially altered acres and the character of those areas would continue to be inconsistent with wilderness. Roadless areas will continue to be open to motorized and mechanized trail use unless otherwise closed by forest travel management plans. Motorized and mechanized use detracts from the wilderness experience

within IRAs. In addition, the newly identified roadless acres that are not within IRAs could have some road construction and tree-cutting activities that could render those 409,500 acres not suitable for recommendation as wilderness in the future.

Wildland-urban interface. Alternative 1 offers limited flexibility and access to address wildland-urban interface (WUI) concerns. Future fuels projects would be limited to those areas that can be accessed via existing road systems, or to tree-cutting activities within substantially altered acres. The Economic Values and Fire and Fuels sections of this analysis address the potential community impacts in more detail.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Using public comments received on the DEIS the impacts of alternative 2 on the nine categories of social values and interests are described as follows.

Conservation. In the conservation balance between land use management and allowing natural processes to dominate, this alternative would offer a limited ability to actively manage forest resources now and in the future. The majority of active management would be for treatments within the CPZ to address wildfire concerns of at-risk communities, within the North Fork Coal mining area for access to future coal reserves, and for water conveyance structures associated with existing water rights. The majority of CRAs, including those new CRA acres, would retain roadless area characteristics, and those acres in the upper tier would have additional restrictions. The substantially altered acres would be open for additional management according to the forest plan direction.

Industry Access. The potential economic impacts to industry from limited access into roadless areas are considered specifically in the Economic Values section of this analysis. Because of limited road construction exceptions and the additional restrictions on the upper tier acres, alternative 2 limits commercial activity such as timber harvest, and coal and oil/gas extraction. Existing lease activity would continue, but future leases would prohibit road construction. Coal exploration would continue on the 20,000 acres within the North Fork Coal mining area, but would not be allowed elsewhere in the CRAs. Some timber cutting would be allowed in CPZs and to protect municipal watersheds. The substantially altered acres would be open for access in accordance with forest plan direction.

Preservation. Alternative 2 allowances for additional road construction and tree-cutting, sale or removal would be focused within the CPZ around communities. Other exceptions for coal development or water conveyance would be limited or spread over several CRAs. Removing the substantially altered acres from CRAs reduces the total acres included under a roadless rule, although adding the additional 409,500 unroaded acres into CRAs increases the restrictions of future road construction and tree-cutting on those acres. The restriction on additional oil and gas pipelines from sources outside of CRAs through a CRA would also prevent some pipeline activity in a CRA that could be allowed under alternative 1. Additional restrictions on activities in upper tier acres would further increase the preservation of roadless area characteristics.

Recreational use – motorized. There would be little difference from the impacts stated under alternatives 1, above. Any additional road construction in CRAs under alternative 2 would be limited and likely not change the current level of roaded access. Overall, forest travel management decisions may have more impacts on motorized travel than a roadless rule. There would be no impact on off-road motorized recreation use within CRAs. Any additional road construction would generally be temporary and closed to public motorized use, so there would be no increase in roaded opportunities.

Recreational use – non-motorized. As stated under alternative 1, above, the forest travel management decisions will have a greater impact on the non-motorized recreation use than a roadless rule. The road construction/reconstruction restrictions on upper tier acres in alternative 2, would restrict most road construction activity, and benefit non-motorized recreation values.

Roaded access. Like alternative 1, alternative 2 would not provide additional road access. Public motorized access would not be allowed on the roads constructed under the exceptions of the proposed rule. In addition, the newly identified roadless acres would be included within the CRAs and would limit additional roaded opportunities on those 409,500 acres, and the upper tier acres would be managed with further restrictions on potential road construction.

Tourism. As with the recreational categories, there is not much additional roaded access. Specific to the ski industry, this alternative would allow limited expansions of ski areas not allowed in alternative 1 (see Developed Ski Areas section for details). Alternative 2 may create some short term declines in scenery within the CPZ. Over time, the temporary roads and tree-cutting allowed within the CRA acres may provide for improved scenery compared to the rest of the CRA acres depending on the outcome of the beetle epidemics.

Wilderness. The exceptions for road construction and tree-cutting in alternative 2 are viewed by some groups as not offering the same protection for potential future wilderness as alternative 1. CRAs do not include the substantially altered acres which, under alternative 1, are not required to be returned to a roadless state. Over all, alternative 2 has 57,600 fewer acres within the roadless inventory than alternative 1. Alternative 2 would protect 409,500 unroaded acres as CRAs that would not be protected under alternatives 1 or 3. The additional protection under alternative 2 could increase the areas' potential for future wilderness over that of alternatives 1 or 3. Wilderness interests concerned that management of the 409,500 acres under forest plan direction would open those acres for additional activities would prefer alternative 2. In addition, additional protections for upper tier acres in alternative 2 would retain more roadless area characteristics over time on those acres than alternative 1.

Wildland-urban interface. Alternative 2 offers some flexibility and local direction to address WUI concerns. Future fuels projects in CRAs would be limited to the CPZ area and municipal water supply systems. This alternative provides communities with opportunities to reduce wildland fire hazards with temporary road construction and tree-cutting, sale or removal just the CPZ, except where CPZ acres overlap upper tier acres.

Alternative 3 – Forest Plans (No Action)

Under this alternative, all IRAs would be managed under the existing forest plan direction. Most of the forest plans would continue to allow families to have adequate opportunities to collect fuel wood in the roadless areas. Road construction restrictions for each forest plan are generally described in Appendix B, forest plan management area direction. Using public comments received on the DEIS, the impacts of alternative 3 on the nine categories of social values and interests are described as follows.

Conservation. In the conservation balance between land use management and allowing natural processes to dominate, this alternative offers the most flexibility to actively manage forest resources now and in the future. It provides less emphasis on allowing natural processes to dominate compared to alternatives 1, 2 or 4. While some forest plans have restrictions on new road construction in roadless areas that could prevent future resource impacts, there may be more land management activities than in either alternative 1, 2 or 4 (based on the projections of

activities described in the Analysis Framework section). See Appendix B, forest plan management area direction, for specific forest plan information.

Industry Access. Alternative 3 would offer industry the most flexibility to access timber and oil/gas, coal or mineral resources within IRAs, in accordance with forest plan direction.

Preservation. Depending on individual forest plan direction, alternative 3 would likely have the potential for the greatest impact to roadless area characteristics over the long-term.

Recreational use – motorized. While the majority of projected new road construction would likely be closed to public motorized use, alternative 3 would allow for new NFS roads in IRAs as in accordance with forest plan direction, travel management plans, and budgets. Outside of the possibility of new road construction, alternative 3 is similar to alternatives 1, 2 and 4 in terms of providing for motorized trail opportunities in IRAs.

Recreational use – non-motorized. Alternative 3 could detract the most from non-motorized recreation values. As stated in the motorized category, new road construction could occur in IRAs or in the CRAs under alternative 3 and could remain open to public use depending on forest travel management decisions. Any new road construction in roadless areas would negatively impact non-motorized opportunities in the short-term and, if those roads remain open for public motorized use, the impact would be longer-term.

Roaded access. Alternative 3 could allow additional NFS roads open for public use, of the alternatives; this is the only one that has the potential to construct new roads in roadless areas that could likely be open for public use, thus increasing future roaded access.

Tourism. Alternative 3 projects the most additional road construction and tree-cutting, sale or removal which may impact scenery in the short-term. As with the other alternatives, many of the roads would likely be closed to public motorized use. In terms of providing a roadless experience, alternative 3 has the most potential to impact such experiences in specific locations. Specific to the ski industry, existing and future ski resorts that wanted to expand or construct infrastructure in roadless areas would need to be consistent with the forest plan, but would not be limited by specific roadless rule direction under alternative 3.

Wilderness. Those areas identified in forest plans as recommended wilderness would continue to be managed according to forest plan direction under alternative 3. This alternative may impact future areas from being recommended for wilderness due to projected road construction, tree-cutting, sale or removal, and other management activities.

Wildland-urban interface. Alternative 3 offers the most flexibility to address WUI concerns. Future fuels projects would be scheduled as needed and as budgets allowed. Road construction and tree-cutting, sale or removal would take place as allowed under the forest plans and as needed to access specific WUI locations as outlined by local community wildfire protection plans.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Using public comments received on the DEIS, the impacts of alternative 4 on the nine categories of social values and interests are described as follows:

Conservation. In the conservation balance between land use management and allowing natural processes to dominate, this alternative offers a limited ability to actively manage forest resources now and in the future. The majority of active management is for treatments within the CPZ to address wildfire concerns of at-risk communities, within the North Fork Coal mining area for access to future coal reserves, and for water conveyance structures associated with

existing water rights. The majority of CRAs, including those new CRA acres, would retain roadless area characteristics, and those acres in the upper tier would have additional restrictions. The substantially altered acres would be open for management in accordance with forest plan direction.

Industry Access. The potential economic impacts to industry from limited access into roadless areas are considered specifically in the Economic Values section of this analysis. Because of limited road construction exceptions and the additional restrictions on the upper tier acres, alternative 4 limits tree-cutting and removal on more acres than any of the other alternatives. Like alternatives 1 and 2, existing lease activity would continue, but future leases would prohibit road construction. Coal exploration would continue on the 20,000 acres within the North Fork Coal mining area, but would not be allowed elsewhere in the CRAs. The substantially altered acres would be open for access in accordance with forest plan direction.

Preservation. The allowances in alternative 4 for road construction and tree-cutting, sale or removal would be focused within the CPZ around communities. Other exceptions for coal development or water conveyance would be limited or spread over several CRAs. Removing the substantially altered acres from CRAs reduces the total acres included under a roadless rule, although adding the additional 409,500 unroaded acres into CRAs increases the restrictions of future road construction and tree-cutting on those acres. The restriction on additional oil and gas pipelines from sources outside of CRAs through a CRA would also prevent some pipeline activity in a CRA that could be allowed under alternative 1. Alternative 4 would provide additional limitations on road construction/reconstruction and tree-cutting on more upper tier acres than alternative 2.

Recreational use – motorized. There would be little change for this category between alternatives 1, 2 and 4. Any additional road construction would generally be temporary and closed to public motorized use, so there would be no increase in roaded opportunities.

Recreational use – non-motorized. Similar to the motorized category, the forest travel management plans will be of concern to the non-motorized category, and may have a greater impact on the non-motorized current and future roadless opportunities depending on future travel management decisions. The upper tier acres in alternative 4, which restrict most road construction activity, may be preferred by the non-motorized users.

Roaded access. Like alternatives 1 and 2, alternative 4 would not provide additional roaded opportunities. The majority of road construction allowed under the exceptions would not be open for public motorized access. In addition, the newly identified roadless acres would be included within the CRAs and would limit additional roaded opportunities on those 409,500 acres, and road construction on upper tier acres would be very limited.

Tourism. As with the recreational categories, there is not much additional roaded access expected under alternative 4. Specific to the ski industry, this alternative would allow limited expansions of ski areas not allowed in alternative 1 (see Developed Ski Areas section for details). Alternative 4 may create some short term declines in scenery within the CPZ. Over time, the temporary roads and tree-cutting allowed within the CRA acres may provide for improved scenery compared to the rest of the CRA acres depending on the outcome of the beetle epidemics.

Wilderness. The additional circumstances for road construction and tree-cutting in alternative 2 and 4 are viewed by some groups as not offering the same protection for potential future wilderness as alternative 1. CRAs do not include the substantially altered acres which, under

alternative 1, are not required to be returned to a roadless state. And, over all, alternative 4 has 57,000 less acres within the roadless inventory than alternative 1. Alternative 4 would add an additional 409,500 unroaded acres as CRAs. The additional acres would not be managed as roadless under alternatives 1 or 3 so alternative 4 could increase the future wilderness potential of the 409,500 acres over that under alternatives 1 or 3. Wilderness interests concerned that management of the additional acres under forest plan direction would open those acres for more activities would prefer alternative 2 or 4. In additional, upper tier acres in alternative 4 are more restrictive than alternative 1 and would retain more roadless area characteristics over time, but some people may feel other acres of roadless areas are more suitable for upper tier status to serve as future wilderness than the upper tier presented in alternative 4.

Wildland-urban interface. Alternative 4 offers limited flexibility for addressing local WUI concerns. Future fuels projects in CRAs would be limited to the CPZ areas that do not overlap with the upper tier acres. Temporary roads and tree-cutting to reduce fuels could be allowed in about half the ½-mile CPZ. No tree-cutting, sale or removal would be allowed on any CPZ acres within the upper tier.

Social Values: Cumulative Effects

Growth in population, influx of retirees, changes in diversity, and other demographic trends are outside of Forest Service control, but could greatly impact the demands placed on national forest resources, both inside and outside of roadless areas.

Population growth is resulting in the conversion of existing open spaces and ranches into subdivisions and ranchettes. This may limit the opportunity for private lands to supply recreation areas or meet other demands for open space and push additional demand onto public lands. Possible impacts include increasing demands for open space recreation resources in roadless areas adjacent to private lands. Future development of private lands adjacent to roadless areas is expected to increase the WUI acreage in roadless areas, requiring more vegetation treatment to address concerns of wildland fire hazard.

Future changes expected in recreation activities and equipment would change the way people use roadless areas. The current user conflicts on NFS lands between motorized, mechanized, and non-motorized users would likely increase in the future, both inside and outside roadless areas. Additional management tools would be required to address these conflicts.

Public demands and market values for energy resources such as oil, gas and coal are expected to increase, which can increase the demand for industry access to public lands as discussed in the Leasable Minerals (Energy Resources) and Economic Values sections.

As these trends play out in Colorado, more types of people with different values would be affected and the values people hold for roadless areas would likely change. It is unlikely that there will be agreement in the future on how roadless areas should be managed.

Under any alternative, the debate is likely to continue. The issues of debate will be different depending on which alternative is selected.

ECONOMICS

This section provides a description of current economic conditions in Colorado and the potential changes to those conditions given alternative roadless area management.

In the course of public involvement, two issues regarding the economic implications in Colorado were raised frequently and are analyzed in this section; energy development and community protection from wildfire. Other common resource management activities and outputs including recreation use (tourism), water yield, livestock grazing and wood products were also considered, but not at the same level of detail. Resource sections analyzing these fields in this document generally found that activities and outputs would vary little among the alternatives considered. With little change to these resources, no change in quantitative economic effects is expected or can be modeled in this analysis.

The notable exception is commercial wood products (outputs) produced from roadless areas. As highlighted in the Vegetation section of this document, wood production would vary by alternative when only considering roadless areas, but Forest-wide commercial timber production levels would remain constant. Production that could not be obtained from roadless areas under a more restrictive alternative would be obtained from non-roadless areas. Overall, the value of wood production would remain unchanged among alternatives.

As a result of these considerations, energy development and community protection from wildfire are the only issues that varied by alternative and could be analyzed quantitatively for this economic section. Some topics that could not be quantified and valued in monetary terms are discussed and analyzed qualitatively.

The economic consequences of implementing each alternative are categorized as either impact or efficiency effects. Impact effects, sometimes called distributional effects, include consequences to jobs and labor income in specified areas of the State. These effects also include consequences to Colorado State and local governments in the form of Federal payments and taxes. Procedures for estimating jobs and income were based on economic models of Colorado economies using an input/output economic model and local Colorado data sources. Methods for estimating fiscal consequences to Colorado State and local governments were based on fiscal models using current tax and Federal revenue sharing structures.

Efficiency effects analysis, referred to in this report as benefits and costs, considers both financial and economic benefits and costs of each alternative. Benefits and costs include discussions of market and non-market goods and services, including roadless area characteristics, options for future use of roadless areas, and ecosystem function. The benefit and cost discussion provided in this section is a summary of the larger treatment of benefits and costs provided in the Regulatory Impact Analysis (Miller 2010).

Economics: Affected Environment

Economic Impacts

All of the economic impacts presented in this report occur in Colorado. The Colorado economy is diverse, ranging from urban centers along the Front Range (the urban development from the Denver metro area north to Fort Collins and south to Pueblo) to rural communities in the mountains and plains. Known world-wide for skiing and outdoor recreation, Colorado enjoys a

strong tourism industry. It also benefits from substantial cable and satellite, defense, technology, and mining industries. Roadless area management, as described in this document, directly affects only one of these sectors –mining (natural gas and coal) – but indirectly affects many others. Table 3-53 displays the Colorado economy [30] using metrics of production value, employment, and labor income.

Table 3-53. Value of Production, Employment, and Labor Income in the Colorado Economy (2006)

	2006		
Industry	Value of Production ($ millions)	Employment (jobs)	Labor Income ($ millions)
Agriculture	5,554	47,044	824
Mining	12,361	24,191	3,091
Utilities	5,173	8,421	1,155
Construction	30,908	229,465	12,373
Manufacturing	61,010	157,037	11,216
Transportation & Warehousing	12,920	79,545	4,942
Trade	39,816	398,601	15,745
Finance, insurance, & real estate	48,183	239,346	11,770
Professional services	37,524	270,801	19,521
Administrative & waste services	11,602	168,875	5,350
Educational, health, & social services	23,237	289,192	12,123
Arts, entertainment, & recreation	4,285	67,908	1,719
Accommodation & food services	13,005	229,075	4,450
Other services	53,745	245,328	15,509
Government	46,566	416,486	27,266
Totals	**405,890**	**2,871,314**	**147,053**

Source: Minnesota IMPLAN Group, Inc. 2008 & & Colorado Department of Local Affairs, State Demography Office 2006.

Agriculture comprises establishments primarily engaged in growing crops, raising animals, harvesting timber, and harvesting fish and other animals from a farm, ranch, or their natural habitats.

Mining comprises establishments that extract naturally occurring mineral solids, such as coal and ores; liquid minerals, such as crude petroleum; and gases, such as natural gas. The term mining is used in the broad sense to include quarrying, well operations, beneficiating (e.g., crushing, screening, washing, and flotation), and other preparation customarily performed at the mine site, or as a part of mining activity.

Utilities comprise establishments engaged in the provision of the following utility services: electric power, natural gas, steam supply, water supply, and sewage removal. Within this

[30] *The data and models used in this analysis are comparable to those used in the July 2008 DEIS. Any analysis results that differ from those in the DEIS are the result of updated resource projections. See the economic specialist report for details.*

sector, the specific activities associated with the utility services provided vary by utility: electric power includes generation, transmission, and distribution; natural gas includes distribution; steam supply includes provision and/or distribution; water supply includes treatment and distribution; and sewage removal includes collection, treatment, and disposal of waste through sewer systems and sewage treatment facilities.

Construction comprises establishments primarily engaged in the construction of buildings or engineering projects (e.g., highways and utility systems). Establishments primarily engaged in the preparation of sites for new construction and establishments primarily engaged in subdividing land for sale as building sites also are included in this sector.

Manufacturing comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. The assembling of component parts of manufactured products is considered manufacturing, except in cases where the activity is appropriately classified in Construction. Establishments in the Manufacturing sector are often described as plants, factories, or mills and characteristically use power-driven machines and materials-handling equipment.

Transportation and Warehousing includes industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation. Establishments in these industries use transportation equipment or transportation related facilities as a productive asset. The type of equipment depends on the mode of transportation. The modes of transportation are air, rail, water, road, and pipeline.

Trade comprises establishments engaged in wholesaling merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The merchandise described in this sector includes the outputs of agriculture, mining, manufacturing, and certain information industries, such as publishing. Trade also includes those establishments that sell merchandise, generally without transformation, and attract customers using methods such as advertising, point-of-sale location, and display of merchandise. A store retailer has a selling place open to the public; merchandise on display or available through sales clerks; facilities for making cash or credit card transactions; and services provided to retail customers.

Finance, Insurance and Real Estate comprises establishments primarily engaged in financial transactions (transactions involving the creation, liquidation, or change in ownership of financial assets) facilitating financial transactions and/or establishments primarily engaged in financial transactions (transactions involving the creation, liquidation, or change in ownership of financial assets) and/or in facilitating financial transactions.

Professional Services (Prof, Scientific, & Tech Services) comprises establishments that specialize in performing professional, scientific, and technical activities for others. These activities require a high degree of expertise and training. Activities performed include: legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and interpretation services; veterinary services; and other professional, scientific, and technical services.

Administrative and Support; Waste Management and Remediation Services comprises establishments performing routine support activities for the day-to-day operations of other organizations. The establishments in this sector specialize in one or more of these support

activities and provide these services to clients in a variety of industries and, in some cases, to households. Activities performed include: office administration, hiring and placing of personnel, document preparation and similar clerical services, solicitation, collection, security and surveillance services, cleaning, and waste disposal services.

Educational, Health and Social Assistance comprises establishments that provide instruction and training in a wide variety of subjects. This instruction and training is provided by specialized establishments, such as schools, colleges, universities, and training centers. Also included are establishments providing health care and social assistance for individuals. The sector includes both health care and social assistance because it is sometimes difficult to distinguish between the boundaries of these two activities. All industries in the sector share this commonality of process, namely, labor inputs of health practitioners or social workers with the requisite expertise.

Arts, Entertainment, and Recreation include a wide range of establishments that operate facilities or provide services to meet varied cultural, entertainment, and recreational interests of their patrons. This sector comprises (1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.

Accommodation and Food Services comprises establishments providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption. The sector includes both accommodation and food services establishments because the two activities are often combined at the same establishment.

Other Services comprises establishments engaged in providing services not specifically provided for elsewhere in the classification system. Establishments in this sector are primarily engaged in activities, such as equipment and machinery repairing, promoting or administering religious activities, grant making, advocacy, and providing dry cleaning and laundry services, personal care services, death care services, pet care services, photofinishing services, temporary parking services, and dating services.

Government consists of establishments of federal, state, and local government agencies that administer, oversee, and manage public programs and have executive, legislative, or judicial authority over other institutions within a given area. These agencies also set policy, create laws, adjudicate civil and criminal legal cases, provide for public safety and for national defense.

Energy Minerals

Energy minerals provided to the US economy from any source, including roadless areas in Colorado, has national as well as local implications. This section briefly describes the economic context within which natural gas and coal from Colorado roadless areas are provided to the nation.

Natural Gas

The demand for natural gas in the US is projected to grow by 0.8 percent annually over the next 20 years. Although, natural gas heats most American homes, it also generates about 20 percent of the nation's electricity (USDOE, Energy Information Administration 2008). Fifty percent of

projected increases in natural gas consumption are driven by electric power generation (USDOE, Energy Information Administration 2008). Most new electricity generation capacity is expected to be fueled by natural gas because natural-gas-fired generators are projected to have advantages over coal-fired generators that include lower capital costs, higher fuel efficiency, shorter construction lead times, and lower emissions.

Colorado has the sixth largest reserves of natural gas in the U.S. behind Texas, Wyoming, New Mexico, Oklahoma, and the Gulf of Mexico (Cappa et al. 2007). Two prominent areas of known and high potential unconventional natural gas on the western slope of Colorado are the Piceance and Paradox Basins. Including conventional and unconventional gas fields, Colorado is the sixth largest gas producing State in the nation. In 2008, Colorado wells produced 1.45 trillion cubic feet of natural gas, or 5 percent of US production (Colorado Department of Natural Resources, Oil and Gas Conservation Commission 2009; USDOE, Energy Information Administration 2009).

Coal

Coal has been a vital energy source throughout the history of this county. In the last 30 years, coal production has shifted from traditional eastern states to abundant coalfields in the western United States. Starting in the 1970's, increasingly more stringent restrictions on atmospheric emissions of sulfur dioxide at power plants often made western coal the most cost effective choice for meeting sulfur dioxide limits without the installation of expensive retrofits. Because western sub bituminous coal is cleaner than coal found in the eastern US, the demand for coal from Colorado and Wyoming is expected to claim a larger share of the national coal market in years to come.

Colorado ranks sixth nationally among coal-producing states (National Mining Association 2009). Coal production in the State is dominated by mines in four counties: Routt, Moffat, Delta and Gunnison. Reserves under roadless areas are found only in Gunnison County. In the last decade, State-wide production has doubled, growing from 20 to nearly 40 million tons. About 60 percent of State-wide coal is shipped out of Colorado, most going to Midwestern and southern states. The remainder of state production stays in Colorado, supplying several coal-fired electric generation plants (Colorado Department of Natural Resources, Geological Survey 2007).

The Economic Impact Areas in Colorado

An economic model of four model areas was developed using an input/output model. The data set used in this analysis was developed specifically for Colorado using 2006 employment data from the Colorado Department of Local Affairs, State Demography Office. Model production value, employment, and labor income was further customized to capture economic conditions and interactions in the oil, natural gas, and coal mining industries (McDonald et al. 2007). Production for the energy sectors within the mining industry was based on average prices for 2006 reported by the Colorado Oil & Gas Conservation Commission (oil and gas) and the Colorado Geological Survey (coal).

To provide a State-wide context for the analysis, all Colorado counties were grouped into four model areas. Table 3-54 summarizes the counties in each of these model areas. Figure 3-4 displays the county composition of each area.

Table 3-54. Colorado Counties by Economic Impact Model Area

Model Area	Counties
Energy Roadless[1]	Delta, Garfield, Mesa, Montrose, Rio Blanco
Rural Roadless[1]	Alamosa, Archuleta, Chaffee, Conejos, Costilla, Custer, Dolores, Eagle, Fremont, Grand, Gunnison, Hinsdale, Huerfano, Jackson, La Plata, Lake, Las Animas, Mineral, Moffat, Montezuma, Ouray, Park, Pitkin, Rio Grande, Routt, Saguache, San Juan, San Miguel, Summit, Teller
Front Range Metro[2]	Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Denver, Douglas, El Paso, Gilpin, Jefferson, Larimer, Pueblo, Weld
Eastern Plains	Baca, Bent, Cheyenne, Crowley, Elbert, Kiowa, Kit Carson, Lincoln, Logan, Morgan, Otero, Phillips, Prowers, Sedgwick, Washington, Yuma

[1] *Oil, gas, and coal production for Gunnison and Pitkin Counties has been moved into the Energy Roadless Counties model to better account for economic interactions.*
[2] *Some counties contain roadless areas.*

Natural gas and coal resources potentially affected by roadless area management are primarily located in five western slope counties (Energy Roadless): Delta, Garfield, Mesa, Montrose, and Rio Blanco. Natural gas and coal resources are found in numerous other locations around the State of Colorado, but these locations are either

- not affected by roadless management alternatives or
- are isolated with somewhat small deposits.

Pitkin and Gunnison counties are exceptions to this characterization. Important natural gas and coal resources associated with roadless areas are located in the northwest corners of Pitkin and Gunnison Counties. Development of these resources would likely impact jobs and labor income in the Energy Roadless counties rather than in the counties where the deposits are located. For these reasons, the economic impacts for oil, gas and coal are modeled using the Energy Roadless counties, but to fully account for the production, employment, and labor income of all coal mining operations in Gunnison County, the Energy Roadless model has been adjusted to include mines located in Gunnison County.

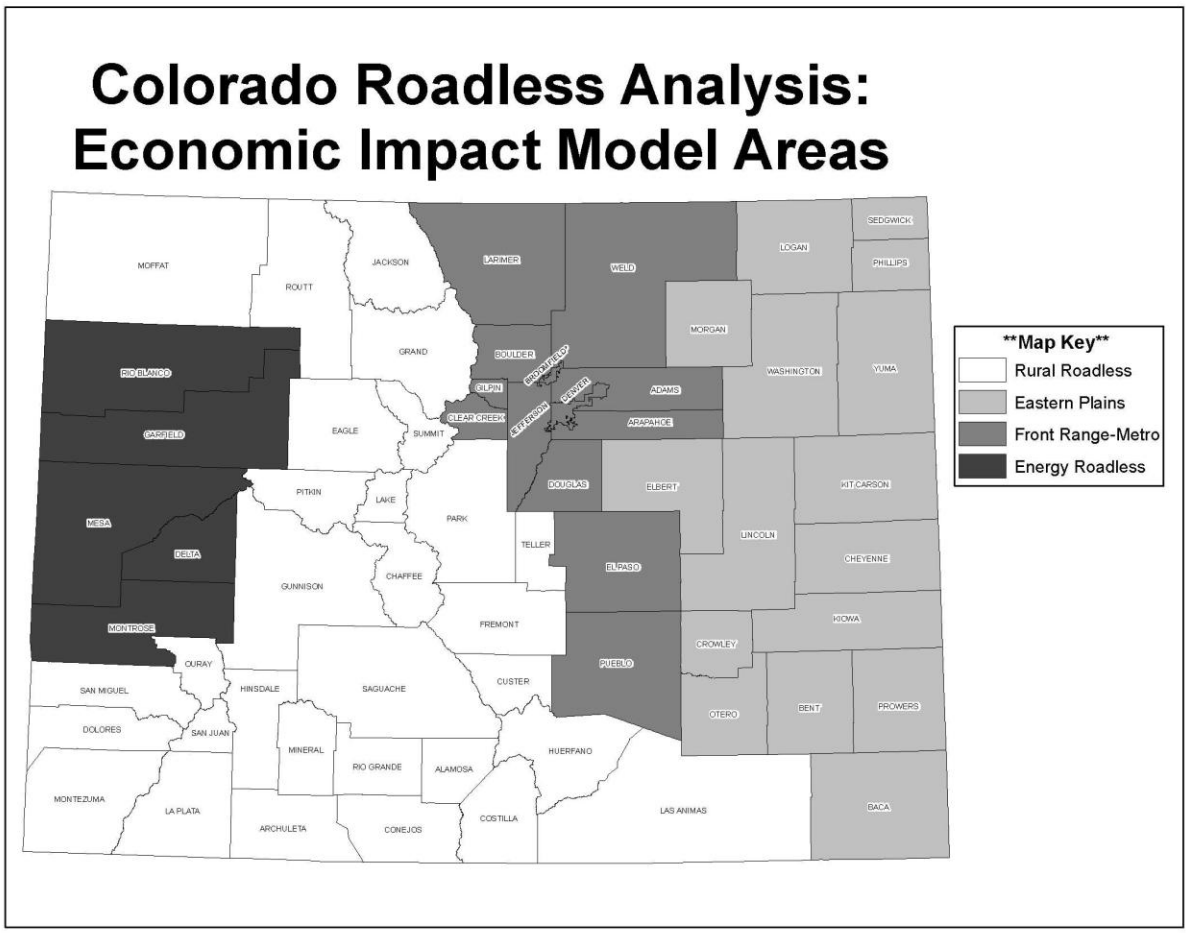

Figure 3-4. Colorado Roadless Analysis: Economic Impact Model Areas

The Energy Roadless model area includes a variety of communities, ranging from small towns, such as Somerset, to the economic center of western Colorado in Grand Junction. In prior years, this area was primarily defined by retirees, tourism, and agriculture. With the recent energy boom, however, the area has developed into the center of energy development in western Colorado. Table 3-55 provides a picture of economic indicators by industrial sector.

Table 3-55. Value of Production, Employment, and Labor Income in the Energy Roadless Model Area (2006)

Industry	2006 Value of Production ($ millions)	2006 Employment (jobs)	2006 Labor Income ($ millions)
Agriculture	472.6	5,472	87.4
Mining	5,101.9	7,027	662.1
Utilities	294.2	780	65.8
Construction	2,393.5	18,153	942.6
Manufacturing	1,822.3	6,561	294.6
Transportation & Warehousing	647.5	4,897	238.8
Trade	1,772.7	21,824	713.5
Finance, insurance, & real estate	1,723.5	9,799	378.7
Professional services	791.3	7,540	358.4
Administrative & waste services	415.2	6,370	189.1
Educational, health, & social services	1,141.4	15,642	603.4
Arts, entertainment, & recreation	119.3	2,559	42.3
Accommodation & food services	586.4	11,322	192.1
Other services	856.6	10,674	292.5
Government	1,903.3	19,836	1,039.2
Totals	**20,041.8**	**148,457**	**6,100.5**

Source: Minnesota IMPLAN Group, Inc. 2008 & & Colorado Department of Local Affairs, State Demography Office 2006.

To put the Energy Roadless model area in perspective, Table 3-56 summarizes the same economic variables for all model areas in Colorado. The Front Range Metro area dominates the Colorado economy in all respects with over 80 percent of production, jobs, and labor income. The Rural Roadless model area, with 30 counties, follows in economic importance. The Energy Roadless area, with only five counties, trails only slightly in the size of its economy and includes roadless areas in all counties. The Eastern Plains of Colorado complete the picture with about two percent of State-wide totals.

Table 3-56. Comparison of the Energy Roadless model area with other roadless model areas (2006)

Model Area	2006 Value of Production ($ millions)	Value of Production Percent	2006 Employment (jobs)	Employment Percent	2006 Labor Income ($ millions)	Labor Income Percent
Energy Roadless	20,041.8	5%	148,457	5%	6,100.5	4%
Rural Roadless	32,551.7	8%	279,280	10%	10,657.4	7%
Front Range Metro	343,794.5	85%	2,366,618	82%	127,871.0	87%
Eastern Plains	9,502.1	2%	76,959	3%	2,423.7	2%
Colorado	**405,890.1**	**100%**	**2,871,314**	**100%**	**147,052.8**	**100%**

Source: Minnesota IMPLAN Group, Inc. 2008 & & Colorado Department of Local Affairs, State Demography Office 2006.

Table 3-57 focuses on the mining industry in each model area of Colorado. The Energy Roadless area has greater production than any other part of the State. This is notable given the large oil and gas fields north of Denver that have been producing for many years. Employment in the Energy Roadless area ranks second to the Front Range Metro area, primarily because of Denver-based corporate headquarters for mining companies doing business in Colorado and other parts of the US. For the same reason, income in the Energy Roadless area trails the Front Range Metro area.

Table 3-57. Comparison of the Mineral Industry in roadless model areas (2006)

	2006					
	Value of Production		Employment		Labor Income	
Model Area	($ millions)	Percent	(jobs)	Percent	($ millions)	Percent
Energy Roadless	5,101.9	35%	7,027	29%	662.1	21%
Rural Roadless	4,383.4	30%	3,371	14%	331.7	11%
Front Range Metro	4,466.1	31%	12,694	52%	2,005.4	65%
Eastern Plains	690.6	5%	1,110	5%	106.0	3%
Colorado	**14,641.9**	**100%**	**24,202**	**100%**	**3,105.2**	**100%**

Source: Minnesota IMPLAN Group, Inc. 2008 & Colorado Department of Local Affairs, State Demography Office 2006.

In a recent study of the Colorado oil and gas industry (McDonald et al. 2007), it was estimated that over two percent of State-wide employment and three percent of earnings were supported by oil and gas development and production. When compared with the travel industry, oil and gas provided 56 percent fewer jobs, but only 14 percent less income. As energy development continues in the State, especially on the western slope, these differences can be expected to narrow.

Coal Industry in the Energy Roadless Area

The coal industry in the Energy Roadless area constitutes a sizeable share of the economy. When considering the production and employment at the mines plus all other secondary effects, the industry generates 2,200 jobs and a total of $130 million in labor income.

State and Local Government Fiscal Health and Energy Minerals

Sizeable revenues accrue to state and local governments from the production of energy resources on Federal lands. These revenues are important contributions to the fiscal health of small and large governmental entities alike. Royalties of 12.5 percent are paid on production value from Federal mineral leases. Half of these revenues are paid to the states where production originated. In Colorado, these revenues are allocated to a variety of State funds, including the State Public School Fund, and to local jurisdictions. Federal Mineral Lease payments to Colorado totaled $128.7 million in 2007. In 2008, $254.9 million was paid to Colorado (Colorado Department of Local Affairs, Division of Local Governments 2009).

The State of Colorado levies a severance tax that applies to energy mineral production. These revenues are distributed among State funds and local jurisdictions similar to Federal Mineral Lease payments. Oil, gas, and coal accounted for $135 million – 99 percent of all severance tax collections in 2007 (Colorado Department of Local Affairs, Division of Local Governments 2009). In 2008, State-wide collections jumped to $151 million, of which $148 million were from oil, gas, and coal production.

Values at Risk of Wildfire

High-country communities in Colorado are rich in amenities and have always attracted new residents. In recent decades, however, the in-migration of full-time residents and proliferation of second homes with seasonal residents have reached new levels. Whether they come to stay seasonally or year-round, the economy of these towns has become highly dependent upon their presence and activities (Lloyd Levy Consulting 2004). As a result, these economies are characterized by strong lodging, food service, recreation, and real estate industries.

While the juxtaposition of public lands has been a strong factor in the growth of mountain communities, it also comes with liabilities. Many mountain communities are becoming particularly susceptible to natural disturbances, such as mountain pine beetle infestations and drought. When the threat becomes reality and wildfire hits these communities – where landscapes are a critical foundation for life and livelihood – the results can be devastating.

A vibrant community is healthy in both its public and private sectors. The values at risk can include such things as citizen health, reliable water and power supplies, infrastructure (both public and private), business activity, and general quality of life. Community infrastructure is the most visible and quantifiable value at risk. Homes, schools, retail shops, office buildings, libraries, hospitals, and police stations are just a few examples of infrastructure at risk of wildfire loss. Should these assets be lost, impacts would not be limited to the owners of affected properties. Property tax revenues, employment, income, health care, emergency services, and the general welfare of communities may all be affected.

Damage or loss of private homes to wildfire is one of the most common and visible effects of wildfires to communities. As such, homes provide a good indicator of more comprehensive community values at risk of wildfire. Table 3-58 displays the 2009 county assessor valuation of non-agricultural, single residence homes in Colorado counties containing IRAs or CRAs (Colorado Department of Local Affairs, Division of Property Taxation 2010). In addition, the table also displays an estimate of home values within 500 meters (about 0.3 mile) of public forest land in each county (USDA Forest Service 2010). It also puts these values in context by comparing the estimated home value with total valuation in the county. This analysis provides a very conservative indication of vulnerability to the tax base in each county. The infrastructure value of homes in this setting averages only 2.8% of total valuation across all counties with either IRAs or CRAs, but it exceeds 10% in Eagle, San Miguel, Summit, and Teller Counties. The higher the ratio, the greater the vulnerability of local government community services, and other economic activities, to losses by a potential wildfire. Table 3-58 does not imply that all properties are at risk equally. It should also be noted that the share of residential valuation to total valuation is not equivalent to the share of total property taxes paid by residential owners to local governments. Even with the caveats, Table 3-58 offers an indication of vulnerability among counties with IRA or CRA lands.

Table 3-58. Estimated Non-agricultural Single-Family Residences and Valuation within 500 Meters of Forested Public Lands in Counties with Inventoried Roadless Areas (2009)

	All Properties	Non-agricultural Single-Family Residences				Estimated Non-agricultural Single-Family Residences within 500 Meters of Forested Public Lands			
County	Total Valuation $ millions	Total Valuation $ millions	Improvement Valuation $ millions	Number number	Average Improvement Valuation dollars	Share of Total Properties* percent	Number of Properties number	Estimated Improvement Valuation $ millions	Share of County Total Valuation *percent*
Archuleta	824.6	152.7	108.1	6,020	17,962	17.6%	1,061	19.1	2.3%
Boulder	6,914.3	2,654.4	1,500.1	80,896	18,543	4.8%	3,905	72.4	1.0%
Chaffee	449.1	160.9	98.8	10,703	9,227	7.8%	831	7.7	1.7%
Clear Creek	563.4	102.6	79.0	4,494	17,577	68.6%	3,084	54.2	9.6%
Conejos	63.4	19.4	16.0	2,599	6,153	7.8%	202	1.2	2.0%
Costilla	132.0	5.4	4.5	931	4,832	0.2%	2	0.0	0.0%
Custer	102.4	38.1	31.2	2,711	11,524	13.6%	370	4.3	4.2%
Delta	774.7	134.9	95.0	8,868	10,712	5.0%	446	4.8	0.6%
Dolores	103.1	9.2	5.8	772	7,458	9.3%	72	0.5	0.5%
Douglas	5,790.5	2,573.5	1,868.8	88,955	21,008	1.3%	1,199	25.2	0.4%
Eagle	3,917.7	1,452.2	929.8	14,467	64,268	44.3%	6,412	412.1	10.5%
El Paso	8,236.8	3,196.3	2,460.7	172,414	14,272	0.0%	-	-	0.0%
Fremont	478.5	168.8	126.4	14,819	8,529	2.9%	435	3.7	0.8%
Garfield	5,500.8	538.6	357.1	14,410	24,782	14.3%	2,066	51.2	0.9%
Gilpin	414.3	57.4	45.3	3,152	14,381	76.6%	2,416	34.7	8.4%
Grand	1,063.6	318.5	228.2	9,357	24,388	33.8%	3,164	77.2	7.3%
Gunnison	1,234.3	270.6	183.5	6,790	27,024	19.6%	1,333	36.0	2.9%
Hinsdale	309.2	27.9	18.4	1,135	16,231	71.2%	808	13.1	4.2%
Jefferson	9,224.5	3,834.3	2,574.2	173,268	14,857	2.1%	3,689	54.8	0.6%
La Plata	3,740.1	523.9	332.0	15,879	20,911	18.9%	2,997	62.7	1.7%
Lake	115.3	47.4	34.8	3,102	11,213	26.6%	824	9.2	8.0%

Sources Colorado Department of Local Affairs, Division of Property Taxation 2010 and U.S. Department of Agriculture, Forest Service 2010.

Table 3-58. (cont'd). Estimated Non-agricultural Single-Family Residences and Valuation within 500 Meters of Forested Public Lands in Counties with Inventoried Roadless Areas (2009)

	All Properties	Non-agricultural Single-Family Residences				Estimated Non-agricultural Single-Family Residences within 500 Meters of Forested Public Lands			
County	Total Valuation $ millions	Total Valuation $ millions	Improvement Valuation $ millions	Number number	Average Improvement Valuation dollars	Share of Total Properties* percent	Number of Properties number	Estimated Improvement Valuation $ millions	Share of County Total Valuation percent
Larimer	5,439.9	1,918.6	1,459.2	100,811	14,475	5.2%	5,277	76.4	1.4%
Las Animas	897.2	49.1	42.1	9,261	4,541	0.0%	4	0.0	0.0%
Mesa	2,776.5	903.1	621.7	44,025	14,121	1.5%	648	9.1	0.3%
Mineral	42.5	15.3	12.1	1,188	10,174	33.7%	401	4.1	9.6%
Moffat	564.7	51.3	41.7	3,780	11,040	0.2%	7	0.1	0.0%
Montezuma	698.3	107.2	74.7	6,951	10,749	3.9%	272	2.9	0.4%
Montrose	659.7	215.8	155.4	11,494	13,518	0.8%	94	1.3	0.2%
Ouray	234.5	75.8	48.0	2,243	21,417	33.5%	750	16.1	6.9%
Park	572.2	221.4	166.4	10,985	15,150	30.1%	3,311	50.2	8.8%
Pitkin	3,888.7	1,743.0	688.6	5,062	136,036	46.2%	2,339	318.2	8.2%
Pueblo	1,479.8	560.2	494.3	52,063	9,494	0.8%	419	4.0	0.3%
Rio Blanco	1,201.3	32.1	24.3	2,018	12,062	1.8%	37	0.4	0.0%
Rio Grande	231.9	51.4	41.0	4,604	8,899	6.3%	289	2.6	1.1%
Routt	1,646.2	460.6	277.8	7,898	35,171	9.7%	766	26.9	1.6%
Saguache	66.5	14.5	11.9	-	-	0.0%	-	-	-
San Juan	113.1	11.7	6.3	510	12,380	45.2%	230	2.9	2.5%
San Miguel	1,289.5	344.1	217.2	2,647	82,073	66.1%	1,749	143.6	11.1%
Summit	2,036.6	796.8	499.1	13,700	36,433	79.9%	10,945	398.8	19.6%
Teller	535.1	182.0	142.2	10,524	13,515	46.4%	4,884	66.0	12.3%
TOTAL	**74,326.8**	**24,041.5**	**16,121.9**	**925,506.0**	**827,101.7**	**7.3%**	**67,737.9**	**2,067.6**	**2.8%**

Sources Colorado Department of Local Affairs, Division of Property Taxation 2010 and U.S. Department of Agriculture [USDA], Forest Service 2010.

Benefits and Costs

Unlike the previous section which dealt with regional economic impacts of jobs, income, taxes, payments, and assets, this section considers benefits and costs realized by all citizens in Colorado and across the nation.

Benefits and costs are divided into two parts: 1) those which are financial and captured in the fiscal records of the Forest Service and 2) those which are realized by any organization or individual. Financial considerations include revenues and costs from the perspective of the Forest Service or other government agencies. Other benefits and costs can be realized by users of roadless areas in national forests, including backpackers, hunters, viewers of wildlife, permitted outfitters and guides, ski areas, ranchers, timber processors, and water users. Other benefits and costs can also be realized by those who never set foot in Colorado roadless areas who desire the retention of wildland characteristics for their children.

In considering non-financial benefits and costs of roadless area management, both market and non-market goods and services can vary widely. Market goods or services are those for which one can observe transactions in the marketplace. Water rights, ski lift tickets, and the sale of cattle which graze on public lands are some examples of market values that are not captured in the financial records of government agencies. When road building and vegetative treatments are not allowed, these values may be minimal or non-existent. With roads and treatment options, these uses of roadless areas have a greater opportunity to develop and market values are realized.

Goods and services not found in the marketplace are also affected by roadless area management. Non-market goods and services are those for which there are no observable transactions. The value of these benefits are often estimated by economists using "willingness to pay" concepts (Peterson et al. 1988). Examples of non-market benefits include dispersed recreation, viewing scenery and wildlife, solitude, health benefits, biological diversity, and ecosystem functions. Another group of benefits includes those who desire to retain options for the future use, either for themselves or for others. All of these pertain to roadless areas in Colorado, and can potentially be affected by road or vegetative treatment activities.

Economic Impacts: Environmental Consequences

Energy Minerals

The economic impacts of each alternative are based upon projections of energy mineral development and production over a 15-year period. See the individual resource sections for details and specific assumptions applied to the projections. Projected oil and gas development for Colorado roadless areas is specific to each basin and forest. Most projected activity relevant to Colorado roadless areas occurs on the Grand Mesa-Uncompahgre-Gunnison (GMUG) and White River (WR) National Forests and in the Piceance Basin.

Oil and gas development and production on the San Juan National Forest in the San Juan Basin are projected to not vary by alternative in 1, 2, and 4. Acres within roadless areas boundaries change by alternative, but total oil and gas activity in the San Juan Basin is not expected to change by alternative (Holm 2009). Alternative 3 may see additional leases in the future, but within the timeframe for this analysis it is not likely, and would therefore be the same as alternatives 1, 2, and 4. For these reasons, consequences of alternative roadless management in southwestern Colorado are not presented in this report as they are assumed to not change

between alternatives over the timeframe considered.

While oil and gas extraction in roadless areas is characterized by changes in annual production, coal extraction in roadless areas is characterized by constant production over differing lengths of time. All recoverable coal reserves in roadless areas are assumed to be economically viable. These coal reserves are located in Gunnison County adjacent to the Elk Creek and West Elk mines.

Output, employment, and labor income effects in the five-county area from oil and gas and from coal production are shown in Table 3-59. Output, employment, and labor income impacts have been estimated for the Piceance Basin by applying both development and production activities to the Energy Roadless model. To facilitate comparisons with the DEIS, the model and model year remain unchanged in the Revised DEIS.

All indicators are expressed on an average annual basis over a 15-year analysis period (2010-2024). Only those impacts associated with development and production from roadless areas are included.

Table 3-59 shows the direct, indirect, and induced effects for output (production value), employment, and labor income by alternative. Direct effects are realized by drilling and extraction companies from the sale of oil, natural gas, coal, and well drilling services. Indirect effects are realized by local companies that provide goods and services to the extraction and drilling industries. Induced effects result from local spending of employee income paid by the companies directly and indirectly affected by extraction and well drilling activities.

Alternative 3 has the largest total effects on output, employment, and labor income. Alternatives 2 and 4 have the next largest effects. Compared with alternative 3, output would be lower by about 6 percent each year and employment and income would be lower by about 3 percent. Alternative 1 has the smallest effects. Compared with alternative 3, output would be lower by about 30 percent each year, employment by about 35 percent, and labor income by 35 percent each year over the 15 year analysis period.

Coal would provide about three quarters of the labor income under alternatives 2, 4 and 3, and 60 percent under alternative 1. Coal would also provide nearly 70 percent of the employment and half of the production value under alternatives 2, 4 and 3.

Economic impacts displayed in Table 3-59 are substantially larger than those presented in the DEIS. Impacts attributable to oil and gas are very similar to those estimated in the DEIS for alternatives 2, 4 and 3. However, impacts under alternative 1 are nearly three times larger. In the DEIS, the 2001 rule was in effect and severely limited the leasing of roadless acres. In the RDEIS, the 2001 rule is no longer in effect in Colorado and leasing of these lands has already occurred. Limitations on road activity for future leases would not occur until a Colorado rule is in effect. Leases awarded prior to the decision can be developed according to lease stipulation under any alternative, resulting in much higher projections of drilling and production under alternative 1 than estimated in the DEIS.

The largest change in Table 3-59 compared with the DEIS is associated with coal production, where estimates are up to three times larger. This change is based on revised estimates of recoverable coal reserves and its repercussion on mine life. Because the two mines in Gunnison County are expected to operate through the 15-year analysis period under alternatives 2, 4 and 3, annual average production, employment, and labor income is nearly as high as current levels. Larger impacts associated with coal under alternative 1 are the result of a technical correction made in the RDEIS.

Table 3-59. Average Annual Economic Impacts by Alternative for Energy Mineral Activity in the Energy Roadless Model Area, 2010-2024 (2006 dollars)

	Value of Production ($ millions)			Employment (jobs)			Labor Income ($ millions)		
Activity/Effects	**Alt 1**	**Alt 2 & 4**	**Alt 3**	**Alt 1**	**Alt 2 & 4**	**Alt 3**	**Alt 1**	**Alt 2 & 4**	**Alt 3**
Oil & Gas Drilling									
Direct	103.1	103.1	116.7	152	152	172	12.7	12.7	14.3
Indirect	39.0	39.0	44.1	196	196	221	8.2	8.2	9.2
Induced	14.8	14.8	16.8	141	141	159	4.5	4.5	5.1
Totals	156.9	156.9	177.6	489	489	553	25.3	25.3	28.6
Oil & Gas Production									
Direct	167.5	167.5	188.9	51	51	57	9.0	9.0	10.2
Indirect	87.4	87.4	98.6	172	172	194	11.2	11.2	12.7
Induced	14.6	14.6	16.4	138	138	155	4.4	4.4	4.9
Totals	269.4	269.4	303.9	360	360	406	24.6	24.6	27.8
Coal Production									
Direct	195.9	362.5	362.5	416	770	770	50.8	94.1	94.1
Indirect	53.1	98.2	98.2	185	342	342	10.7	19.9	19.9
Induced	57.0	105.5	105.5	432	799	799	13.6	25.2	25.2
Totals	305.9	566.2	566.2	1,033	1,912	1,912	75.2	139.1	139.1
Total Energy Minerals									
Direct	466.5	633.1	668.1	619	973	1,000	72.6	115.8	118.6
Indirect	179.5	224.6	240.9	552	710	757	30.1	39.3	41.8
Induced	86.4	134.9	138.7	710	1,078	1,114	22.4	34.0	35.1
Totals	732.3	992.6	1,047.7	1,882	2,761	2,871	125.1	189.1	195.5

Tables 3-60 through 3-62 show the estimated average annual state and local government revenues derived from energy mineral activity in roadless areas. Federal mineral lease payments, property taxes, and severance taxes have been estimated using production and revenue relationships provided by the Colorado Department of Local Affairs, Division of Property Taxation and the Colorado Department of Revenue (Anders, 2008; Colby, 2008; Colorado Department of Local Affairs, Division of Property Taxation 2007; Colorado Department of Local Affairs, Division of Property Taxation 2008). For ease of comparison with the DEIS, models used for estimating local government revenues remains unchanged in the Revised DEIS.

Estimates are based on historical, basin-wide averages of well drilling and productivity. The timing and magnitude of actual revenues will be dependent upon factors such as market prices, tax laws, regulatory constraints, and availability of equipment and personnel. For property taxes, only revenue based on production is estimated. Personal and other real property may vary by alternative, but estimates for these could not be made.

Alternatives 3, 2 and 4 have the largest State and local government revenue effects, totaling $51.0 and $48.7 million, respectively. Total revenues under alternative 1 are $33.8 million. Generally, property tax revenues account for the largest share of local government revenues.

Gunnison and Mesa Counties consistently garner the largest shares of local government revenues. Gunnison County is the largest beneficiary of revenues because of sizable coal and natural gas production. Mesa County revenues are solely based on oil and gas production. Distribution among counties varies by alternative because of differences in anticipated development and management limitations by individual roadless area. Details regarding production by roadless area can be found in the oil and gas and in the coal specialist reports.

Property tax revenues vary depending upon the level of oil and gas development, where oil and gas development is likely to occur, and whether coal reserves can be mined. Total property tax revenues are the highest under alternative 3, but not all counties share equally. Gunnison County shows the largest decrease under alternative 1 compared with No Action ($1.6 million); Pitkin shows the largest increase under alternative 1 compared with No Action ($0.2 million). Montrose County shows property tax revenues only for alternatives 2 and 4. The Horsefly Canyon Roadless Area is entirely contained within Montrose County, has oil and gas potential, allows roads, but is only available under alternatives 2 and 4. The Montrose County share of total production in alternatives 2 and 4 is estimated to yield about $111,000 in property taxes per year.

Impacts on revenues for State and local governments are substantially larger than the DEIS. Reasons for the change follow those noted above for economic impacts: a high level of current oil and gas leasing that was not available under alternative 1 in the DEIS, and longer lives of coal mines under alternatives 2, 4 and 3. Larger impacts associated with coal under alternative 1 are the result of a technical correction made in the RDEIS.

Historically, decisions on the management of National Forest System lands have affected forest revenues and subsequent payments to states and counties. In 2000, the Secure Rural Schools and Community Self-Determination Act (SRSCSA) gave counties the opportunity to elect payments that would not vary and be independent of National Forest System receipts. All counties in Colorado elected to receive the SRSCSA, except Douglas, Gilpin, Jefferson, and San Miguel. Only San Miguel could experience a change in forest payments resulting from energy mineral development activities in roadless areas. Only fees associated with Forest Service permits for oil, gas, and coal exploration and development would affect payments to San Miguel County. Federal mineral lease royalties are collected by the Department of Interior and not subject to Forest Service payments. Changes in the payment to the county are not expected to be sizeable under any alternative.

Table 3-60. Alternative 1 – Average Annual Federal Mineral Lease Production, Payments, and Related Tax Revenues from Roadless Areas, 2010-2024 (thousands of 2007 dollars)

Description	Energy-Affected Counties						All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Montrose	Pitkin		
O&G Production Value	$5,841	$24,558	$68,123	$34,102	$0	$23,356	$0	$155,980
Coal Production Value	$44,625	$0	$167,734	$0	$0	$0	$0	$212,359
Property tax receipts (production only)	$413	$644	$2,750	$1,353	$0	$521	$0	$5,680
Severance tax receipts								$5,052
Federal Mineral Lease Payments								
Retained by U.S.								$23,021
Paid to Colorado								$23,021
State Distribution of Severance Tax & Federal Royalties*								
Public School Fund								$11,511
Other State Funds								$12,927
To Local Governments	$350	$657	$7	$1,256	$40	$0	$1,325	$3,635
Total of Payments and Taxes Received	$763	$1,301	$2,757	$2,609	$40	$521	$1,325	$33,753

**Distribution of severance tax and federal mineral lease revenues to counties was revised in 2008 by Colorado statute. Transition distributions were implemented in 2009. Estimates above are based on prior distribution formulae for comparison with the DEIS.*

Table 3-61. Alternatives 2 and 4 – Average Annual Federal Mineral Lease Production, Payments, and Related Tax Revenues from Roadless Areas, 2010-2024 (thousands of 2007 dollars)

	Energy-Affected Counties							
Description	**Delta**	**Garfield**	**Gunnison**	**Mesa**	**Montrose**	**Pitkin**	**All Other Counties**	**State Total**
O&G Production Value	$11,462	$26,161	$59,293	$32,700	$3,158	$23,206	$0	$155,980
Coal Production Value	$44,625	$0	$348,399	$0	$0	$0	$0	$393,024
Property tax receipts (production only)	$606	$686	$3,794	$1,297	$111	$517	$0	$7,011
Severance tax receipts								$7,360
Federal Mineral Lease Payments								
Retained by U.S.								$34,313
Paid to Colorado								$34,313
State Distribution of Severance Tax & Federal Royalties								
Public School Fund								$17,156
Other State Funds								$19,123
To Local Governments	$578	$942	$11	$1,812	$63	$0	$1,987	$5,393
Total of Payments and Taxes Received	$1,184	$1,628	$3,805	$3,109	$174	$517	$1,987	$48,683

**Distribution of severance tax and federal mineral lease revenues to counties was revised in 2008 by Colorado statute. Transition distributions were implemented in 2009. Estimates above are based on prior distribution formulae for comparison with the DEIS.*

Table 3-62. Alternative 3 – Average Annual Federal Mineral Lease Production, Payments, and Related Tax Revenues from Roadless Areas, 2010-2024 (thousands of 2007 dollars)

Description	Energy-Affected Counties						All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Montrose	Pitkin		
O&G Production Value	$33,171	$17,312	$77,221	$31,808	$0	$16,405	$0	$175,916
Coal Production Value	$44,625	$0	$348,399	$0	$0	$0	$0	$393,024
Property tax receipts (production only)	$1,351	$454	$4,334	$1,262	$0	$366	$0	$7,766
Severance tax receipts								$7,659
Federal Mineral Lease Payments								
Retained by U.S.								$35,559
Paid to Colorado								$35,559
State Distribution of Severance Tax & Federal Royalties								
Public School Fund								$17,779
Other State Funds								$19,845
To Local Governments	$589	$983	$11	$1,889	$65	$0	$2,058	$5,594
Total of Payments and Taxes Received	$1,939	$1,437	$4,345	$3,151	$65	$366	$2,058	$50,984

**Distribution of severance tax and federal mineral lease revenues to counties was revised in 2008 by Colorado statute. Transition distributions were implemented in 2009. Estimates above are based on prior distribution formulae for comparison with the DEIS.*

Counties with Federal lands also receive Payments in Lieu of Taxes, (PILT) by the Department of Interior to help offset the loss of property tax revenues caused by Federal ownership. Using a system of formulas, payments are based on county population and acreage in Federal ownership less Federal payments from land use in the prior year. Federal mineral lease payments are included in prior year deductions. A minimum payment is established so that every qualifying county receives some PILT, regardless of prior year payments. Federal mineral lease payments estimated for all alternatives could reduce PILT by equal amounts. However, PILT payments are subject to Congressional appropriation, and have not been fully funded in recent years. Consequently, any reduction in PILT for Colorado counties is likely to be smaller than the increase in Federal mineral lease payments. For those counties already receiving the minimum PILT payment, no change would occur under any alternative.

The development and production of energy minerals in roadless areas may impose additional demands on services provided by local governments. Higher levels of traffic, greater demands for social services, and increased loads on utility infrastructure are examples of additional costs that may be incurred by local governments in the Piceance Basin. While these costs are common for communities near energy development, the specific timing, magnitude, and location of energy development cannot be estimated at this level of analysis. Such impacts on local governments are typically addressed at the project level when site-specific development is proposed. Because energy markets can be volatile, energy development can begin and end quickly, posing significant challenges to local governments in serving residents and visitors alike.

Summary of Effects

Provisions for energy mineral development in alternatives 2, 4 and 3 are likely to result in sizeable increases of average annual production, employment, and labor income over the next 15-years for the Energy Roadless model area (Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin counties). Total jobs under alternative 1 are estimated at 2,200 jobs, while for alternatives 2 and 4 it rises to 3,300 jobs and for alternative 3 are estimated at nearly 3,400 jobs. The estimated effects of alternative 1 range from 60 to 70 percent of alternative 3 for output, employment and labor income. Effects under alternatives 2 and 4 are about 95 percent of those under alternative 3.

A pattern similar to economic effects emerges for average annual State and local government revenues. Compared with $51 million under alternative 3, Federal mineral lease payments and tax revenues are estimated to be $49 million for alternatives 2 and 4 and $34 million for alternative 1. Gunnison and Mesa Counties are expected to yield the largest revenues under any alternative. Other Federal payments to state and local governments, such as those from the National Forest Fund and PILT, are expected to either not change or be more than offset by revenues from Federal mineral lease payments.

Values at Risk From Wildfire

Some roadless areas pose a higher wildfire hazard to communities than others. In addition, each alternative poses different management restrictions that may influence the ability to treat hazardous fuels within roadless areas. The combination of these factors can influence potential vulnerabilities of wildfire losses to at-risk communities located nearby.

For the DEIS, a CWPP-based definition of the wildland urban interface was used to identify at-

risk communities that could be affected by roadless area management. To approximate a CWPP-defined WUI and to provide a consistent analysis area, a 3-mile radius from the community center was circumscribed around all communities identified to be at risk. For the RDEIS, the analysis area has changed. A Community Protection Zone (CPZ) has been defined around all at-risk communities near inventoried or proposed roadless areas. The CPZ extends a minimum of 0.5 miles and up to 1.5 miles out from at-risk communities. The CPZ that intersects an IRA or CRA is the focus of this analysis. A detailed description of the lands included in this analysis area can be found in the Fire and Fuels section in this chapter.

National forest field personnel in Colorado projected the likelihood of mechanical fuel treatments in each roadless area under each alternative. The purpose of these treatments would be to reduce the risk of losses from wildfire in nearby at-risk communities. The likelihood ranged from "none" to "low" to "high". Table 3-63a shows the CPZ land area by county that could potentially be treated under each alternative. Some potential is defined as the combination of both "low" and "high" likelihoods. High potential is defined as only the "high" likelihood projected by forest personnel. Potential does not mean that these acres will be treated. Actual treatment depends on funding, overall fuel treatment priorities both in and outside of roadless areas, and other factors. However, Table 3-63a provides a cursory indication of options and likelihoods for reducing wildfire risks to at-risk communities by county.

A potential for fuel treatments in either IRAs or CRAs in the CPZ exists in twenty-four counties. Across these counties, the greatest acreages of potential treatment occur under alternatives 2 and 3. The counties with the greatest acreage of high potential treatment include La Plata, Park, and Larimer. Those with moderate acreage of high potential include Archuleta, Custer, Chaffee, and Douglas. By referencing Table 3-58 above, these seven counties have a minimum of 0.4% to 8.8% of their total valuation in homes located in the wildland urban interface. While all counties with high potential acres could benefit from reduced wildfire risks, these seven counties could benefit substantially.

Under alternative 1, sixteen counties have potential for fuel treatments in the CPZ. The counties with the greatest acreage of high potential treatment are La Plata, Larimer, Archuleta and Douglas. Under alternative 4, twenty-two counties have potential for treatments in the CPZ. The counties with the greatest acreage of high potential treatment are La Plata, Larimer, Park, and Douglas.

Table 3-63b provides a comparison of potential treatment acres between each alternative and alternative 3. This table shows more clearly that there are few differences between alternatives 2 and 3. It also shows clearly a reduction in potential treatment acres under alternatives 1 and 4. Thirteen counties would have a lower potential of treatment under alternative 1, while nineteen counties would have a lower potential of treatment under alternative 4. Based on Table 3-58, Eagle and Summit Counties have a sizeable tax dependence on properties in the urban interface and would also have a substantial reduction in potential treatment acres under alternative 1. Clear Creek is the only county to have an increase in acreage under alternative 1. Boulder, Clear Creek, Dolores, Grand, and Montezuma Counties could have an increase in acreage under alternative 4, mostly with lower potential for treatment. Based on estimates in Table 3-58, Clear Creek and Grand Counties have a modest, but not insignificant tax dependence on properties in the urban interface.

Tables 3-64a and 3-64b provide another context for understanding potential treatment acres. These tables display the share of CPZ acres with treatment potential in IRAs and CRAs

compared with all National Forest System (NFS) acres that intersect the CPZ by county. A high percentage means that IRAs and CRAs could play an important role in overall reduction of community vulnerabilities due to wildfire. A low percentage means that treatments in IRAs or CRAs may not be critical for this purpose. Table 3-64a shows that fuel treatments under alternatives 2 and 3 in IRAs or CRAs may be especially important for La Plata, Custer, Pueblo, Huerfano, and Fremont Counties. Acres with a high likelihood of treatment range from about 16% to 38% of all NFS acres in the CPZ in these counties. Based on Table 3-58, Custer has the highest relative vulnerability to losses in the wildland urban interface among these five counties. For most other counties, high potential acres are a relatively small share of all NFS acres in the CPZ. Under alternative 1, La Plata, Clear Creek, Montezuma, and Larimer Counties show a high share of all NFS acres. Under alternative 4, high potential treatment acres are a small share of all NFS acres in the CPZ for all counties.

Table 3-64b shows the difference in shares of CPZ acres when comparing each alternative to alternative 3. This table clearly shows that there are very small differences between alternative 2 and 3 when considering the share of all NFS acres available for fuel treatment in the CPZ. Alternatives 1 and 4, on the other hand, have clear reductions compared with alternative 3 in the proportion of NFS acres available for fuel treatment in the CPZ. Compared with alternative 3, IRAs and CRAs under these alternatives would have a substantially reduced role on NFS lands in attempts to protect communities from wildfire losses.

Table 3-63a. Potential Fuel Treatment[1] Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities, Totals by County, acres rounded to nearest 100

County	Alternative 1				Alternative 2				Alternative 3				Alternative 4			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
	acres, rounded to the nearest 100 acres															
Archuleta	2,800	18,700	2,800	18,700	2,800	18,700	2,800	18,700	2,800	18,700	2,800	18,700	300	2,400	300	2,400
Boulder	-	4,600	-	3,900	-	4,000	-	3,900	-	4,600	-	3,900	1,400	4,500	-	3,900
Chaffee	900	3,900	900	3,900	3,700	11,900	3,700	11,900	3,700	11,900	3,700	11,900	400	5,700	400	1,600
Clear Creek	5,600	24,100	-	-	4,600	15,700	-	-	4,500	13,400	-	-	4,800	18,200	-	-
Custer	-	-	-	-	4,300	13,000	4,300	13,000	4,300	13,000	4,300	13,000	2,100	6,500	-	200
Dolores	900	1,900	-	-	900	1,900	-	-	900	1,900	-	-	1,300	1,900	-	-
Douglas	2,400	10,200	2,400	10,200	2,500	11,800	2,500	11,800	2,500	11,800	2,500	11,800	2,500	11,800	2,500	11,800
Eagle	-	-	-	-	13,300	25,300	2,200	5,000	13,300	25,300	-	-	3,500	-	-	-
El Paso	-	-	-	-	-	900	-	900	-	900	-	900	-	900	-	900
Fremont	-	-	-	-	1,100	3,600	1,100	3,600	1,100	3,600	1,100	3,600	1,100	3,600	-	-
Garfield	-	-	-	-	500	2,100	-	-	500	2,100	-	-	-	-	-	-
Grand	1,100	11,100	700	6,100	800	5,400	500	3,200	1,100	11,100	700	6,100	2,300	20,600	500	3,900
Gunnison	100	1,200	100	1,200	900	2,600	100	1,200	900	2,600	100	1,200	100	1,200	100	1,200
Huerfano	-	-	-	-	1,693	6,550	1,693	6,550	1,693	6,550	1,693	6,550	136	2,560	136	2,560
Jefferson	500	4,400	500	4,400	500	4,400	500	4,400	500	4,400	500	4,400	500	4,400	500	4,400
La Plata	17,600	69,600	16,700	66,700	17,600	69,600	16,700	66,700	17,600	69,600	16,700	66,700	8,300	20,700	8,300	20,700
Lake	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Larimer	22,500	61,700	11,000	29,000	22,500	61,700	11,000	29,000	22,500	61,700	11,000	29,000	8,100	26,200	3,400	8,800
Mineral	-	500	-	500	-	500	-	500	-	500	-	500	-	-	-	-
Montezuma	4,000	22,900	-	-	4,000	22,900	-	-	4,000	22,900	-	-	5,700	22,800	-	-
Park	1,100	5,800	1,100	5,800	8,200	29,700	8,200	29,700	8,200	29,700	8,200	29,700	8,200	25,600	4,200	10,000
Pitkin	-	-	-	-	11,318	36,279	-	-	9,777	33,739	-	-	901	17,618	-	-

County	Alternative 1				Alternative 2				Alternative 3				Alternative 4			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
	acres, rounded to the nearest 100 acres															
Pueblo	-	-	-	-	2,900	9,400	1,600	5,600	2,900	9,400	2,900	9,400	-	300	-	300
Summit	200	1,400	-	-	2,200	9,000	200	1,400	2,200	9,000	200	1,400	1,100	3,100	-	-
Total	**59,900**	**242,200**	**36,400**	**150,800**	**106,500**	**367,200**	**57,300**	**217,400**	**105,200**	**368,700**	**56,600**	**219,100**	**53,000**	**200,700**	**20,600**	**72,800**

Totals may not add due to rounding.

[1] Potential means there is some likelihood of tree-cutting for the purpose of fuel treatment.

[2] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "low" or "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

[3] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

Table 3-63b. Potential Fuel Treatment[1] Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities Compared with Alternative 3, Totals by County, acres rounded to nearest 100 acres.

County	Alternative 1 vs. Alternative 3				Alternative 2 vs. Alternative 3				Alternative 4 vs. Alternative 3			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
	acres, rounded to the nearest 100 acres											
Archuleta	-	-	-	-	-	-	-	-	-2,500	-16,400	-2,500	-16,400
Boulder	-	-	-	-	-	-600	-	-	1,400	-200	-	-
Chaffee	-2,800	-7,900	-2,800	-7,900	-	-	-	-	-3,300	-6,200	-3,300	-10,200
Clear Creek	1,100	10,600	-	-	<50	2,300	-	-	200	4,700	-	-
Custer	-4,300	-13,000	-4,300	-13,000	-	-	-	-	-2,200	-6,500	-4,300	-12,800
Dolores	-	-	-	-	-	-	-	-	500	-	-	-
Douglas	-100	- 1,600	-100	- 1,600	-	-	-	-	-	-	-	-
Eagle	-13,300	-25,300	-	-	-	-	2,200	5,000	-9,800	-25,300	-	-

County	Alternative 1 vs. Alternative 3				Alternative 2 vs. Alternative 3				Alternative 4 vs. Alternative 3			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
	acres, rounded to the nearest 100 acres											
El Paso	-	-900	-	- 900	-	-	-	-	-	-	-	-
Fremont	-1,100	-3,600	-1,100	-3,600	-	-	-	-	-	-<50	-1,100	-3,600
Garfield	-500	-2,100	-	-	-	-	-	-	-500	-2,100	-	-
Grand	-	-	-	-	-300	-5,700	-200	-2,900	1,200	9,500	-200	-2,261
Gunnison	-900	-1,400	-	-	-	-	-	-	-900	-1,400	-	-
Huerfano	-1,700	-6,600	-1,700	-6,600	-	-	-	-	-1,600	-4,000	-1,600	-4,000
La Plata	-	-	-	-	-	-	-	-	-9,300	-49,000	-8,412	-46,000
Larimer	-	-	-	-	-	-	-	-	-14,400	- 35,500	- 7,600	-20,100
Mineral	-	-	-	-	-	-	-	-	-	-500	-	-500
Montezuma	-	-	-	-	-	-	-	-	1,700	-<50	-	-
Park	-7,200	-23,900	-7,200	-23,900	-	-	-	-	-<50	-4,100	-4,000	-19,800
Pitkin	-9,800	-33,700	-	-	1,500	2,500	-	-	-8,900	-16,100	-	-
Pueblo	-2,900	- 9,400	-2,900	- 9,400	-	-	-1,300	- 3,800	-2,900	- 9,200	-2,900	- 9,200
Summit	-2,000	-7,600	-200	-1,400	-	-	-	-	-1,000	-6,000	-166	-1,400
Total	**-45,300**	**-126,500**	**-20,100**	**-68,300**	**1,300**	**-1,500**	**700**	**-1,700**	**-52,200**	**-168,000**	**-36,000**	**-146,000**

Totals may not add due to rounding

[1] Potential means there is some likelihood of tree-cutting for the purpose of fuel treatment.

[2] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "low" or "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

[3] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

Table 3-64a. Share of Total NFS Lands in the Community Protection Zone where Potential[1] Exists for Fuel Treatment by County

County	Alternative 1				Alternative 2				Alternative 3				Alternative 4			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
Archuleta	5.5%	12.3%	5.5%	12.3%	5.5%	12.3%	5.5%	12.3%	5.5%	12.3%	5.5%	12.3%	0.5%	1.6%	0.5%	1.6%
Boulder	-	3.1%	-	2.6%	-	2.7%	-	2.6%	-	3.1%	-	2.6%	1.4%	3.0%	-	2.6%
Chaffee	1.7%	2.1%	1.7%	2.1%	6.8%	6.4%	6.8%	6.4%	6.8%	6.4%	6.8%	6.4%	0.8%	3.1%	0.8%	0.9%
Clear Creek	13.1%	24.1%	-	-	10.6%	15.8%	-	-	10.6%	13.5%	-	-	11.1%	18.2%	-	-
Custer	-	-	-	-	28.1%	23.7%	28.1%	23.7%	28.1%	23.7%	28.1%	23.7%	13.9%	11.9%	-	0.3%
Dolores	9.1%	4.8%	-	-	9.1%	4.8%	-	-	9.1%	4.8%	-	-	14.4%	4.8%	-	-
Douglas	5.4%	9.3%	5.4%	9.3%	5.5%	10.8%	5.5%	10.8%	5.5%	10.8%	5.5%	10.8%	5.5%	10.8%	5.5%	10.8%
Eagle	-	-	-	-	13.9%	10.0%	2.3%	2.0%	13.9%	10.0%	-	-	3.7%	-	-	-
El Paso	-	-	-	-	-	1.0%	-	1.0%	-	1.0%	-	1.0%	-	1.0%	-	1.0%
Fremont	-	-	-	-	27.6%	18.4%	27.6%	18.4%	27.6%	18.4%	27.6%	18.4%	27.4%	18.1%	-	-
Garfield	-	-	-	-	7.6%	6.4%	-	-	7.6%	6.4%	-	-	-	-	-	-
Grand	3.3%	9.6%	1.9%	5.3%	2.4%	4.7%	1.5%	2.8%	3.3%	9.6%	1.9%	5.3%	6.9%	17.7%	1.5%	3.3%
Gunnison	0.1%	0.4%	0.1%	0.4%	1.1%	0.9%	0.1%	0.4%	1.1%	0.9%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%
Huerfano	-	-	-	-	17.3%	20.4%	17.3%	20.4%	17.3%	20.4%	17.3%	20.4%	1.4%	8.0%	1.4%	8.0%
Jefferson	1.7%	6.3%	1.7%	6.3%	1.7%	6.3%	1.7%	6.3%	1.7%	6.3%	1.7%	6.3%	1.7%	6.3%	1.7%	6.3%
La Plata	16.3%	29.9%	15.5%	28.7%	16.3%	29.9%	15.5%	28.7%	16.3%	29.9%	15.5%	28.7%	7.7%	8.9%	7.7%	8.9%
Lake	1.5%	0.5%	1.5%	0.5%	1.5%	0.5%	1.5%	0.5%	1.5%	0.5%	1.5%	0.5%	1.5%	0.5%	1.5%	0.5%
Larimer	13.2%	16.1%	6.4%	7.6%	13.2%	16.1%	6.4%	7.6%	13.2%	16.1%	6.4%	7.6%	4.8%	6.9%	2.0%	2.3%
Mineral	-	0.4%	-	0.4%	-	0.4%	-	0.4%	-	0.4%	-	0.4%	-	-	-	-
Montezuma	10.2%	22.6%	-	-	10.2%	22.6%	-	-	10.2%	22.6%	-	-	14.5%	22.6%	-	-
Park	0.7%	1.6%	0.7%	1.6%	5.1%	8.4%	5.1%	8.4%	5.1%	8.4%	5.1%	8.4%	5.1%	7.2%	2.6%	2.8%
Pitkin	-	-	-	-	17.3%	20.9%	-	-	15.0%	19.4%	-	-	1.4%	10.2%	-	-
Pueblo	-	-	-	-	27.2%	38.4%	15.0%	22.9%	27.2%	38.4%	27.2%	38.4%	-	1.1%	-	1.1%
Summit	0.1%	0.5%	-	-	1.7%	3.5%	0.1%	0.5%	1.7%	3.5%	0.1%	0.5%	0.9%	1.2%	-	-

County	Alternative 1				Alternative 2				Alternative 3				Alternative 4			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
Total	**3.9%**	**6.1%**	**2.3%**	**3.8%**	**6.9%**	**9.2%**	**3.7%**	**5.4%**	**6.8%**	**9.2%**	**3.6%**	**5.5%**	**3.4%**	**5.0%**	**1.3%**	**1.8%**

[1] Potential means there is some likelihood of tree-cutting for the purpose of fuel treatment.

[2] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "low" or "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

[3] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

Table 3-64b. Change in Share of Total NFS Lands in the Community Protection Zone where Potential[1] Exists for Fuel Treatment Compared with Alternative 3 by County

County	Alternative 1 vs. Alternative 3				Alternative 2 vs. Alternative 3				Alternative 4 vs. Alternative 3			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
Archuleta	-	-	-	-	-	-	-	-	-5.0%	-10.7%	-5.0%	-10.7%
Boulder	-	-	-	-	-	-0.4%	-	-	1.4%	-0.1%	-	-
Chaffee	-5.1%	-4.3%	-5.1%	-4.3%	-	-	-	-	-6.0%	-3.3%	-6.0%	-5.5%
Clear Creek	2.5%	10.7%	-	-	0.1%	2.3%	-	-	0.5%	4.8%	-	-
Custer	-28.1%	-23.7%	-28.1%	-23.7%	-	-	-	-	-14.2%	-11.8%	-28.1%	-23.4%
Dolores	-	-	-	-	-	-	-	-	5.3%	0.0%	-	-
Douglas	-0.1%	-1.5%	-0.1%	-1.5%	-	-	-	-	-	-	-	-
Eagle	-13.9%	-10.0%	-	-	-	-	2.3%	2.0%	-10.2%	-10.0%	-	-
El Paso	-	-1.0%	-	-1.0%	-	-	-	-	-	-	-	-
Fremont	-27.6%	-18.4%	-27.6%	-18.4%	-	-	-	-	-0.2%	-0.2%	-27.6%	-18.4%
Garfield	-7.6%	-6.4%	-	-	-	-	-	-	-7.6%	-6.4%	-	-
Grand	-	-	-	-	-0.8%	-4.9%	-0.4%	-2.5%	3.6%	8.1%	-0.4%	-1.9%

County	Alternative 1 vs. Alternative 3				Alternative 2 vs. Alternative 3				Alternative 4 vs. Alternative 3			
	Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]		Some Potential for Treatment[2]		High Potential for Treatment[3]	
	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles	Within 0.5 miles	Within 1.5 miles
Gunnison	-1.0%	-0.5%	-	-	-	-	-	-	-1.0%	-0.5%	-	-
Huerfano	-17.3%	-20.4%	-17.3%	-20.4%	-	-	-	-	-15.9%	-12.4%	-15.9%	-12.4%
La Plata	-	-	-	-	-	-	-	-	-8.6%	-21.0%	-7.8%	-19.8%
Lake	-	-	-	-	-	-	-	-	-8.4%	-9.3%	-4.4%	-5.3%
Larimer	-	-	-	-	-	-	-	-	-	-0.4%	-	-0.4%
Mineral	-	-	-	-	-	-	-	-	-5.0%	-10.7%	-5.0%	-10.7%
Montezuma	-	-	-	-	-	-	-	-	4.3%	0.0%	-	-
Park	-4.4%	-6.7%	-4.4%	-6.7%	-	-	-	-	0.0%	-1.2%	-2.5%	-5.6%
Pitkin	-15.0%	-19.4%	-	-	2.4%	1.5%	-	-	-13.6%	-9.3%	-	-
Pueblo	-27.2%	-38.4%	-27.2%	-38.4%	-	-	-12.2%	-15.4%	-27.2%	-37.3%	-27.2%	-37.3%
Summit	-1.6%	-3.0%	-0.1%	-0.5%	-	-	-	-	-0.8%	-2.3%	-0.1%	-0.5%
Total	**-2.9%**	**-3.2%**	**-1.3%**	**-1.7%**	**0.1%**	-	-	-	**-3.4%**	**-4.2%**	**-2.3%**	**-3.7%**

[1] Potential means there is some likelihood of tree-cutting for the purpose of fuel treatment.

[2] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "low" or "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

[3] Number of Colorado Roadless Area acres that overlap with Community Protection Zones for at-risk communities where the likelihood of tree-cutting for the purpose of fuel treatment is projected to be "high" by forest units in the most recent roadless area activity projection survey (completed summer, 2010)

Benefits and Costs

The final part of economic consequences deals with a national perspective of benefits and costs. Unlike the previous section which dealt with regional economic impacts of jobs, income, and assets, this part considers benefits and costs realized by citizens across the nation. A discussion of benefits and costs, whether expressed in monetary terms or not, is a core function of disclosure and critical to decision-making. Table 2-14 in chapter 2 provides a summary of environmental consequences by alternatives. A detailed, qualitative discussion of benefits and costs based on Table 2-14 may be found in the Regulatory Impact and Cost-Benefit Analysis (Miller 2010). What follows is a brief summary of tradeoffs by alternative.

Alternative 1 – 2001 Roadless Rule

Roads and tree removal are highly restricted in this alternative. Projected road construction and tree removal in roadless areas are the lowest in this alternative. About 14 miles of road are anticipated, 11 of which are associated with energy development. No roads are anticipated for hazardous fuels reduction within the IRAs. About 2,300 acres are projected for tree-cutting for fuels reduction and forest health purposes. Entry into each roadless area would be prohibited except where existing rights allow. The government cost of management would generally be low. Emergency access would be expensive when required. Recreation settings would not change. Alternative 1 places the highest priority on protection of non-market roadless area characteristics. Natural processes and current conditions are recognized to be of very high value. This alternative offers the fewest opportunities for hazardous fuel treatments near at-risk communities, treatments for forest health, and energy mineral extraction. Alternative 1 retains the greatest options for roadless values, but effectively foregoes most options for future use or development. While management restrictions for any roadless area could be reversed, the time and budgetary costs to do so would be very high.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Roads and tree removal are allowed under limited conditions in this alternative. Twenty miles of road are anticipated, 13 of which are associated with energy development. Five miles of road are anticipated for hazardous fuels or forest health treatment. About 6,900 acres are projected for tree-cutting for fuels reduction and forest health purposes. The government cost of management would generally be modest. Emergency access would be expensive when required. Recreation settings would change little from current conditions. Alternative 2 places a high priority on protection of non-market roadless area characteristics, especially within the upper tier acres. Natural processes and current conditions are recognized to be of high value. This alternative offers some opportunities for hazardous fuel treatments near at-risk communities, some water conveyances, and coal extraction. Alternative 2 retains most options for roadless values, but effectively foregoes many options for future use or development. While management restrictions for any roadless area could be reversed, the time and budgetary costs to do so would be high.

Alternative 3 – Forest Plans (No Action)

Projected road construction and tree-cutting, sale or removal in roadless areas is the highest in this alternative. Nearly 28 miles of road are anticipated, 22 of which are associated with energy development or hazardous fuels reduction. About 16,600 acres are projected for tree-cutting for fuels reduction and forest health purposes. In addition, 300 acres are projected for entry and tree-cutting for public health safety and other purposes. Entry into each roadless area would be

weighed as part of the forest planning process. In most cases, entry would require compliance with NEPA and consideration of benefits and costs – market and non-market – for each roadless area. The government cost of management would have the greatest range, from low cost for no entry and treatment in some roadless areas to high cost for road construction and maintenance, law enforcement, permit administration, and other routine activities in other roadless areas. The cost of entry also includes administrative costs for NEPA compliance and resource monitoring. Recreation settings would change, but forest-wide recreation use may not. Roadless area characteristics would receive the highest priority and remain unchanged in some areas, but could be significantly altered in others, depending on forest plan direction. This alternative includes the largest potential change to wildlife habitat along with the greatest opportunities for hazard fuel reduction for at-risk communities, forest health treatments, energy mineral development and production. Roadless area characteristics and non-market benefits would be retained. Alternative 3 retains the most options for future use or non-use, and thus limits opportunities foregone.

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier Acres

Effects are similar to alternative 2, but with additional upper tier acres, there would be more restrictions on road construction and tree-cutting on more acres. This alternative would protect most roadless area characteristics on those upper tier acres than the other alternatives, limiting all other future uses.

Eighteen miles of road are anticipated, approximately 13 of which are associated with energy development. Three miles of road are anticipated for hazardous fuels or forest health treatment; 1 mile of the 3 is within the CRAs. Approximately 3,000 acres are projected for tree cutting for fuels reduction and forest health purposes; 1,800 acres of which are within the CRAs.

Economics: Cumulative Effects

Values at Risk From Wildfire

Growth of mountain communities, including those near public lands and roadless areas, may be the single most important factor in gauging cumulative effects for values at risk of wildfire. National demographics and income trends are primary drivers in Colorado population forecasts. By 2025, the Colorado population is expected to grow by 34 percent. The western slope and central mountain areas of the State, where most roadless areas are located, are expected to grow by 49 percent and 47 percent, respectively (Colorado Department of Local Affairs, State Demography Office 2008). This high growth will likely add to local infrastructure, both public and private, making current at-risk communities even more vulnerable to wildfire hazards. The ability to treat fuels in roadless areas located in the urban interface could prove to be increasingly important to maintaining the quality of life in at-risk communities. Even with responsible, proactive actions on the part of local homeowners, the ability to manage wildland fuels could be critical. Alternatives 2 and 3 offer more options for reducing the threat of wildfire in roadless areas near these communities now and in the future.

Benefits and Costs

With population growth and private land development, the value of non-market roadless area characteristics can be expected to increase. This increase places a higher premium on the retention of roadless area characteristics, such as natural processes, retention of future options, and recreation uses. The same growth, however, also increases the value of wildland protection

for communities and energy mineral benefits to the nation. The tradeoffs inherent in each of the alternatives could easily shift in the future, but it is very difficult to assess the direction and magnitude of societal values.

OTHER EFFECTS DISCLOSURES

Short-Term Uses and Long-Term Productivity

The NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR §1502.16). As declared by Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101). The alternatives all integrate those considerations, and ascribe to the principles described in the Forest and Rangeland Renewable Resources Planning Act as amended by the National Forest Management Act, as well as the Multiple-Use Sustained-Yield Act. The Multiple-Use Sustained Yield Act defines productivity as part of multiple-use management. None of the alternatives would deviate from those requirements. Consistent with the Multiple-Use Sustained Yield Act, some land will be used for less than all of the resources, and the management of various resources would be done without impairing the long-term productivity of the land. In addition, consideration is given to the relative values of the various resources, and not necessarily the uses that would give the greatest dollar return or output. Adopting any of the alternatives would not involve implementing any on-the-ground action; therefore, the alternatives do not compel any short-term uses.

However, there are differences among alternatives in prohibitions and permissions related to road construction or tree-cutting activities in roadless areas. Road construction would be the only short-term use that varies by alternative and has the potential to cause a reduction in long-term productivity in the roadless areas. Such roads can cause a loss of long-term soil and vegetative productivity and other watershed and wildlife habitat values that last for several decades or longer. Tree-cutting activities would not be likely to result in a long-term or permanent loss of productivity in the roadless areas.

All Alternatives

Under all alternatives, the use of short-term temporary roads would be more typical in the IRAs or CRAs, and those roads would be rehabilitated to restore long-term productivity after their use has ended.

Alternative 1 would cause the lowest risk of a short-term use impairing long-term productivity because the 2001 Rule is the most restrictive of the alternatives in terms of constructing roads in IRAs.

Alternatives 2 and 4 would cause a relatively low risk of losing long-term productivity in CRAs as well, because most roads allowed would be temporary and would eventually be decommissioned. However, projections indicate that alternatives 2 and 4 would result in more miles of temporary roads being built in CRAs in support of coal operations, so alternatives 2 and 4 would result in a slightly higher loss of long-term productivity on those road miles (see

projections in Analysis Framework section). For alternatives 1, 2, or 4 the loss of long term productivity would be to a relatively limited acreage, especially compared with NFS and other lands where road construction is not restricted.

Alternative 3 would cause a moderate risk of losing long-term productivity in IRAs where several forest plans do not restrict construction of permanent roads. See Appendix B and the alternative 3 map, which show the forest plan restrictions on roads in roadless areas. Projections of temporary roads in support of oil, gas and coal operations are slightly higher under alternative 3 compared to alternatives 1, 2 or 4.

Unavoidable Adverse Effects

The projected amount of road construction, tree-cutting, and oil, gas or coal development activities in roadless areas that differ by alternative would result in some potentially unavoidable adverse effects in localized portions of some roadless areas. These effects are described in more detail in each section of chapter 3 as well as in the Comparison of Alternatives section in chapter 2. Site-specific mitigation measures would be expected to be identified during project planning and applied during implementation to avoid or minimize adverse environmental effects.

Alternative 1 – 2001 Roadless Rule

Unavoidable adverse effects associated with alternative 1 include less IRA acreage within which to reduce wildland fire hazard, provide for utilities or water conveyances, or explore for and develop oil, gas or coal resources.

Alternative 2 – Colorado Roadless Rule (Proposed Action)

Compared to alternative 1, unavoidable adverse effects associated with alternative 2 include a slight reduction in semi-primitive recreation settings and existing scenic quality; increases in invasive plant populations that can indirectly adversely affect threatened, endangered or sensitive plants and other resources; and an increased risk to aquatic and terrestrial animal species and habitat in some CRAs.

Alternative – Forest Plans (No Action)

Compared to alternatives 1, 2, and 4 unavoidable adverse effects associated with alternative 3 include greater reductions in IRA acreage providing semi-primitive recreation settings and high scenic integrity; greater increases in roadless areas with invasive plant populations that can indirectly adversely affect threatened, endangered or sensitive plants and other resources; and an increased risk to aquatic and terrestrial animal species and habitat in some areas.

Alternative 1 – Colorado Roadless Rule with Public Proposed Upper Tier

This alternative is similar to alternative 2. There would be a lesser degree of unavoidable adverse effects than alternative 2.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time, such as the temporary loss of vegetative or soil productivity in forested areas that are cleared for use of those lands for roads, powerline rights-of-way, or other constructed

facilities.

The roadless area management alternatives that are subject to this analysis do not include any site-specific actions to be implemented. Therefore, there can be no actual irreversible or irretrievable commitments of resources associated with any of these alternatives. Commitments of resources would take place when projects or activities are proposed and after the preparation and consideration of appropriate NEPA analysis and documentation.

However, based on projections of potential activities that differ by alternative, differences in the potential for irreversible and irretrievable commitments of resources could be estimated. Constructing new roads and other facilities would result in commitments of resources, as would extraction of non-renewable energy mineral resources such as oil, gas and coal. No irreversible or irretrievable commitments of resources would be likely to result from permissible tree-cutting activities under any alternative.

Alternative 1 – 2001 Roadless Rule

The amount of irreversible or irretrievable commitments of resources expected under this alternative would be negligible, due to the general prohibition on road construction and tree-cutting except under very limited exceptional circumstances. However, there would be approximately 11 miles of road construction or reconstruction per year in IRAs and 3 miles of road construction or reconstruction in the remainder of the analysis area. Some of the roads would entail longer term road use for oil, gas or coal operations. Wells, well pads, and other ground disturbing activities projected to occur in roadless areas under this alternative would be considered an irretrievable commitment of resources in those localized sites. That commitment would be reversed and vegetative productivity reclaimed on those constructed roads and facilities sites after the use of those roads or facilities has ended. Additionally, the amount of oil, natural gas, and coal that could be extracted from roadless areas would be an irreversible commitment of resources (see the Leasable Minerals section for details and quantities).

Alternative 2 – Colorado Roadless Rule (Proposed Action)

There would be a minimal amount of irreversible or irretrievable commitments of resources expected under this alternative due to the general prohibition on road construction and tree-cutting except under certain exceptional circumstances. However, there would be approximately 16 miles of road construction or reconstruction per year in CRAs with 4 miles of road construction or reconstruction per year in the remainder of the analysis area. Some of the roads would entail longer term road use for oil, gas or coal operations. Wells, well pads, and other ground disturbing activities projected to occur in roadless areas under this alternative would be considered an irretrievable commitment of resources in those localized sites. That commitment would be reversed and vegetative productivity reclaimed on those constructed roads and facilities sites after the use of those roads or facilities has ended. Additionally, the amount of oil, natural gas, and coal that could be extracted from roadless areas would be an irreversible commitment of resources (see the Leasable Minerals section for details and quantities).

Alternative 3 – Forest Plans (No Action)

The commitments of resources would be similar to alternative 2, but there would be more roadless area acres where there is an irretrievable commitment of resources anticipated, based on projections displayed in the Analysis Framework section. Approximately 28 miles of roads

would be built in the analysis area each year, with the majority of those roads being for oil, gas or coal resource operations; some of the roads would entail longer term road use. Wells, well pads, and other ground-disturbing activities projected to occur would add to the total irretrievable commitment of resources in those localized sites. Additionally, the amount of oil, natural gas, and coal that could be extracted from roadless areas would be an irreversible commitment of resources (see the Leasable Minerals section for details and quantities).

Alternative 4 – Colorado Roadless Rule with Public Proposed Upper Tier

Similar to alternative 2, there would be a minimal amount of irreversible or irretrievable commitments of resources expected under this alternative due to the general prohibition on road construction and tree-cutting except under certain exceptional circumstances. However, there would be approximately 14 miles of road construction or reconstruction per year in CRAs with 4 miles of road construction or reconstruction per year in the remainder of the analysis area. Some of the roads would entail longer term road use for oil, gas or coal operations. Wells, well pads, and other ground disturbing activities projected to occur in roadless areas under this alternative would be considered an irretrievable commitment of resources in those localized sites. That commitment would be reversed and vegetative productivity reclaimed on those constructed roads and facilities sites after the use of those roads or facilities has ended. Additionally, the amount of oil, natural gas, and coal that could be extracted from roadless areas would be an irreversible commitment of resources (see the Leasable Minerals section for details and quantities).

Other Required Disclosures

The NEPA implementing regulations direct agencies to prepare draft environmental impact statements concurrently with and integrated with other environmental review laws and executive orders (40 CFR 1502.25a). Consultation and coordination with the US Fish and Wildlife Service is ongoing during preparation of the EIS for this rulemaking proposal, and included completion of a biological assessment, in accordance with the Endangered Species Act requirements (more information is in the Terrestrial Species and Habitat section and EIS record). None of the alternatives would require consultation under the Fish and Wildlife Coordination Act because they do not require water to be impounded or diverted, or with the National Historic Preservation Act because there would be no ground-disturbing actions.

The US Department of Agriculture rulemaking procedural requirements are being followed for this proposed rulemaking action, including associated requirements of the Unfunded Mandates Reform Act, Executive Order 12988, and the Civil Justice Reform Act, as is discussed in the preamble for the proposed rule (published in the Federal Register). There are no anticipated effects on any State or county laws because of the permissions for existing rights. Effects of each alternative in relation to the Clean Air Act, Clean Water Act, Migratory Bird Treaty Act, Wilderness Act, and other federal environmental laws, regulations, and executive orders are disclosed in each section of chapter 3 where an effect is anticipated.

CHAPTER 4. PREPARERS AND EIS DISTRIBUTION

LIST OF PREPARERS

This section provides a list of the people who were primarily responsible for preparing this environmental impact statement (EIS), in accordance with regulations at 36 CFR 1502.17. It is organized alphabetically by last name, and includes the individual's work group and organization, contribution to the EIS, and their educational qualifications and years of relevant work experience. A second list is also provided to acknowledge the other specialists and managers who provided oversight, guidance, reviews and other information in support of this document. In addition to those listed, other Forest Service personnel provided invaluable administrative and technical support during the development of this document.

Primary Contributors to the EIS

Name	Organization	EIS Contribution	Education	Years of Relevant Experience
Bruin, Susan	Environmental coordination, FS-TEAMS, Washington Office	Process management and documentation	M.S., Natural Resource Policy and Administration B.S., Natural Resource Management	27
Carlson, Joan	Water resources program, Rocky Mountain Regional Office	Water resources	M.S., Forest Engineering B.S., Forest Science M.B.A.	21
Dean, Cindy	Recreation special uses, Rocky Mountain Regional Office	Process documentation	B.S., Forest Management	25
Dunn, Michael	Minerals and geology program, Rocky Mountain Regional Office, Retired	Locatable and saleable minerals, geological and paleontological resources, and abandoned mines	M.S., Geology B.S., Geology	32
Gee, Angela	Fire and fuels program, Rocky Mountain Regional Office	Fuels and fire ecology	B.S., Forestry	6
Holm, Melody	Minerals and geology centralized national operations	Leasable minerals, oil and gas resources	M.A., Geology B.A., Geology	33

Name	Organization	EIS Contribution	Education	Years of Relevant Experience
John, Tommy	Soil resources program, Rocky Mountain Regional Office	Soil resources	M.S., Forest Soil B.S., Forestry	33
Kowynia, Ken	Winter sports program, Rocky Mountain Regional Office	Developed ski areas	B.A., Pre-Medicine, Psychology M.F., Forest Management	36
Kratz, Andrew	Botany program, Rocky Mountain Regional Office	Threatened, endangered, and sensitive plants	M.S., Biology (plant synecology) B.A., Biology	29
Kurtz, Kathy	Strategic planning, Rocky Mountain Regional Office	Process management	B.S., Forest Biology	29
Langowski, Paul	Fire and fuels program, Rocky Mountain Regional Office	Fuels & Fire Ecology	B.S., Resource Management	32
Liestman, Terri	Heritage program Rocky Mountain Regional Office	Cultural Resources	M.A. Anthropology B.A. Anthropology	30
Mattson, Liane	Leaseable minerals program, Grand Mesa, Uncompahgre, and Gunnison NFs	Leaseable minerals and coal mining	B.S., Geological Engineering	15
McClure, Tom	Invasive species program, Rocky Mountain Regional Office	Invasive plants	B.S., Range and Forest Ecology	29
Milligan, Joshua	NEPA, Chugach National Forest	Writer/editor	Juris Doctor M.S., Environmental Law B.S., Business Administration in Finance	9
Moll, Jeffry	Engineering, Rocky Mountain Regional Office	Roads	Registered Professional Engineer M.S., Civil Engineering B.S., Civil Engineering	32
O'Connell, Michele	Lands and special uses program, Rocky Mountain Regional Office	Land special use authorizations	B.S., Resource Management/ Forestry	28

Name	Organization	EIS Contribution	Education	Years of Relevant Experience
Quimby, Charles	Rangelands and grazing program, Rocky Mountain Regional Office, Retired	Rangeland health and livestock grazing	M.S., Watershed Management B.S., Range Management	39
Retzlaff, Mike	Economic Insights of Colorado, LLC	Economics	M.S., Economics B.S., Hydrology	35
Schaefers, Julie	Strategic planning, Rocky Mountain Regional Office	Social Report, GIS Analysis, and EIS	M.S., Natural Resource Economics B.S., Forestry Management	18
Schillie, Trey	Strategic planning, Rocky Mountain Regional Office	Climate Change	M.S. Environmental Management B.S. Geography	11
Skeels, Pamela	Strategic planning, Rocky Mountain Regional Office	Roadless Rule and EIS writing-editing, and roadless areas information	M.S., Forest and Range Management B.S., Forest Resource Management	36
Sorkin, Jeff	Air program, Rocky Mountain Regional Office	Air Resource	M.S., Environmental Science M.S., Public Affairs B.S., Zoology	11
Sporl, Chris	Recreation, Rocky Mountain Regional Office	Dispersed recreation and scenic resources	M.L.A., Masters of Landscape Architecture B.S., Horticulture	16
Swain, Ralph	Wilderness program, Rocky Mountain Regional Office	Wilderness and other congressionally designated areas	M.S., Natural Resource Management B.A., Marketing	28
Thinnes, Jim	Silviculture, Rocky Mountain Regional Office	Forest vegetation and health	Post- bac., Forest Engineering and Silviculture B.S., Natural Resource Management	30
Tu, Ken	Strategic planning, Rocky Mountain Regional Office	Process management	B.S. Forest Management	26
Warren, Nancy	Regional threatened, endangered and sensitive species program, Rocky Mountain Regional Office	Terrestrial habitat and species, including federally-listed species	M.S., Wildlife Management B.S., Wildlife Biology	30

Name	Organization	EIS Contribution	Education	Years of Relevant Experience
Wehrli, Christopher	Strategic planning, Rocky Mountain Regional Office	NEPA Review	B.A. Political Science	13
Winters, David	Aquatic ecology and fisheries program, Rocky Mountain Regional Office	Aquatic habitat and species, and reference landscapes	M.S., Zoology with an emphasis in Aquatic Biology B.S., Fishery Biology A.A.S., Fish and Wildlife Technology	22
Wilson, Janice E.	Geographic Information, Rocky Mountain Regional Office	GIS analysis and maps	B.A., Geography	26

Other Contributors to the EIS

The following people contributed to the EIS by providing oversight, guidance, document reviews, or other information to this Revised DEIS or the DEIS. This list includes their name, current office, and primary contribution or area of expertise. They are Forest Service employees except where otherwise noted.

Name	Primary Contribution	Office
Abing, Tim	Oil, gas and geothermal review	Rocky Mountain Regional Office
Bowden, Philip	Vegetation review	Pacific Southwest Regional Office
Briggs, Shane	Terrestrial wildlife review	Colorado Division of Wildlife
Burmark, Brad	Economic review	Pacific Southwest Regional Office
Carlson, Ann	Aquatic wildlife review	Northern Regional Office
Cawrse, David	Vegetation review	Washington Office
Ciapusci, Teresa Ann	EIS writing-editing	Coronado National Forest
Clark, David	Tribal consultation	Southwestern Regional Office
Cook, Richard	Process oversight/guidance	Washington Office
Cossette, Steve	Process oversight/guidance	Washington Office
Cox, Brian	Biological evaluations	Bureau of Land Management
DeBord, Karen	Vegetation review	Bureau of Indian Affairs
DeWitte, Vince	Legal compliance	Office of General Council-Washington Office
Dillon, Madelyn	Writing-editing/publishing	Publishing Arts-Washington Office
Duda, Joe	Vegetation review	Colorado Department of Forestry
Ernst-Ulrich, Gwen	Public involvement	Independent Resources, Washington Office
Friedman, Sharon	Process oversight/guidance	Rocky Mountain Regional Office
Garner, Elizabeth	Economic review	State of Colorado, Department of Local Affairs
Graham, Russell	Vegetation review	Rocky Mountain Research Station
Granger, Geneen	EIS writing-editing, comment processing and analysis	Southwest Regional Office
Houghton, Bonnie	Livestock management review	Rocky Mountain Regional Office
ICF- Jones and Stokes, Inc.	Public comment processing and analysis	ICF- Jones & Stokes, Salt Lake City, UT office
Jain, Terrie	Vegetation review	Rocky Mountain Research Station
Janik, Anne	Roadless area profile editing	GMUG National Forest
Johnson, Susan	Tribal consultation	Rocky Mountain Regional Office
Karkula, Ken	Process oversight/guidance	Washington Office
Karsteadt, Randy	Process oversight/guidance	Rocky Mountain Regional Office
Kurth, Jay	Vegetation review	Black Hills National Forest
LaPerriere, Monique	Copy-editing	Publishing Arts-Washington Office
Larkin-McKim, Kelly	Aquatic wildlife review & aquatics data	Arapaho-Roosevelt NF
LoSapio, Carol	Document formatting	Publishing Arts-Washington Office
Lui, Karen	Economic regulatory impact analysis	Washington Office
Martin, Thomas	Vegetation review	Intermountain Regional Office
McDonald, Peter	TES wildlife, ESA consultations	Rocky Mountain Regional Office
Miller, Chris	Economic regulatory impact analysis	Washington Office

Name	Primary Contribution	Office
Misztal, Adam	Aquatic and terrestrial wildlife review	US Fish and Wildlife Service
Mitchell, Veronica	Roads	Rocky Mountain Regional Office
Morgan, Edward	Vegetation review	Bureau of Indian Affairs
Nesler, Tom	Aquatic wildlife review	Colorado Division of Wildlife
Ogden, Cay	Terrestrial wildlife review	National Park Service
Overturf, Jeff	Cultural resources	Rocky Mountain Regional Office
Parker, Tracy	Saleable and locatable review	Washington Office
Page, Dennis	Vegetation review	Pike-San Isabel National Forest
Palmer, Kelly	Air resource	San Juan National Forest
Regan, Claudia	Ecology	Rocky Mountain Regional Office
Riffe, Mark	Copy-editing	Publishing Arts-Washington Office
Rinella, Steve	Lands	Rocky Mountain Regional Office
Rolofson, Bud	Air quality	Retired Forest Service
Rumbold, Ed	Aquatic wildlife review	Bureau of Land Management
Rupe, John	Forest planning and analysis	Rocky Mountain Regional Office
Skorkowsky, Robert	Migratory birds	Medicine Bow-Routt National Forest
Smith, Janelle	Public involvement	Rocky Mountain Regional Office
Stockmann, Keith	Economic review	Intermountain Regional Office
Supulski, Bill	Process oversight/guidance	Washington Office
Sutton, Jody	Comment analysis and responses	Washington Office
Wilson, Josh	Economic review	Forest Service, T.E.A.Ms
Witcosky, Jeff	Vegetation review	Rocky Mountain Regional Office
Woolever, Melanie	Terrestrial animal habitat and species	Rocky Mountain Regional Office

National Forest Coordinators

The following Forest Service employees were the primary contacts between the regional office planning team and the national forests in Colorado. They coordinated the data gathering and document reviews with appropriate national forest resource specialists and managers. The GIS staffs and other specialists on each forest contributed data throughout the planning process.

Name	National Forest Office
Dyer, Harold	Rio Grande National Forest
Gayton, Dyce	Arapaho-Roosevelt National Forest
Haskins, Wendy	White River National Forest
Howe, Carol	Grand Mesa, Uncompahgre, and Gunnison National Forests
Jewkes, Pamela	Manti-La Sal National Forest
Johnson, Mike	San Juan National Forest
Romero, Frank	Routt National Forest
Thibedeau, Ron	Pike-San Isabel National Forest

DISTRIBUTION OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

This section provides a list of the agencies and organizations that were sent copies of the EIS or notified of its availability on the Web. This list includes federal, state, and local governmental organizations, elected officials, and federally recognized tribes who submitted comments or requested to be on the mailing list for this EIS. It does not include the thousands of individuals on the mailing list who were also sent copies of the EIS or notified of its availability on the Web, depending on the preference they expressed in response to a Forest Service inquiry.

Government Agencies and Tribal Governments

Agencies

Access Board, U.S.

Advisory Council on Historic Preservation

Agriculture, U.S. Department of

- Animal and Plant Health Inspection Service (APHIS)
- Forest Service, Washington Office
- Forest Service, Rocky Mountain Regional Office
- Forest Service, Intermountain Regional Office
- Forest Service, Arapaho and Roosevelt National Forest
- Forest Service, Grand Mesa, Uncompahgre, and Gunnison National Forests
- Forest Service, Manti-La Sal National Forest
- Forest Service, Medicine Bow-Routt National Forest
- Forest Service, Pike and San Isabel National Forests
- Forest Service, Rio Grande National Forest
- Forest Service, San Juan National Forest
- Forest Service, White River National Forest
- National Agricultural Library
- Natural Resources Conservation Service
- Office of Civil Rights
- USDA/BLM Gunnison Resource Area

Air Force, U.S.

- Air Force Civil Engineer

Army Corps of Engineers, U.S.

- Washington Office
- Northwestern Division

Defense, U.S. Department of

Environmental Protection Agency, U.S.

- Office of Federal Activities
- EPA- Region 8

Federal Energy Regulatory Commission

Interior, U.S. Department of the

- Bureau of Land Management
- Gunnison Resource Area
- Fish and Wildlife Service
- National Park Service
- Black Canyon National Park
- Uncompahgre Field Office
- Office of Environmental Policy and Compliance

Army Engineer Division, U.S.

Colorado, State of

- Department of Public Health and the Environment
- Air Quality Commission
- Water Quality Commission
- Department of Natural Resources
- Division of Wildlife
- Division of Forestry
- Federal Lands Coordination
- Oil and Gas Conservation Commission
- State Land Board
- Department of Transportation
- Historical Office
- Office of Archaeology and Historic Preservation
- Northwest Colorado Council of Governors

Colorado Congressional Delegations, U.S.

City Governments

- U.S. Conference of Mayors

County Governments

- The 41 counties in Colorado with roadless area lands (listed in chapter 3-Social)

Energy, U.S. Department of

- Western Area Power Administration

National Oceanic and Atmospheric Administration

Navy, U.S.

- Chief of Naval Operations

Utah, State of

- Department of Natural Resources

Federally Recognized Tribes

Arapaho of Ft. Washakie WY	Cheyenne and Arapaho Tribes of OK
Hopi Tribe	Jicarilla Apache Nation
Navajo Nation	Northern Cheyenne Tribe
Ohkay Owingeh	Pueblo of Jemez
Pueblo of Nambé	Pueblo of Picuris
Pueblo of Pojoaque	Pueblo of San Ildefonso
Pueblo of Santa Clara	Pueblo of Taos
Pueblo of Tesuque	Pueblo of Zuni
Shoshone of Ft. Washakie, WY	So. Ute Indian Tribe of Ignacio, CO
Ute Mountain Tribe of Towaoc, CO	

Organizations

American Camping Association	American Farm Bureau Federation
American Counsel of Snowmobile Associations	American Forests
American Fisheries	American Hiking Society
American Geological Society	American Loggers Council
American Lands Alliance	American Mountain Guide Association
American Motorcyclist Association	American Rivers
American Petroleum Institute	American Society of Landscape Architects
American Sheep Industry Association	American Sportfishing Association
American Society of Travel Agents	Appalachian Mountain Club
American Water Works Association	Audubon Society, Grand Valley
Association of Partners for Public Lands	Backcountry Hunters & Anglers
Audubon Society, Arvada Valley	Blue Mesa 4 Wheelers
Backcountry Horsemen of America	Boy Scouts of America
Backcountry Snowsports Alliance	Californians for Western Wilderness
Boone and Crocket Club	Center for Biological Diversity
Buckmasters	Center for Plant Conservation
Camp Fire Club of America	Central Colorado Wilderness Coalition
Center for Native Ecosystems	Colorado Mining Association
Center for Water Advocacy	Colorado Oil and Gas Association
Colorado Environmental Coalition	Colorado Snowmobile Association
Colorado Mountain Club	Colorado Trout Unlimited
Colorado Ski Country USA	Colorado Wildlife Federation
Colorado Timber Industry Association	Conservation Force
Colorado Wild	Creepers Jeepers
Conservation Congress	Crested Butte Mountain Resort
Continental Divide Trail Alliance	Defenders of Wildlife

Crested Butte Mountain Bike Association
Cross Country Ski Areas Association
Domestic Petroleum Council
Earthjustice Legal Defense Fund
Ecological Society of America
Environmental Alliance for Senior Involvement
Environmental Defense
Environmental Working Group
Forest Conservation Council
Forest Landowners Association
Forest Resources Association
Forest World
Foundation for North American Wild Sheep
Four Corners Trail Club
Geological Society of America
Gold Prospectors Association
Great Old Broads for Wilderness
Greenpeace
Gunnison Trails NPO
High Country Citizen's Alliance
High Rocky Riders OHV Club
Indian Land Tenure Foundation
Institute for Culture and Ecology
International City and County Management Association
International Rights Of Way Association
Intertribal Timber Council
Jews of the Earth
Leave No Trace
Marina Operators Association of America
Methow Valley Backcountry Horsemen
Montana Wilderness Association
Mountain Studies Institute
National 4-H Council
National Association of Conservation Districts
National Association of State Trail Administration
National Coal Council
National Council of American Indians
National Forest Foundation
National Hardwood Lumber Association
Ducks Unlimited
Earthjustice
Elk Mountains Hikers Club
Environmental Coalition
Environmental Law Institute
Evergreen Audubon Society
Forest Guild
Forest Products Society
Forest Service Employees for Environmental Ethics
Fort Lewis College Environmental Center
Four Corners Backcountry Horsemen
Friends of the Earth
Girl Scouts of America
Grand Mesa Nordic Council
Greater Yellowstone Coalition
Gunnison Energy Corp
Heritage Conservation Program
High Country Motorsports, Inc.
Independent Petroleum Association of America
Indian Peaks Wilderness Alliance
Intermountain Forest Association
International Mountain Biking Association
International Snowmobile Manufacturers Association
Izaak Walton League
Kokopelli Bike Club
Maricopa Audubon Society
Maryland Ornithological Society
Mineral Policy Center
Mountain Coal Company
Mule Deer Foundation
National Audubon Society
National Alliance of Gateway Communities
National Association of State Park Directors
National Cattlemen's Beef Association
National Council for Science and the Environment
National Environmental Trust
National Governors Association
National Mining Association
National Parks Conservation Association

National Off-Highway Vehicle Conservation Council
National Petroleum Council
National Religious Partnership for the Environment
National Shooting Sports Foundation
National Speleological Society
National Stone, Sand, and Gravel Association
National Trust for Historic Preservation
National Wildlife Federation
Native American Rights Fund
Nature Serve
North American Pronghorn Foundation
Northwest Forestry Association
Ouray Trail Group
Outward Bound
Pacific Rivers Council
Pinchot Institute for Conservation
Powderhorn Resort
Quiet Use Coalition
Rocky Mountain Elk Foundation
Rocky Mountain Mineral Law Foundation
Salida Mountain Trails
San Juan Trail Riders
San Luis Valley Ecosystem Council
Sierra Club
Sierra Club, Rocky Mountain Chapter, Pikes Peak Group
Snowsports Industries America
Society for Ecological Restoration International
Society of American Foresters
Society of Range Management
Southern Rockies Ecosystem Project
The Access Fund
The American Land Conservancy
The Lands Council
The Nature Conservancy, Colorado
The Ocean Conservancy the Wild Foundation
Three Lakes Watershed Association
Travel Industry Association of America
Tri-State Generation & Transmission Association, Inc.
Trust for Public Land
National Recreation and Parks Association
National Rifle Association
National Ski Area Association
National Sporting Goods Association
National Tribal Environmental Council
National Wild Turkey Association
National Wildlife Refuge System
Natural Resources Defense Council
North American Grouse Partnership
Northern Colorado Trail Riders Association
Northwest Mining Association
Outdoor Industry Association
Oxbow Mining LLC
Partnership for the National Trails System
Plains Exploration and Production Company
Public Land Partnership
Resources for the Future
Rocky Mountain Land Use Institute
Safari Club International
San Juan Citizens Alliance
San Juan Wise Use Alliance
Sheep Mountain Alliance
Sierra Club, Colorado Chapter
Silver Institute
Society for Conservation Biology
Society for Historical Archaeology
Society of Mining, Metallurgy, and Exploration
Southern Environmental Law Center
Stewards of the Sequoia
The American Alpine Club
The Conservation Fund
The Nature Conservancy
The Nature Conservancy, Utah
Theodore Roosevelt Conservation Partnership
Trail Users Partnership
Tread Lightly
Trout Unlimited
Uncompahgre Valley Trail Riders
University of Wyoming- Department of Geology and

	Recreation
United Four Wheel Drive Association, Inc.	Vail Resorts, Inc.
Upper Arkansas Motorized Recreation Coalition	Western Environmental Law
Western Colorado Congress	Western Governors Association
Western Fire Ecology Center	Western Lands Project
Western Land Group	Western Organization of Resource Councils
Western Native Trout	Wild Connects Upper Arkansas, South Platte Project
Western States Tourism Council	Wild Wilderness
Wild Earth Guardians	Wilderness Land Trust
Wildlands Center for Preventing Roads	Wilderness Society, Central Rockies Region
Wilderness Society	Wildlands CPR
Wilderness Workshop	Wildlife Habitat Council
Wildlaw	Willsource Enterptise, LLC
Wildlife Management Institute	World Resources Institute
Winter Wildlands Alliance	

CHAPTER 5. REFERENCES CITED

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