# ROADLESS AREA CONSERVATION: NATIONAL FOREST SYSTEM LANDS IN COLORADO,
# Proposed rule

## Regulatory Impact Analysis
**And**
## Cost-Benefit Analysis

**USDA Forest Service**

**February 3, 2011**

TABLE OF CONTENTS

**EXECUTIVE SUMMARY** ..... **1**

**BACKGROUND** ..... **28**

**CHANGES BETWEEN THE DRAFT EIS (2008) AND THE REVISED DEIS (2010)** ..... **29**

**PURPOSE AND NEED** ..... **32**

**PROPOSED RULE AND ALTERNATIVES** ..... **33**

*Description of Roadless Area Boundaries* ..... 33
*Description of Alternatives* ..... 34

**IMPLICATIONS OF RELATED PLANNING EFFORTS AND FEDERAL DIRECTION** ..... **50**

**METHODS, DATA, AND ASSUMPTIONS** ..... **53**

Scope of Analysis ..... 53
*Benefits and Costs* ..... *54*
*Distributional Effects* ..... *55*
Baseline Description and Assumptions ..... 59
Time Frame and Geographic Scope ..... 59
Data Sources ..... 59

**ANALYSIS AREA FOR ROAD CONSTRUCTION AND TREE-CUTTING PROJECTIONS** ..... **60**

Road Construction and Reconstruction (roading) ..... 61
Tree-cutting and Removal ..... 66

**BENEFITS AND COSTS** ..... **67**

Overview of Benefits Associated with Roadless Areas ..... 67
Preferences and Values Affected by Alternatives ..... 68
Analysis of Local Resource Concerns ..... 70
*Timber (Wood Products) Supply* ..... *70*
*Minerals and Energy* ..... *71*
*Compliance with Executive Order 13211 (Statement of Energy Effects)* ..... *88*
*Forest Vegetation and Health* ..... *91*
*Fire Ecology and Fuels* ..... *96*
*Public Health and Safety* ..... *105*
*Special Use Authorizations: Non-Recreational* ..... *106*
*Ski Areas* ..... *113*
*Other Resources, Services, and Programs* ..... *115*
Analysis of Roadless Area Characteristics ..... 116
*Scenic Quality* ..... *116*
*Wilderness and Recommended Wilderness* ..... *121*
*Other Congressionally or Administratively Designated Areas and Trails* ..... *124*
*Soils, Water, and Air* ..... *125*
*Threatened, Endangered, and Sensitive Species* ..... *132*
*Biodiversity* ..... *151*
*Invasive Plants* ..... *152*
*Recreation* ..... *156*
*Recreation Special Uses* ..... *160*
*Other Resources, Services, and Programs* ..... *161*
Agency Costs and Revenues ..... 163

**DISTRIBUTIONAL EFFECTS** ..... **166**

Economic Impacts ..... 166
*Economic Profile* ..... *167*

*Values at Risk from Wildfire* ..... *169*
*Economic Impacts: Oil, Gas, and Coal Production* ..... *174*
LOCAL GOVERNMENTS ..... 178
*Mineral Lease Payments* ..... *178*
*Other Revenue Sharing* ..... *184*
*Fuels Treatments* ..... *184*
*Other Community Impacts* ..... *197*
**REFERENCES ..... 197**

**Executive Summary**

In November 2006, Colorado Governor Bill Owens petitioned the Secretary of Agriculture to undertake rule-making requesting certain management direction and flexibility for National Forest System (NFS) roadless areas in Colorado. In April 2007, Governor Ritter resubmitted the petition with a substantive letter of transmittal, and in June 2007, the State and the U.S. Forest Service presented the petition with some modifications to the Department of Agriculture's Roadless Area Conservation National Advisory Committee (RACNAC). In August 2007, based on the advisory committee's review and report, 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. Based on the petition, the State and the Forest Service collaboratively developed the rulemaking (regulatory) language for a proposed Colorado Roadless Rule that would govern management of roadless areas on NFS lands in Colorado. The draft rule was published July 25, 2008 (FR Vol 73, No. 144, p. 43544) with solicitation of public comment on the proposed rule as well as the draft Environmental Impact Statement (draft EIS). Based on public comment and additional meetings with RACNAC and the State, the provisions of a proposed rule have been revised, in preparation for the publication of a revised version of a Colorado Roadless rule.

This report summarizes the regulatory impact analysis for the proposed Colorado Roadless Rule (proposed rule) as directed by Executive Order (E.O.) 12866 issued September 30, 1993, on Regulatory Planning and Review. These executive orders address regulatory planning and review and require that agencies conduct a regulatory analysis for economically significant regulatory actions. Significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors. Office of Management and Budget (OMB) Circulars as well as guidance regarding E.O. 12866 indicate that regulatory impact analysis should include benefit cost analysis and an assessment of distributional effectsTotal annual output associated with oil, gas, and coal production in the affected areas is projected to be approximately $970 million under the proposed rule, compared to approximately $1,030 million under baseline conditions, implying the annual impact of the proposed rule is estimated to be a decrease of approximately $60 million for energy mineral sectors. Due to the potential magnitude of economic impacts and the level of interest in inventoried roadless area management, the proposed rule is designated as significant and is therefore subject to E.O. 12866.

The proposed rule is programmatic in nature and intended to guide future development of proposed actions in roadless areas. The proposed rule is intended to provide greater management flexibility under certain circumstances to address unique and local land management challenges, while continuing to conserve roadless values and characteristics. Increased management flexibility is primarily needed to reduce hazardous fuels and large-scale insect and disease outbreaks, to allow access to coal reserves in the North Fork coal mining areas, and to allow access to future utility and water conveyances, while continuing to conserve roadless area values and characteristics. 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 in roadless areas. Before authorizing land use activities in roadless areas, the Forest Service must complete a more detailed and site-specific environmental analysis pursuant to the National Environmental Policy Act (NEPA) and its implementing regulations at

40 CFR 1500-1508. Because the proposed rule does not prescribe site-specific activities, it is difficult to predict changes in benefits under the different alternatives. It should also be emphasized that the types of benefits derived from uses of roadless areas in Colorado are far ranging and include a number of non-market and non-use benefit categories. As a consequence, benefits are discussed qualitatively in many sections of this report.

Details about the environmental effects of the proposed rule can be found in the revised draft environmental impact statement (RDEIS) for the proposed rule (USDA Forest Service, 2010), as well as 'specialist' reports developed to support the effects summarized in the RDEIS. The environmental effects for a number of resources are not significantly different across alternatives and are therefore not discussed in detail in this regulatory impact analysis; the reader is again referred to the RDEIS for details about these resource areas. The following changes have occurred since the release of the initial DEIS in 2008:

- The No Action Alternative has changed from Alternative 1 (2001 rule) to Alternative 3 (Forest Plan Direction). 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 have changed. In the revised DEIS the "no action" or baseline conditions means that IRAs in Colorado will be managed according to direction set forth in the applicable forest plan (alternative 3).
- Effective date of Alternative 1 (2001 rule) is the effective date of the Colorado rule,
- Changes in the language of the proposed Colorado Roadless rule include:
  - Changes in roadless area boundaries: 1,000 acres from the Indian Peaks Adjacent Area Roadless Area (now Wilderness) are removed. A net increase of approximately 155,000 acres to be managed as Colorado Roadless Areas (CRAs) under alternative 2;
  - New requirements regarding regional forester responsibilities for making tree-cutting determinations;
  - The proposed rule uses the term Community Protection Zone (CPZ) instead of Wildland Urban Interface (WUI) to describe 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. 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. A temporary road can only be constructed within the first ½ mile of the CPZ to facilitate the projects (unlike previous allowances for construction within 1.5 miles);
  - Tree-cutting, sale or removal in Colorado Roadless Areas must maintain or improve one or more roadless area characteristics;
  - Tree-cutting, sale or removal is allowed within the CPZ or outside of the CPZ with Regional Forester concurrence where needed to suppress or prevent an insect or disease epidemic once four factors have been considered;
  - Linear Construction Zones (LCZs) and linear facilities have been defined and addressed as 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. The proposed Colorado Roadless Rule generally prohibits the construction of LCZs unless

the construction relates to a water conveyance structure, electrical power line or telecommunication line or oil and gas pipeline;

- Road construction in support of water conveyance structures, including reservoirs, is only allowed for those that have a pre-existing water court decree as of the effective date of the Rule;
- The North Fork Coal Mining area exception for road construction has changed. Approximately 9,000 acres of the Currant Creek CRA remains as CRA acreage but no longer allows temporary roads;
- Any road construction or LCZ construction must not diminish existing native cutthroat trout habitat;
- The Colorado Roadless Rule has identified Colorado Roadless Areas upper tier acres and provided a set of draft acreage and prohibitions for these acres for public comment. Tree-cutting, sale or removal is prohibited unless the Regional Forester determines it is needed incidental to the implementation of a management activity not otherwise prohibited by the rule. Road construction or road reconstruction is prohibited unless it is needed pursuant to reserved or outstanding rights or as provided for by statute or treaty. Alternative 2 identifies 257,400 upper tier acres with an additional 304,900 acres being considered as upper tier; and
- The term "long-term temporary road" has been eliminated from the Colorado Roadless Rule.

A fourth alternative (Alternative 4) has been added with the same prohibitions and exceptions as alternative 2 but with a larger number of upper tier acres (2,614,200) within the CRAs.

*Methods and Assumptions*

This report summarizes the benefits, costs, and distributional effects of four alternatives referred to as follows: alternative 1 - the 2001 Roadless Rule (2001 rule), alternative 2 - the proposed Colorado Roadless rule (proposed rule), and alternative 3 – forest plan direction (forest plans; no action); and alternative 4 – proposed Colorado Roadless rule with additional public proposed upper tier acreage.

National Forest System (NFS) lands provide a variety of goods and services to the American public. Use of the national forests (NFs) and grasslands for both commodities and amenity services varies over time in response to changing market conditions, consumer preferences, and other factors. In general, the proposed rule indirectly affects the provision of those commodities and services (including non-use values) by altering the circumstances under which road construction and reconstruction (roading), as well as tree-cutting, are permitted in roadless areas on NFS lands in Colorado.

The State's original petition also requested that the rulemaking process use the most updated roadless boundaries and that all existing congressionally designated areas (e.g., wilderness) be removed from roadless areas for all alternatives. In addition, the Colorado roadless areas (CRAs) under the proposed rule exclude ski areas and current inventoried roadless areas that do not meet roadless criteria (referred to as substantially altered areas), but include new roadless acres that meet roadless criteria. As a consequence of these adjustments, inventoried roadless areas (IRAs) under the 2001 rule and the forest plan alternative are approximately 4.24 million acres, while Colorado roadless areas (CRAs) under the revised proposed rule cover approximately 4.19

million acres. The IRAs described in the original environmental analysis for the 2001 rule covered approximately 4.43 million acres.

For the purpose of regulatory impact analysis, Alternative 3 (Forest Plans) represents baseline conditions or goods and services provided by NFS lands in the near future in the absence of the proposed rule.

Because the proposed rule does not prescribe site-specific activities, it is difficult to predict the benefits and costs of the different alternatives. In addition, the types of benefits derived from roadless characteristics and the uses of roadless areas are far ranging and include a number of non-market and non-use benefit categories that are difficult to measure in monetary terms. As a consequence, benefits are not monetized, nor are net present values or benefit cost ratios estimated. Instead, increases and/or losses in benefits are discussed separately for each resource area in a quantitative or qualitative way. Benefits and costs are organized and discussed in the context of local land management challenges or concerns ("local challenges") and "roadless characteristics" in an effort to remain consistent with the overall purpose of the proposed rule, recognizing that benefits associated with local challenges may trigger or overlap with benefits associated with roadless characteristics in some cases (e.g., forest health). Access and designations for motorized versus non-motorized recreation is a topic raised in comments during scoping, however, the proposed rule does not provide direction on where and when off-highway vehicle (OHV) use would be permissible other than roads constructed pursuant to the rule are closed to motor vehicles, including OHVs, unless specifically used for the purpose for which the road was built. Other travel planning-related actions should be addressed through travel management planning and individual land management plans.

The assessment of benefits and costs begins by distinguishing between the *creation of potential opportunities* and the *projection of reasonably foreseeable activities*. Potential opportunities for generating goods and services are affected by the extent to which activities are permitted in roadless areas under each alternative. Projections of reasonable foreseeable activities take into account area-specific data and evidence regarding resource utilization and development trends, location of resources, and other factors affecting the likelihood that land will be used for specific uses. This information is aggregated into assumptions about reasonably foreseeable flows of goods (e.g., coal, oil and gas production), services (e.g., reduction of risks from wildfire in the wildland urban interface), and resource utilization and then used to project activity levels (tree-cutting, roading) for each alternative over a 15 year time period. Projected activity levels can also be used as indicators of potential changes in benefits derived from roadless characteristics. Details about the derivation of activity projections are described in the RDEIS for the proposed rule (USDA Forest Service 2010), as well as the resource specialist reports supporting the RDEIS, and are not reiterated in this regulatory impact analysis document.

Distributional effects or economic impacts, in terms of jobs and labor income, are quantified for the oil and gas and the coal sectors for an economic area consisting of five Colorado counties (Delta, Garfield, Mesa, Montrose, and Rio Blanco) using a regional impact model. Fiscal impacts (i.e., mineral lease payments) are estimated for counties where changes in mineral activity are expected to be physically located (Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin). The distributional effects associated with reducing wildfire hazard are characterized by estimating the extent to which CPZ areas (i.e., 0.5 to 1.5 mile buffer areas surrounding communities at-risk from wildfire) overlap roadless areas where tree-cutting for fuel treatments has been identified as

being likely to occur. Distributional effects or economic impacts are not evaluated for other economic sectors (e.g., timber harvest, recreation) due to evidence presented in respective resource sections suggesting that the extent or magnitude of changes in output or services are not sufficient to cause significant changes in distributional effects.

The analysis area adopted for this Regulatory Impact Analysis is equivalent for all alternatives (4,653,100 acres) to facilitate comparison of effects. However, the portion of the analysis area managed as roadless differs across alternatives; inventoried roadless areas (IRAs) under alternative 1 (forest plans) amount to 4,243,600 acres while Colorado roadless areas (CRAs) are estimated to be 4,186,000 acres under alternatives 2 (proposed rule) and 4 (proposed rule with additional upper tier acreage).

*Local Resource Challenges*

Local resource challenges include reducing the hazard to communities, property, and resources of wildfire; managing forests to reduce the adverse effects of insects and disease; and providing access for commodity production, special uses, and other desirable services (Tables E.1, E.2, and E.3).

Projected levels of treatment involving tree-cutting within the analysis area, are greatest under the forest plans alternative (16,900 acres per year; 253,500 acres over 15 years) followed by the proposed rule (7,000 acres per year; 105,000 acres over 15 years), Alternative 4 (3,000 acres per year; 45,000 acres over 15 years), and the 2001 rule (2,300 acres per year; 34,500 acres over 15 years). The potential timber harvest volumes associated with tree-cutting are likely to differ across alternatives, but these differences are not anticipated to result in significant impacts to the wood products and forest service sectors.

Approximately 14 percent (600,000 acres) of roadless areas in Colorado are considered high risk for insect and disease mortality. Alternative 1 provides limited opportunities to address high risk acres with only 500 acres per year (7,500 acres over 15 years) of treatments directed towards forest health and protection against insect and disease outbreaks. Alternative 2 provides increased treatment opportunities (1,000 acres per year; 15,000 acres over 15 years) to improve resiliency to insect and disease outbreaks, particularly in Ponderosa pine and Douglas-fir stands as well as community protection zones (CPZs) compared to alternatives 1 and 4, but treatment options remain limited in many roadless areas. Alternative 3 provides the most opportunities to maintain forest health and improve resiliency against insects and disease with 3,500 acres per year of treatments projected (52,500 acres over 15 years) but opportunities are still limited in many areas. Treatment opportunities for resiliency under alternative 4 are greater than alternative 1 but less than alternatives 2 and 3.

Other potential changes to forest or rangeland vegetation in the roadless areas include short-term, localized changes in vegetation composition, structure and function related to increases in roads and tree-cutting activities. Long term, more widespread improvements in forest and rangeland health would be more pronounced under the forest plans alternative and lowest under the 2001 rule, with the proposed rule and alternative 4 somewhere in between. There would be no expectation that the boundary differences in CRAs under the proposed rule would have a measurable impact on the opportunities to conduct treatments with the exception that a total of

600 out of 1,000 acres treated, are projected to occur in substantially altered areas (these treatments are also projected under the forest plans alternative).

Fuel reduction treatments on all NFS lands in Colorado average approximately 64,000 acres per year. The 2001 rule provides the lowest probability of conducting hazardous fuel and forest health treatments in roadless areas, and least likelihood of reducing wildfire hazards to at-risk communities in and adjacent to roadless areas. Approximately 3 percent of annual fuel treatments on NFS lands in Colorado could occur in the analysis area under the 2001 rule. Treating 27,000 acres (<1 percent) of the 4.24 million acres in IRAs would not result in a significant reduction in wildfire hazard to many of the more than 600 at-risk communities that lie within the vicinity (3 miles) of an IRA.

The proposed rule and the forest plans alternative both provide flexibility to prioritize where hazardous fuel and forest health treatments would occur in CRAs, and the associated ability to reduce the high-severity wildfire threats to communities and municipal watersheds that lie near the roadless areas. For the proposed rule, hazardous fuel reduction treatments, including tree-cutting, are permitted to occur in CRAs if they are within Community Protection Zones (CPZs) and are consistent with forest plan direction. Approximately 9 percent of annual treatments on all NFS land in Colorado could occur in the analysis area under the proposed rule. Treating 88,000 acres over 15 years offers more opportunity for improving fuels and fire management effectiveness and could result in significantly more fuels and fire hazard reduction compared to the 2001 rule. The proposed rule would result in reduced hazard for at-risk communities and other values in proximity to the CRAs. The forest plans alternative offers the greatest opportunity to reduce wildfire threats to values at risk. When compared to the average of 64,000 acres annually treated on all NFS lands in Colorado, the 13,100 acres projected to occur in the analysis area could represent 20 percent of the total NFS acres treated annually in Colorado. Treating 196,500 of the 4.25 million acres in areas currently inventoried as roadless (IRAs) could result in reducing the fuel hazard on a significant portion of the total in IRA acreage, offering the greatest opportunity to improve fuels management effectiveness. Options for fuel treatments under alternative 4 are similar to alternative 1 where tree-cutting is projected for 2,200 acres or approximately 3% of total annual fuel treatments on NFS land within Colorado. However, due to the large number of upper tier acres under Alternative 4, fuel treatments would not be possible on 48% to 52% of CPZs within roadless areas. In contrast, fuel reductions would not be possible on 12% to 13% of CPZs under the proposed rule (under which fewer acres are classified as upper tier).

Mineral and energy resources (oil and gas, coal, geothermal) from roadless areas can be of substantial value, and road access for exploration and development can affect future development of these resources. Under the 2001 rule, roads would be allowed in IRAs on oil and gas leases that were issued before the effective date of this rule, and those leases allowed for road construction; foreseeable development and production would be limited to 132,000 leased acres on 19 IRAs on the Grand Mesa-Uncompahgre-Gunnison (GMUG), San Juan, and White River NFs (i.e., areas in the Piceance Basin). Under the proposed rule, as well as Alternative 4, roading would be allowed on oil and gas leases that allow surface occupancy and are issued before the proposed Colorado Roadless Rule becomes effective. Forseeable production could occur on 136,700 acres of leased acres on 20 CRAs on the same forests, similar to Alternative 1. Under the forest plans alternative, roading would be allowed on existing and future oil and gas leases where roads are allowed under lease terms and stipulations. Foreseeable production under the

forest plans alternative could occur on 173,100 leased acres on 19 IRAs. Based on these conditions, the forest plans alternative would have slightly more roads, oil and gas wells, and related infrastructure in roadless areas, and corresponding opportunity for oil and gas development and foreseeable production. A total of 783 wells (11 miles of roads constructed or reconstructed annually) are projected in the analysis area over a 15 year period with access to 1,154 billion cubic feet of gas (bcfg)) under Alternative 3. The 2001 rule, the proposed rule, and Alternative 4 are all projected to have equal oil and gas production with 686 wells (9 to 10 miles of roads constructed or reconstructed annually) and access to 1,046 bcfg over 15 years.

Under the 2001 rule, roading in IRAs would be allowed on coal leases issued prior to the effective date of this rule, and prohibited on coal leases issued after that date; foreseeable production opportunities would be limited to 8,600 acres of road-accessible coal reserves (157 million tons) involving approximately 16 miles of roads constructed or reconstructed (7 miles in IRAs) over a 15 year period (157 million tons) in the West Elk IRA in the GMUG NFs. Under the proposed rule, as well as Alternative 4, roading would be approved pursuant to existing and future coal leases and coal exploration licenses in CRAs in the North Fork coal mining area on the GMUG NFs; foreseeable production opportunities would be limited to 27,900 acres of road-accessible coal reserves (514 million tons) involving approximately 52 miles of roads (50 in CRAs) over a 15 year period in the same areas. Under the forest plans alternative, roading could be approved on existing and future coal leases and exploration licenses in IRAs; reasonably foreseeable production opportunities would exist on 39,600 acres of coal reserves (724 million tons) involving 73 miles of roads over a 15 year period on the GMUG NFs. Consideration could also be given to non-quantified reserves on 46,000 acres in the Pagosa Springs coalfield on the San Juan NF, as well as the unexplored and unleased coal resources on the Pike and San Isabel, Routt, and White River NFs.

The forest plans alternative would have the highest potential for geothermal resource development in roadless areas because most land management plans do not prohibit roading in the roadless areas for such development. Geothermal development would not occur in roadless areas under the 2001 rule, the proposed rule, or alternative 4 because of prohibitions on road construction for this purpose. There are no current leases or lease applications for geothermal development on NFS lands in Colorado. A programmatic environmental impact statement (EIS) is underway to address the potential for geothermal resources on NFS land in Colorado.

The Forest Service will continue to respond, under all alternatives, to all potential public health and safety situations in roadless areas. Under the 2001 rule, the lower number of road miles projected to occur in roadless areas would continue to be more limiting regarding responsiveness and timeliness to emergency health and safety situations. Under the proposed rule, Alternative 4, and to a greater extent under the forest plans alternative, increases in road miles projected to occur in roadless areas could facilitate responses to emergency health and safety situations. However, upper tier acres in Alternatives 2 and 4 do not have a specific public health and safety exception for road construction, as does Alternative 1.

In Colorado, there are approximately 3,900 lands-related special use authorizations on NFS lands authorized to individuals, business entities, State and local governments, and other Federal agencies. These uses include, but are not limited to reservoirs, monitoring stations, communication sites, electric transmission, oil and gas pipelines, and water conveyance. All alternatives allow for continuation or renewal of existing authorizations in roadless areas. A draft

programmatic EIS (Department of Energy, Bureau of Land Management (BLM)) regarding designated energy corridors on Federal lands does not indicate that corridor designations would go through IRAs or CRAs.

Special use authorizations for oil and gas pipelines, electrical and telecommunications lines, and water conveyances issued prior to the effective date of this rule are unaffected under all alternatives. However, under Alternative 1, future authorizations (i.e., after the effective date of this rule) would generally prohibit roads by allow linear construction zones (LCZs), including for oil and gas pipelines from lease areas outside of IRAs. Approximately 3.2 miles of LCZs per year are projected under Alternative 1 for these types of special use authorizations. Opportunities for future authorizations related to these types of uses are similar for alternatives 2 and 4, however allowances for LCZs are more limiting – including the requirement that LCZs be allowed only if it can be shown that greater environmental damage would occur by constructing lines or conveyances around CRAs. Alternatives 2 and 4 also prohibit LCZ and road construction for other types of future special use authorizations (i.e., other than OG pipelines, electrical/telecommunication lines, and water conveyances). Similar to Alternative 1, 3.2 miles of LCZs per year are projected under Alternatives 2 and 4. Road and LCZ construction would generally be allowed for a variety of future special use authorizations under Alternative 3, except where prohibited under management plans. Approximately 3.6 miles of LCZs per year are projected under Alternative 3.

Ski resorts are one of the major land use authorizations permitted on NFS lands in Colorado. The 2001 rule would limit opportunities for ski area development (road construction, tree-cutting) for those acres associated with ski areas that are in roadless areas that were not authorized in a permit prior to the effective date of this rule. As a result, development may occur on 6,600 acres in IRAs across multiple ski areas, but road construction and tree-cutting would be prohibited on 1,700 acres allocated for skiing under plans but outside of existing permits. Under the proposed rule and Alternative 4, the ski areas that are currently in IRAs would not be included in the CRAs. This would allow road construction and tree-cutting on the additional 1,700 acres outside of existing permits. Under the forest plans alternative the potential to construct roads and cut trees in IRAs in ski areas would be the same as under the proposed rule. Authorization of roads in developed ski areas might facilitate the implementation of required ski area vegetation management plans to improve forest health, remove hazard trees, and manage fuels.

The proposed rule is not expected to have a significant impact on other local resource issues or concerns including livestock grazing, saleable minerals, other leasable minerals, or locatable minerals.

*Roadless Characteristics*

Roadless characteristics include high quality soil, water (including drinking water), and air; plant and animal diversity; habitat for sensitive species; reference landscapes and high scenic quality; primitive and semi-primitive recreation; cultural resources; and other locally identified unique characteristics (Table E.2). Potential effects to roadless characteristics in the next 15 years are expected to be a function, in part, of the levels of roading, tree-cutting, and energy resource activity that are projected to be reasonably foreseeable during that time.

Overall, minimal direct effects to roadless area characteristics from tree-cutting and road construction or reconstruction are expected under the 2001 rule (Alternative 1) because there is little activity projected to occur on 88 - 89% of IRA acres. Some risk of adverse effects to

roadless area characteristics from the construction of LCZs is possible under the 2001 rule, and there would be no regulatory protection of roadless characteristics on 409,500 acres currently outside of IRA boundaries that exhibit roadless characteristics.

Under the proposed rule (Alternative 2), minimal direct effects to roadless area characteristics are expected because there is little activity projected to occur on 98% of CRA acres. The proposed rule has the lowest risk of adverse effect to roadless area characteristics from LCZ construction as this activity is generally restricted, and regulatory protection of roadless area characteristics on an additional 409,500 acres within CRA boundaries is provided under the proposed rule. The direct effects of Alternative 4 (proposed rule with additional public proposed upper tier acres) on roadless characteristics are similar to the proposed rule, recognizing that little activity is projected to occur on 99% of CRAs.

In general, the forest plans alternative (Alternative 3) has the potential to pose the greatest direct risk to roadless area characteristics because there are no regulatory prohibitions on road construction or tree-cutting, sale or removal in areas that have roadless characteristics within the analysis area. Approximately 10% of the analysis area is currently substantially altered; an additional 5% has projected activities in next 15 years; and 85% will retain roadless area characteristics under the forest plans alternative. No regulatory protection of roadless area characteristics other than that described in forest plans and the Forest Service Manual (FSM) is provided.

Some of the direct adverse effects of increasing levels of tree-cutting and road construction on roadless characteristics under alternatives 4, 2, and 3 respectively may be offset in the long-run by the indirect beneficial effects of the vegetation treatments facilitated by the projected activities. Forest health and fuel treatments are designed to help increase resiliency to insect and disease outbreaks, reduce the ecological and social hazards of high severity wildfires, and improve other resource conditions that can contribute to roadless characteristics. More details about potential short and long-term effects to roadless characteristics under each alternative are presented below.

Roadless area characteristics and values typically include “natural-appearing landscapes with high scenic quality. The CRAs currently have a high degree of scenic integrity. The 2001 rule would retain the greatest number of roadless area acres at high to very high scenic integrity levels; scenic quality would remain largely unaltered. Many substantially altered area acres would continue to reflect moderate to low scenic integrity levels, inconsistent with general roadless area characteristics and values. The proposed rule would retain the majority of CRAs at high to very high scenic integrity levels, including upper tier acres. Projected levels of road construction and other activity could result in a higher potential than the 2001 rule for portions of roadless areas to shift to a moderate to low scenic integrity levels. Substantially altered landscapes would not be included in the CRAs and would therefore not detract from scenic integrity in designated roadless areas. The new unroaded areas included in CRAs would likely add to the number of areas protected at high to very high scenic integrity levels compared to the forest plans alternative. Tree-cutting associated with treatments under Alternative 2, as well as other alternatives, may have long-term beneficial impacts on scenic quality. The forest plans alternative would retain fewer acres in the IRAs at the current high to very high scenic integrity levels, compared to the other alternatives. More portions of IRAs would gradually shift to a moderate to low scenic integrity level due to the levels of projected activity. The effects of

alternative 4 are likely to be similar to alternative 2 but with slightly reduced risk from projected activities and greater potential for high scenic integrity in the larger number of upper tier acres. Overall, tree-cutting and road construction activities occur on a relatively small percentage of total roadless acres, implying scenic quality in large portions of roadless areas will be unaffected. Potential effects would be moderated under all alternatives through project-level compliance with scenic integrity and visual quality objectives specified in land management plans.

There are a total of 35 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 457,000 acres in 14 IRAs have been recommended for wilderness in land management plans. None of the three alternatives, including the proposed rule, will have a direct effect on designated wilderness, because these areas are outside of IRAs or CRAs. The effects to areas recommended as wilderness in land management plans, likewise, do not differ across alternatives, because land management plans generally prohibit road construction and tree-cutting and removal activities in those areas. The 2001 rule generally prohibits tree cutting and road building in IRAs and would therefore be least likely to result in effects that detract from wilderness characteristics in the adjacent wilderness areas. The restrictions on activities in IRAs under the 2001 rule provide a greater opportunity to maintain future options for new recommendations of roadless acres as wilderness. The activity prohibitions under the proposed rule and Alternative 4 would minimize the potential risk of detracting from wilderness characteristics or experience in adjacent wilderness areas, but projected activity levels, including coal mining, could increase risks compared to the 2001 rule. Projections of increased activity could also reduce the number of roadless acres that might support future wilderness recommendations. The risk of detracting from wilderness characteristics in adjacent wilderness areas would be highest under the forest plans alternative. This alternative could also potentially create the greatest reduction in the number of roadless acres that would be capable of supporting new wilderness recommendations. Inclusion of 562,300 and 2.6 million CRA acres in upper tiers under alternatives 2 and 4 respectively may help establish a uniform management approach for recommended wilderness, recognizing that upper tier selection is not based on wilderness criteria.

There are portions of a congressionally designated wild and scenic river (Cache la Poudre river), and a National Scenic Trail in roadless areas. None of the alternatives would directly impact the congressionally designated trail, and none of the alternatives would directly impact the stretches of the wild and scenic river corridor classified as “wild” or “recreation,” because the statute designating the river is equally or more restrictive. Due to similar statutory precedence, none of the altenatives would alter the management or scenic values of the Continental Divide National Scenic Trail. However, there could be indirect effects from projected activity levels under the various alternatives on the characteristics and values of adjacent designated areas. Road construction and tree-cutting are not projected to occur on Research Natural Areas (RNAs) or Special Interest Areas (SIAs) under any alternative. Some land management plans allow roads or facilities to be built in RNAs or SIAs, although the values for which the area was established would need to be maintained.

Soil disturbance from road construction and other ground-disturbing activities can affect the soil resource by increasing erosion, compaction, and other soil quality conditions. The potential for adverse impacts on the soil resource in roadless areas would differ slightly among the

alternatives based on different levels of projected roading, tree removal, and energy resource development activities. The 2001 rule and Alternative 4 would have the least potential for adverse impacts, and the forest plans alternative would have the greatest potential for adverse soil impacts. However, the differences among alternatives would be insignificant because effects from those projected activities would be mitigated through the use of site-specific analysis, watershed conservation practices, and other best management practices (BMPs), including post-project rehabilitation of disturbed soil. The risk of post-fire soil erosion may be highest under alternative 1 and lowest under alternative 3 as a result of projected fuel treatment activity. Impacts would also be limited in geographic extent and would be distributed over many different roadless areas. Thus, the actual effects on soil quality would be minor and of short duration.

The relative differences in potential water quality impacts in roadless areas under any of the alternatives would be negligible. The 2001 rule would have the least risk of adverse effects on water quality, while the proposed rule and alternative 4 would have a slightly higher risk, followed by the forest plans alternative with the greatest risk of adverse impacts in the roadless areas. However, actual impacts on water quality anticipated from any alternative would be small in magnitude and scattered over a wide geographic area. Most of the potential effects would be of short duration, with disturbed soil areas rehabilitated after projects are completed in those areas. Future activities under the alternatives are not expected to cause exceedences of water quality standards or contribute to the list of impaired water bodies. Increasing levels of projected fuel treatment activity under alternatives 2, 4, and 3 respectively are expected to help decrease risks to water quality and municipal water supplies from floods and sedimentation resulting from wildfire.

There is no major difference in the projected effects on air quality among the alternatives. One minor difference is related to potential smoke-related impacts from wildfires, which would be more likely to occur in roadless areas under the 2001 rule, and least likely to occur under the forest plans alternative. There are projections of methane gas emissions that would contribute to cumulative amounts of greenhouse gases in the atmosphere. However, the methane would dissipate to such diluted concentrations as to be insignificant.

Threatened and endangered (T&E) species are listed by the US Fish and Wildlife Service to satisfy the goals of the Endangered Species Act (ESA), while *sensitive* plant species are designated by a regional forester for which population viability is a concern. One T&E and 44 sensitive plant species are known or likely to occur in roadless areas in Colorado. The alternatives do not substantially differ in their estimated effect on T&E plant species, because no additional roading, tree-cutting, or energy development activities are projected to occur in the portions of roadless areas that support T&E plants. The only difference among alternatives in the risk to T&E plants is related to potential increases in risk under Alternative 4, the proposed rule, and the forest plans alternative, compared to the 2001 rule, from invasive plants spreading into T&E plant communities. The risk of impact on sensitive plants could be progressively higher under Alternative 4, the proposed rule, and the forest plans alternative compared to the 2001 rule primarily because of (a) the higher likelihood of increases in invasive plants spreading into sensitive plant communities, and (b) the higher likelihood of inadvertent mistakes that may be made during project implementation. These differences in risk are correlated with the differences in the amount of projected activities in roadless areas that support sensitive plants. However,

none of the alternatives are expected to result in the loss of viability, nor cause a trend toward federal listing of sensitive species due in part to site specific design criteria and mitigation measures designed to minimize risk. In contrast to potential adverse effects from projected activities, some management actions (e.g., forest health treatments) in roadless areas could benefit sensitive plants over the long term, even if there are short-term adverse impacts.

One T&E fish species, five sensitive fish species, six management indicator fish species (MIS) (MIS are identified in a forest plan as an indicator of management effectiveness), one aquatic mammal MIS (American beaver), and an array of benthic invertebrate MIS are known or likely to occur in roadless areas in Colorado. There are also aquatic habitats in many roadless areas that have been identified as being ecologically important as well as "rare" (e.g., fens, other wetlands). Considering the overall effects of each alternative, regardless of the differences on each forest, the 2001 rule would pose the least risk of adverse impact, and would generally have the least potential for adverse effects on protecting aquatic species and habitat compared to the more intensively managed lands outside roadless areas. The proposed rule and Alternative 4 would have more potential for adverse impacts to aquatic species due to projected activities, with the greatest potential for adverse effects under the forest plans alternative. Activities projected under the proposed rule as well as other alternatives are not expected to result in measurable declines in overall population trends on any national forest for any of the aquatic T&E species, sensitive species, or MIS due in part to site and project-specific mitigation measures and BMPs. The proposed rule and Alternative 4 provide greater protection for cutthroat trout compared to alternatives 1 and 3. While potential for adverse effects may be similar for the proposed rule and Alternative 4, a portion of upper tier acres under Alternative 4 are within watersheds occupied by TES fish, implying potential improvements in protection relative to Alternative 2. A beneficial effect of the proposed rule and the forest plans alternative would be associated with the increased amount of fuel reduction treatment acres in IRAs, which could reduce wildfire severity in the IRAs and CRAs, resulting in beneficial effects on aquatic habitat and species.

The greatest concern for potential impacts to aquatic species and habitat occurs when aquatic species and habitat overlap with roadless areas where roading and tree-cutting activities are projected, especially where combined with projected oil-gas and/or coal activities. This risk would be highest under the forest plans alternative, slightly less under the proposed rule and Alternative 4, and lowest under the 2001 rule. The roadless areas of highest concern occur on the GMUG, San Juan, and White River NFs.

For terrestrial wildlife, six T&E species, 34 sensitive species, and 36 MIS are known or likely to occur in roadless areas in Colorado. The 2001 rule would afford terrestrial species and habitats the most protection because it is most restrictive for activities in the roadless areas that could be detrimental to T&E, sensitive, MIS, and migratory bird species. By comparison, the proposed rule offers a lower level of protection in roadless areas than the 2001 rule due to activity permissions in areas with TES terrestrial species and habitats. The forest plans alternative correspondingly would have the highest potential for adverse impacts to terrestrial species and habitat. Lower activity projections and increased allocation of acreage to upper tier status under Alternative 4 reduces risks compared to Alternatives 2 and 3. Detrimental effects from an expected increase in invasive plants, animals, and pathogens would be of greater risk under the proposed rule and the forest plans alternative respectively. Given the temporary status of most

roads projected for roadless areas, the impact of these roads would be relatively short-term. However, increases in roads could encourage non-motorized recreational use as well as unauthorized motorized use that could increase potential impacts to wildlife.

The increasing opportunities to treat acres for forest health and fuels under Alternative 4, the proposed rule, and the forest plans alternative respectively could improve terrestrial habitats for early seral species in some areas and reduce the potential for a severe stand-replacing wildfire that could adversely impact terrestrial habitat. While a majority of projected treatment acreage is for forest health and fuels, only a small number of projected treatment acres in roadless areas have been identified as being for TEPS habitat improvement (e.g., <5 acres for alternatives 1 and 4; less than 100 acres for alternatives 2 and 3). Restricting tree-cutting to smaller-diameter trees under Alternatives 2 and 4, and the limitations of tree-cutting to small diameter trees under Alternative 1 help maintain larger trees and provide more variability in forest structure.

In general, for all alternatives, activities may affect individual terrestrial animals but are not likely to adversely affect terrestrial populations or critical habitat of T&E species, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. There is increasing potential for change in population trends for MIS under Alternative 4, the proposed rule, and the forest plans alternative respectively, depending upon the location, timing, intensity, and magnitude of activity. But, as with plants and aquatic species, potential adverse effects to terrestrial species are expected to be either avoided or minimized through compliance with standards and guidelines in land management plans and other applicable laws, regulations, and policy.

The value of roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude in lands outside of roadless areas. Potential benefits of conserving roadless areas include protected large contiguous blocks of habitat and biological strongholds as well as providing habitat connectivity. These types of benefits would be similar for the proposed rule, Alternative 4, and the 2001 rule but would be realized to a lesser degree under the forest plans alternative. The forest plans alternative, because of fewer restrictions, would probably pose a higher risk of affecting biological diversity. Increasing opportunities for treatments under Alternatives 4, 2, and 3 respectively to address hazardous fuels and insect and disease outbreaks/spreading may have off-setting beneficial effects on long-term biodiversity.

Potential damages from invasive plants differ by alternative primarily in terms of the acres included in or eliminated from roadless designation. They also differ in terms of projected activity levels. The potential spread of invasive plants in roadless areas under the 2001 rule would therefore remain low. The risk of increasing invasive plant occurrences would remain relatively low under the proposed rule and Alternative 4, with the greatest relative risk under the forest plans alternative. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would still be relatively low under the forest plans alternative.

The 2001 rule would retain the greatest proportion of roadless area acres in a primitive or semi-primitive setting, at the lowest level of human development. Smaller proportions of the IRAs

would show evidence of motorized vehicle use or be in a roaded natural setting. None of the projected activities under the 2001 rule would be expected to reduce the quality of hunting and fishing opportunities. The proposed rule would retain a majority of the CRA acres in a semi-primitive setting, although there would be more CRA acres with roads and energy operations. The higher levels of human activity and development would shift some areas from offering semi-primitive opportunities to a more roaded natural setting. Excluding the substantially altered areas and developed ski areas in CRAs would allow the CRAs to appear more consistent with semi-primitive and unroaded characteristics expected in roadless areas. The inclusion of unroaded areas in CRAs would further protect and provide for dispersed recreation in generally unroaded and semi-primitive settings. Hunting and fishing opportunities likely would not change under the proposed rule because of the dispersed nature of projected road and tree-cutting activity and the large amount of NFS lands not altered by these activities. The amount of projected activity under the forest plans alternative may create the greatest risk of shifts from primitive/semi-primitive settings to roaded natural settings in areas where the most roads and energy operations are projected to occur. The effects of the IRA boundaries would be the same as described for the 2001 rule; however, more of the IRAs that offer semi-primitive settings would shift toward roaded natural settings as more roading, tree cutting and energy resource development occurs in the IRAs. The effects of alternative 4 on dispersed recreation would be similar to alternative 2, with more opportunities to retain higher proportions of primitive/semi-primitive acres given slight reductions in construction and tree-cutting activity under Alternative 4. In general, dispersed recreation opportunities are not expected to change under any alternative, but feelings of remoteness and solitude may change for periods of time in areas where activity occurs.

The effects to developed recreation opportunities in roadless areas do not substantially differ between the alternatives. Developed recreation sites would not be constructed in the roadless areas under the 2001 rule or the proposed rule. One mile of road construction for development of a new campground is projected under the forest plans alternative over the next 15 years.

None of the alternatives would be expected to cause a measurable change in the amount of carbon dioxide nor other greenhouse gas emissions compared to current conditions and trends in the roadless areas under the no-action alternative (the 2001 rule). The cumulative effects of climate change, in combination with the direct effects associated with the alternatives, on roadless area conditions (e.g., drought, wildfire, insects/disease) and resources (e.g., water yield, air quality, T&E species and habitat) cannot be quantitatively described in this programmatic evaluation.

The proposed rule is expected to have negligible adverse effects on other resources associated with roadless characteristics including geological and paleontological resources, cultural and heritage sites, non-timber products, and recreational special uses (including outfitter and guide opportunities) based on reasonably foreseeable activity projections. Any adverse impacts to these resources and services would be addressed through analysis conducted in accordance with NEPA and minimized through compliance with forest plan standards and guidelines.

*Agency Costs*

Agency costs are summarized in Table E.2. The proposed rule does not prescribe project-level or site-specific activities. Differences in program costs have therefore not been quantified, but qualitative comparisons of relative treatment effectiveness can be made.

Treatment projects associated with fuel reductions and/or forest health may involve one or more treatment methods including biomass removal, mechanical mulching, mastication, and prescribed fire. In most roadless areas, the limited amount of roads, fuel-breaks, and fuel-treated areas makes them more difficult to treat and more vulnerable to high-severity fires. Much of the road construction under the proposed rule is expected to be affiliated with biomass removal under service contracts with or without salvage rights, stewardship, or a timber sale where receipts can help offset the cost of treatment and temporary road construction. Given the assumption that program budgets will remain relatively flat, it is unlikely that the alternatives will result in significant changes in administrative costs.

Under the 2001 rule, fuel treatments would likely be more expensive and less efficient to implement in IRAs because of the lack of established roads and inability to reconstruct or construct roads. Compared to the 2001 rule, the proposed rule would provide increased flexibility to achieve fire and fuels management objectives in critical areas in Community Protection Zones (CPZs), where consistent with forest plan direction. Circumstances allowing construction of temporary road miles would increase the Agency's ability to strategically locate fuel treatment areas on the landscape to improve effectiveness and possibly reduce the total amount of the landscape that requires treatment. Under the proposed rule, treating 5,900 acres per year implies that more hazardous fuel treatments would occur in CRAs, compared with the 4,400 acres of CRAs treated annually on average from the past several decades, if budgets remain flat. Correspondingly, fewer treatments would occur outside CRAs. Under the forest plans alternative, there would be a shift to treating even more acres (up to 16,100 acres per year) in IRAs and fewer acres outside IRAs compared to the past 9-year trend. The effects of building more roads for fuel treatments would generally be the same as described for the proposed rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs. Alternative 4 is structured similar to Alternative 2, thereby offering similar strategic and efficiency advantages regarding treatments. However, due to increased acreage assigned to upper tier status, projected treatment levels are reduced under Alternative 4.

Road maintenance costs have been exceeding funding levels for at least the past couple decades. Thus, there is a backlog of road maintenance needs on NFS land, and the Agency has increasingly emphasized the decommissioning of unnecessary roads; for every mile of new road constructed over the past 10 years on NFS lands in Colorado, more than 10 miles of authorized or unauthorized roads on NFS lands have been decommissioned. It is expected that the trend in closing and decommissioning more road miles than are constructed would continue, recognizing that it may become more difficult to identify roads for decommissioning over time. The focus on temporary roads, in addition to decommissioning, will decrease the need for maintenance expenditure.

*Distributional Effects*

The distributional effects are listed in Table E.3. Many roadless areas (IRAs and CRAs) are in rural counties in the western and southwestern regions of Colorado, though some roadless areas are in counties in the Front Range metro area. A large majority of counties are considered small (population less than 50,000). The resource outputs with measurable and quantifiable differences between alternatives are oil and gas, and coal. Jobs and income contributed by these output levels are estimated for a five county "energy model" area (Delta, Garfield, Mesa, Montrose, Rio

Blanco counties). Changes in output of goods or services associated with timber harvest, livestock, recreation/special use permits, and other resource sectors are not projected to be significant across alternatives.

The provisions for enhanced energy mineral development under the proposed rule and the forest plans alternative are likely to result in sizeable increases of average annual production, employment, and labor income contributed by energy sectors over the next 15 years. Total value of annual output from the oil, gas, and coal sectors is estimated to be similar for the proposed rule and the forest plans alternative ($969 and $1,026 million per year respectively) and substantially higher than output under the 2001 rule ($636 million). Total jobs contributed under the 2001 rule are estimated to be 1,557 jobs, increasing to 2,679 under the proposed rule and to 2,796 under the forest plans alternative. Respective annual labor income is estimated to be $101 million, $183 million, and $190 million (2006 dollars). Results for Alternative 4 are equivalent to the results for the proposed rule. The total annual output, employment, and labor income associated with the entire mining sector in the five-county energy model area is estimated to be approximately $5.1 billion, 7,027 jobs, and $662.1 million for 2006.

A pattern similar to economic impacts emerges for average annual State and local government revenues (i.e., revenue sharing) from energy mineral leases. Compared with $28.4 million per year total payments and taxes received by the State and counties under the 2001 rule, payments are estimated to be approximately 67% larger for the proposed rule ($47.3 million per year) and 75% higher under the forest plans alternative ($49.7 million per year). Again, results for Alternative 4 are equivalent to the proposed rule. Other Federal payments to State and local governments, such as those from National Forest (25 percent) Fund and Payments in Lieu of Taxes (PILT), are expected to either not change or be more than offset by revenues from Federal mineral lease payments.

The distribution of projected fuel treatments and corresponding reduction in wildfire hazard to at-risk-communities near roadless areas varies by alternative. Values at risk can include citizen health, reliable water and power supplies, infrastructure (e.g., buildings, both public and private), business activity, and general quality of life. Potential opportunities for fuel treatments (based on projected likelihood of tree-cutting for fuel treatments in roadless areas that overlap with community protection zones (CPZs)) decreases for 13 counties under the 2001 rule compared to baseline conditions (i.e., forest plans alternative) and increases for one county. Results are similar for Alternative 4 compared to baseline conditions where treatment potential decreases for 18 counties and increases for five. There is little projected change in potential fuel treatments within CPZs under the proposed rule compared to forest plans (baseline conditions) (decrease in two counties and increase in three counties), suggesting that potential opportunities to address wildfire hazards to at-risk communities are similar under the proposed rule and the forest plans alternative. These results simply identify potential opportunities and are not intended to be projections of the actual extent or magnitude of WUI treatments.

**Table E. 1 – Framework for analysis: comparison of roadless area acreage, road miles, and Tree-cutting**

| | **Alternative 1**<br>**2001 Roadless Rule** | **Alternative 2**<br>**Proposed Rule** | **Alternative 3**<br>**Forest Plans** | **Alternative 4**<br>**Proposed Rule with Public Identified Upper Tier Acres (1)** |
|---|---|---|---|---|
| Roadless Areas | Inventoried Roadless Areas (IRAs) = 4,243,600 acres | Colorado Roadless Areas (CRAs) = 4,186,000 acres | 4,653,100 acres | Colorado Roadless Areas (CRAs) = 4,186,000 acres |
| Total Existing Authorized Road Miles in Roadless Areas (1) | 1,260 miles in IRAs | 8.5 miles in CRAs | 1,260 miles | 8.5 miles in CRAs |
| Road Construction and Reconstruction Projected in the Analysis Area | 14 miles/year<br>(11 miles in IRAs) | 20 miles/year<br>(16 in CRAs) | 28 miles/year | 18 miles/year<br>(14 in CRAs) |
| Tree-cutting Projected in the Analysis Area | 2,300 acres/year<br>(1,200 in IRAs) | 7,000 acres/year<br>(5,800 acres in CRAs) | 16,900 acres/year | 3,000 acres/year<br>(1,800 acres in CRAs) |

**(1) Approximately 24 miles of roads are projected to be decommissioned in IRAs and 8 miles decommissioned in CRAs.**
**Alternative 4 is the same as Alternative 2 with the exception that more roadless areas are assigned to the upper tier restrictions.**

**Table E.2 - Comparison of Environmental Consequences, by alternative**

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| **Local Challenges and Resources: Roadless Area Management** | | | | |
| Fire and Fuels (Hazardous Fuel Reductions) | Tree-cutting projected for 1,800 acres per year in the analysis area to reduce hazardous fuels (900 of which are within IRAs); this amounts to 3% of average annual fuel treatments on all NFS lands in CO.<br>Least flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems. | Tree-cutting projected for 5,900 acres per year in the analysis area to reduce fuels (5,300 fo which are within CRAs); this amounts to 9% of annual fuel treatments on all NFS lands in CO.<br>More flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems.<br>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. | Tree-cutting projected for 13,100 acres per year in the analysis area to reduce fuels; this amounts to 20% of annual fuel treatments on all NFS lands in CO.<br>Greatest flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems. | Tree-cutting projected for 2,200 acres per year in the analysis area to reduce fuels (1,600 of which are within CRAs); this amounts to 3% of annual fuel treatments on all NFS lands in CO.<br>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, but there are more upper tier acres that cannot be treated.<br>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. |
| Forest Health including reduced risk from Insect and Disease Outbreaks | Tree-cutting projected for 500 acres per year in the analysis area for forest health purposes (300 of which are within IRAs).<br>Untreated areas will be less resilient to insect and disease outbreaks; particularly in the ponderosa pine and Douglas-fir cover types. Composition and structure | Tree-cutting projected for 1,000 acres per year in the analysis area for insect and disease purposes (400 of which are within CRAs).<br>Treatment options remain limited in many roadless areas; untreated areas will be less resilient to insect and disease outbreaks; particularly in ponderosa pine and Douglas-fir cover | Tree-cutting projected for 3,500 acres per year in the analysis area for insect and disease purposes.<br>Treatment options remain limited in many roadless areas; untreated areas will be less resilient to insect and disease outbreaks; particularly in ponderosa pine and Douglas-fir cover types. Composition and | Tree-cutting projected for 800 acres per year in the analysis area for insect and disease purposes (200 of which are within CRAs).<br>Untreated areas will be less resilient to insect and disease outbreaks; particularly in the ponderosa pine and Douglas-fir cover types. Composition and structure |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| | of stands may be affected.<br>Few or limited opportunities to improve forest health and improve resiliency to insect and disease outbreaks. | types. Composition and structure of stands may be affected.<br>More opportunities to improve forest health and resiliency to insect and disease in critical areas such as CPZs than alternative 1 and 4 but less than alternative 3. Unable to treat upper tier acres. | structure of stands may be affected.<br>Greatest opportunities to maintain forest health and improve resiliency to insect and disease outbreaks in critical areas such as CPZs. | of stands may be affected.<br>More opportunities to improve forest health and improve resiliency to insect and disease outbreaks than alternative 1 but less than alternative 3 and alternative 2 due to upper tier acres. |
| Timber | Tree-cutting (sale or removal) in the roadless analysis area is projected to occur in association with treatments on 2,300, 3,000, 7,000, and 16,900 acres per year respectively under Alternatives 1, 2, 3, and 4. However, average annual treatment acreage on all NFS land is not expected to be affected substantially by the alternatives, with the only change being the extent to which treatments occur in roadless versus non-roadless areas on NFS lands. Minimal impacts to the wood products sector are therefore expected. | | | |
| Oil and Gas | Projections are for approximately 686 oil and gas wells in the analysis area with access to 1,046 bcfg over a 15-year period (same for Alternatives 1, 2, and 4). Projected annual road construction and reconstruction is about 10 miles in roadless areas. | | Projections are for approximately 783 oil and gas wells in the analysis area with access to 1,154 bcfg over a 15-year period, providing slightly more opportunity compares to the other alternatives. Annual road construction/reconstruction is 11 miles. | Same as Alternative 1 and 2. |
| Coal (North Fork mining area) | Projections are for 16 miles of new roads in the analysis area, of which 7 are in IRAs.<br>Restricts access to potential coal resources in IRAs more than other alternatives.<br>8,600 acres of road-accessible reserves (7,100 in current leases; 1,500 in unleased areas outside of | Projections are for 52miles of new roads in the analysis area, of which 50 are in CRAs.<br>Reduces restrictions on access to potential coal resources in CRAs compared to the 2001 rule, but is more restrictive than Alternative 3 (limits new roads to the North Fork coal mining area). | Projections are for 73 miles of new roads in the analysis area, of which 64 are in areas that overlap IRAs.<br>Least restrictive on access to potential coal resources in IRAs compared to the other two alternatives.<br>39,600 acres of road-accessible reserves (7,100 in current leases; 32,500 in unleased areas) with | Same as Alternative 2. |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| | IRAs) with access to 157 million tons. | 27,500 acres of road-accessible reserves (7,100 in current leases; 18,900 in unleased areas outside of CRAs) with access to 514 million tons. Within North Fork coal mining area, 15,600 unleased within CRAs,5300 in unleased areas outside of CRAs. | access to 724 million tons. | |
| Geothermal | Opportunities for geothermal development in roadless areas would not occur under the 2001 rule, the proposed rule, and Alternative 4 due to new road prohibitions. Opportunities for geothermal development in roadless areas would occur under the forest plans alternative as most land management plans allow new roads in roadless areas for this purpose. There are no current leases on NFS lands in Colorado, though potential for geothermal resources is being studied. | | | |
| Public Safety | All of the alternatives provide adequate flexibility to respond to emergency situations or major threats to public health and safety in roadless areas (refer to features common to all alternatives). In contrast, the potential for accidents and safety hazards increases as the amount of activity and traffic increases, The Forest Service will continue to respond to wildfires, chemical or oil spills, abandoned mine hazards, road-design hazards, hazard trees, and other similar situations. Roads for this purpose must be temporary under the proposed rule, and would be expected to be temporary under the 2001 rule and forest plans. | | | |
| | | . Upper tier acres in Alternatives 2 and 4 do not have a specific public health and safety exception for road construction, as does alternative 1. | | Upper tier acres in Alternatives 4 and 2 do not have a specific public health and safety exception for road construction, as does alternative 1. |
| Special Uses: Non-recreational<br>(pipelines, electrical or telecommunication lines, water conveyances) | 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, but there would be no prohibition on the use of LCZs. 3.2 miles per year of LCZs projected. | Future special use authorizations in CRAs would generally prohibit road construction.<br>Limited exceptions for the construction of LCZ for future oil and gas pipelines, electrical power lines or telecommunication lines, and water conveyance structures in CRAs.<br>3.2 miles per year of LCZs | Future special use authorizations would generally allow for road construction; except where prohibited under forest plans.<br>There would be no prohibition on the construction of LCZs.<br>3.6 miles per year of LCZs projected. | Same as alternative 2. |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| | | projected. | | |
| Developed Ski Areas | Least opportunities for ski area development and expansion.<br>Road construction and tree-cutting permitted on 6,600 acres within IRA boundaries and also under permit prior to the effective date of this rule. Roads and tree-cutting would be prohibited in 1,700 acres of ski areas allocated under forest plans but outside of existing permits. | Greater opportunity for ski area development and expansion.<br>Road construction and tree-cutting permitted on 6,600 acres under permit as well as the additional 1,700 acres of ski areas allocated under forest plans and located outside existing permits. | Same as alternative 2.<br>Forest plans can be amended or revised to expand ski area allocations beyond the current allocation. | Same as alternative 2. |
| Other Developed Recreation | Only one mile of new road is current projected for recreational purposes over the next 15 years under No Action; effects on developed recreation opportunities therefore do not differ substantially across alternatives. | | | |
| Livestock Management | None of the projected activities in roadless areas that vary by alternative would be likely to have any substantial beneficial or adverse impacts on livestock management operations in roadless area grazing allotments. | | | |
| **Roadless Area Characteristics and Values** | | | | |
| Scenic Quality | Projected activity levels (e.g., tree-cutting) occur on relatively small percentages of total roadless area under all alternatives. | | | |
| | Maintains the most IRA acreage at high to very high scenic integrity levels where it exists. | Retains majority of CRAs at high or very high integrity, including CRAs in upper tiers; the scenic integrity of some areas would be reduced by the roads and road-related activities projected as likely to occur in CRAs.<br>Tree-cutting associated with treatments may result in high quality scenic levels in the long-term. | Highest risk to scenic integrity, as more IRA acres may shift to a moderate to low scenic integrity as a result of road and tree-cutting activities projected.<br>Greater opportunities for treatments may contribute more to high quality scenic levels in the long-term. | Similar to Alternative 2 within CRAs that are not upper tier. Greater assurances about preserving high quality scenic levels in upper tier acres, compared to Alternative 2. |
| Wilderness and Other Congressionally Designated Areas | No major difference among the alternatives related to the risk of adverse effects on congressionally designated areas. There would be no potential direct effect on these areas as they are outside the roadless areas that are the subject of each alternative. | | | |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| | Effects on areas in forest plans as recommended wilderness would not differ by alternative as land management plans generally prohibit road construction and tree-cutting and removal activities in those areas. However, restrictions on activities in IRAs under the 2001 rule provide a greater opportunity to maintain future options for recommending roadless acres as wilderness in the future, compared to the proposed rule and forest plans. | | | |
| | Indirect effects on wilderness area characteristics or experience from activities in adjacent roadless areas are expected to be low under Alternatives 1 and 2 because projected activities are not expected to occur adjacent to wilderness area boundaries. | | Higher risk of indirect adverse effects on wilderness experience from activities in the analysis area due to higher likelihood that activities could occur adjacent to wilderness boundaries. | Similar to Alternatives 1 and 2. Greater opportunity to establish uniform management approaches for recommended wilderness through placement of roadless areas in upper tier. |
| Soil | No major difference among alternatives related to the risk of soil impacts. Alternative 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 expected to 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. | | | |
| Water and Water Quality | Activities under all alternatives are unlikely to contribute to water quality impairment (i.e., exceeding water quality standards) due to application of mitigation measures and BMPs as a result of NEPA process and site-specific analysis. | | | |
| | Lowest risk of direct adverse effects from tree-cutting and road construction. Higher risk from adverse impacts from floods and sedimentation resulting from wildfires. | Slightly greater risk of direct adverse effects from tree-cutting and road construction. Decreased risks from floods and sedimentation resulting from wildfire, relative to alternatives 1 and 4, due to increased fuel treatments to protect communities and/or water supplies. | Higher risk of direct adverse effects from tree-cutting and road construction.<br>Greatest decrease in risk from floods and sedimentation resulting from wildfire due to increased fuel treatments to protect communities and/or water supplies. | Similar to Alternative 2 though slightly lower risk from tree-cutting and road construction activities. |
| 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. | | | |
| 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. Site specific design criteria and mitigation measures are expected to minimize risk. Individual sensitive plants may be affected by projected activities, however, none of the alternatives are expected to result in the loss of viability, nor cause a trend toward Federal listing of sensitive species. | | | |
| | Least risk to adverse impacts to sensitive plants, including threats from | More risk of adverse impacts to sensitive plants, including threats from | Greatest risk of adverse impacts to sensitive plants, including threats from | More risk of adverse impacts to sensitive plants, including threats from |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| | invasives. | invasives, than alternatives 1 or 4; less than alternative 3. | invasives. | invasives, than alternatives 1; less than alternatives 2 or 3. |
| Aquatic Species and Habitat | No long-term adverse effects are expected on threatened and endangered (T&E)species, sensitive species, and MIS population trends; downstream T&E species; or wetlands and riparian areas under any alternative due to the assumption that mitigation measures and best management practices would help avoid or minimize impacts from the projected activities. | | | |
| | Least risk for adverse impacts on aquatic species. | Increase in risk of adverse impacts to aquatic species. Provides greater protection for cutthroat trout compared to alternatives 1 and 3. | Greatest potential for adverse impacts to aquatic species. | Lower risk of adverse impacts to aquatic species compared to alternative 2 and 3. A portion of upper tier acres are within watersheds occupied by TES fish, implying potential improvements in protection relative to Alternative 2. |
| Terrestrial Species and Habitat | For all alternatives, potential adverse effects are expected to be avoided or minimized through compliance with standards and guidelines in land management plans and other applicable laws and policies. For all alternatives, activities may affect individual animals but are not likely to adversely affect populations or critical habitat of T&E species, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. | | | |
| | Least risk to terrestrial species and habitat. Limitations of tree-cutting to small diameter trees helps maintain larger trees and variability in forest structure. | Increased risk to terrestrial species and habitat due to activity projections.<br>Tree-cutting to improve habitat for threatened, endangered, and protected species (TEPS) prohibited in upper tier acres but fewer upper tier acres compared to Alternative 4.<br>Opportunities to improve early seral stage and lower elevation habitat is higher as a result of improved capacity to treat fuels. Restricting tree-cutting inside and outside of CPZs to small diameter trees helps maintain larger trees | Greatest risk to terrestrial species and habitat due to activity projections. Opportunities to improve early seral stage and lower elevation habitat is highest as a result of increased flexibility to treat fuels. | Increased risk to terrestrial species and habitat, but less than Alternative 2 due to activity projections and acreage allocation to upper tier.<br>Tree-cutting to improve habitat for TEPS species prohibited on a greater number of upper tier acres compared to Alternative 2. Opportunities to improve early seral stage and lower elevation habitat is lower than alternative 2 but higher than alternative 1 (due to treatment projections). |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| | | and forest structure (also applies to Alternative 4). | | |
| Biodiversity | The value of roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude in lands outside of roadless areas. Opportunities for protected large contiguous blocks of habitat, biological strongholds, and habitat connectivity would be greatest for the 2001 rule and lowest under the forest plans alternative. Increasing opportunities for treatments under Alternatives 4, 2, and 3 respectively to address hazardous fuels and insect and disease outbreaks/spreading may have off-setting beneficial effects on long-term biodiversity. | | | |
| Invasive Plants | Site-specific design criteria and mitigation measures are expected to minimize risk. | | | |
| | Lowest risk of spread due to low projections of road construction or tree-cutting. | Somehigher risk of the spread due to greater projections of road construction or tree-cutting. Acres removed may experience increased rates of spread while acres added may have decreased rates (same applies for Alternative 4). | Greatest risk of the spread due to the greatest projections for road construction or tree-cutting compared to other alternatives. | Slightly less risk of the spread compared to Alternative 1 but less than alternatives 2 and 3 due to projected levels of road construction and tree-cutting. |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| Recreation - Primitive and Semi-Primitive Recreation Settings and Opportunities | Tree-cutting activity is projected to occur on only a small percentage of roadless areas over 15 years across the alternatives. Dispersed recreation opportunities (including hunting and fishing) are therefore not expected to change under any alternative, but feelings of remoteness and solitude may change for periods of time in areas where activity occurs. | | | |
| | Likely to retain the greatest proportion of IRA acreage in a primitive or semi-primitive setting.<br>The substantially altered areas and developed ski areas in IRAs may continue to appear inconsistent with semi-primitive characteristics expected in roadless areas. | Likely to retain a high proportion of CRA acreage in a semi-primitive setting; although some CRA acres would shift toward roaded natural in areas where the most roads and energy operations are projected to occur in CRAs.<br>By not including substantially altered areas and developed ski areas in CRAs and adding unroaded areas to CRAs, the CRAs would appear more consistent with semi-primitive characteristics expected in roadless areas. | Greatest risk of shifts from primitive/semi-primitive settings to roaded natural settings in areas where the most roads and energy operations are projected to occur. | Same as Alternative 2 but more likely to retain high proportion of primitive/semi-primitive acres given slight reductions in construction and tree-cutting activity. |
| Outfitters and Guides (recreation) | Out of 1,390 recreational special use permits authorized on NFS lands in Colorado, 1,066 are associated with outfitters and guides, some of which are likely to operate in roadless areas. The alternatives are expected to have negligible adverse effects on recreational special uses, including outfitter and guide opportunities, based on the magnitude and distribution of reasonably foreseeable activity projections; 7,000 acres of tree-cutting and 20 miles of road construction per year are projected over more than 4 million CRA acres under the proposed rule . Limitations on road construction and tree-cutting under any alternative would not be likely to affect ability to obtain or use a recreation use authorization. | | | |
| Cultural Resources | Least risk of damage to cultural resources because this alternative has the least projections for tree-cutting, sale or removal.<br>Site-specific design criteria and mitigation measures are expected to minimize risk. | Slightly higher risk of damage to cultural resources because this alternative has a high projection of tree-cutting, sale or removal and road construction.<br>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.<br>Site-specific design criteria and mitigation measures are expected to minimize risk. | Same as alternative 2.<br>Site specific design criteria and mitigation measures are expected to minimize risk. |

| Issue or Affected Resource | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| **Native Plants, Including Special Status Plants** | No major difference among alternatives related to the risk of adverse effects on native threatened, endangered or sensitive plant species. There would be very little to no increases in roads, tree-cutting, or energy development activities in the roadless areas that support those plant species. The main difference is the higher risk under the proposed rule and the forest plans alternative that invasive plants would increase from the higher levels of ground-disturbance, thereby increasing this threat to native plant communities. | | | |
| Geological and Paleotological Resources | None of the projected activities in roadless areas that vary by alternative would be likely to adversely affect geological or paleontological resources, which would either be avoided or otherwise protected from potential adverse impacts. | | | |
| Climate Change | None of the alternatives are expected to cause a measurable change in the amount of carbon dioxide or other greenhouse gas emissions. The cumulative effects of climate change on roadless area conditions cannot be quantitatively described in this programmatic evaluation. With regard to energy resources, it is assumed that if production is not allowed in roadless areas, the same greenhouse impacts will be moved to sites outside roadless areas and contribute the same amount to the atmosphere. In terms of fuels treatments,biomass removed can be burned, used in products, replace fossil fuels, or be left in piles elsewhere on the landscape. Except for prescribed burning, any of these disposal methods would slow release of carbon to the atmosphere. | | | |
| **Agency Costs** | | | | |
| Vegetation and Fuel Treatments | Treatments are likely to be less efficient and more costly in IRAs. | Increased flexibility to achieve management objectives in critical insect and disease areas; increase ability to strategically locate treatments and improve efficiency. | Capacity to shift even more treatment acres into IRAs; increased efficiency, effectiveness and timeliness of wildfire suppression response as well as fuel reductions in CPZs | Management flexibility is similar to Alternative 2, but projected treatment amounts are lower due to constraints imposed by more upper tier acreage under Alternative 4. |
| Other Costs | Administrative costs are unlikely to change due to flat or static budgets and corresponding constraints on projects. Emphasis on road decommissioning and temporary roads is expected to ease demands on maintenance backlog. Overall need to address invasive plants is expected to remain relatively constant across alternatives; although new roads can contribute to the spread of invasive plants, roads can also be an asset in helping to effectively control invasive populations. | | | |

**Table E3 – Summary of distributional effects and economic impacts of the proposed rule and alternatives.**

| | Alternative 1<br>2001 Roadless Rule | Alternative 2<br>Proposed Rule | Alternative 3 (No Action)<br>Forest Plans | Alternative 4<br>Proposed Rule with Public Identified Upper Tier Acres |
|---|---|---|---|---|
| **Leaseable Minerals: Coal, Oil and Gas – Output Value, Jobs and Income (2006$) Contributed (1)** | $636 million/yr Output<br>1,557 Jobs supported<br>$101,4 million per year Labor Income | $969 million/yr Output<br>2,679 Jobs supported<br>$183.2 million per year Labor Income | $1,026 million/yr Output<br>2,796 Jobs supported<br>$190 million per year Labor Income | $969 million/yr Output<br>2,679 Jobs supported<br>$183.2 million per year Labor Income |
| **Revenue Sharing: Mineral Lease Payments and Tax Revenues (2007$) (2)** | State Total: $28.4 million<br>Energy-Affected Counties: $7.3 million<br>All other CO Counties: $1.1 million | State Total: $47.3 million<br>Energy-Affected Counties: $10.2 million<br>All other CO Counties: $1.9 million | State Total: $49.7 million<br>Energy-Affected Counties: $11.1 million<br>All other CO Counties: $2.0 million | State Total: $47.3 million<br>Energy-Affected Counties: $10.2 million<br>All other CO Counties: $1.9 million |
| **Values at risk: Number of Counties Where Potential for Fuel Treatments in CPZs may Increase or Decrease Compared to Baseline Conditions (3)** | Decrease: 13 counties<br>Increase: 1 county | Decrease: 2 county<br>Increase: 3 counties | NA | Decrease: 18 counties<br>Increase: 5 counties |

**(1) Jobs and income contributed annually (2006 dollars) based on projected levels of coal, oil, and gas production and regional economic modeling multipliers derived from an IMPLAN model representing the five counties where employment effects are assumed to occur (Delta, Garfield, Mesa, Montrose, and Rio Blanco).**

**(2) Payments consist of property tax receipts from coal, oil, and gas production; State distribution of severance taxes and Federal royalties. Energy-affected counties are Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin counties. Changes in payments associated with the Secure Rural Schools and Self Determination Act and Payments in Lieu of Taxes (PILT) are not expected to change significantly.**

**(3) CPZs = community protection zones (0.5 to 1.5 mile buffer area surrounding communities that have been identified as being at-risk to wildfire. "Potential for fuel treatments" implies that at least one CPZ area in a county overlaps with an IRA or CRA where tree-cutting has at least a low likelihood of occurring, according to national forest unit field staff.**

## BACKGROUND

In January 2001, a Roadless Area Conservation Rule (2001 rule) was adopted into regulations at 36 CFR 294. Since its promulgation, the 2001 rule has continued to be the subject of litigation. Ongoing uncertainty about the future of the 2001 rule was a key factor that influenced the Governor of Colorado to initiate state-specific protections that would conserve the values and characteristics of CRAs. 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 (NFs) in Colorado.

In November 2006, Colorado Governor Bill Owens used the taskforce's recommendations as the basis for petitioning to the Secretary of Agriculture to undertake state-specific roadless rulemaking for Colorado. The State's petition was considered for rulemaking by the Secretary of Agriculture in accordance with the Administrative Procedure 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. After Governor Owens submitted the State's petition to the Department of Agriculture, Bill Ritter, Jr. was elected Governor of Colorado. In April 2007, Governor Ritter resubmitted the petition with a substantive letter of transmittal. In June 2007, the State and the U.S. Forest Service presented the petition with some modifications to the Department's Roadless Area Conservation National Advisory Committee. In August 2007, based on the advisory committee's review and report, 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 2007).

The State's petition requested the rulemaking process use the most updated roadless boundaries (State of Colorado 2007). Updating roadless area evaluation for Colorado resulted in identifying approximately 4.031 million acres or about 29 percent of National Forest System (NFS) lands in Colorado, as appropriate for management as Colorado's roadless areas (fig. 1.2). Based on the petition, the State and the Forest Service collaboratively developed the rulemaking (regulatory) language for a proposed Colorado Roadless Rule that would govern management of roadless areas on NFS lands in Colorado. The draft rule was published July 25, 2008 (FR Vol 73, No. 144, p. 43544) with solicitation of public comment on the proposed rule as well as the draft Environmental Impact Statement (draft EIS). The provisions of a revised proposed rule have been developed based on public comment and additional meetings with RACNAC and the State.

This report summarizes the regulatory impact analysis for the revised proposal for the Colorado Roadless Rule (proposed rule) as directed by Executive Order (E.O.) 12866 issued September 30, 1993, as amended. This executive order addresses regulatory planning and review and requires that agencies conduct a regulatory analysis for economically significant regulatory actions. Significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors. Total annual output associated with oil, gas, and coal production in the affected areas is projected to be approximately $970 million under the proposed rule, compared to approximately $1,030 million under baseline conditions, implying the annual economic impact of the proposed rule is

estimated to be a decrease of approximately $60 million for energy mineral sectors. Due to the potential magnitude of economic impacts and the level of interest in inventoried roadless area management, this rule is designated as significant and is therefore subject to E.O. 12866.
The Office of Management and Budget Circular A-4 provides guidance to Federal agencies on the development of regulatory analysis including the use of benefit-cost analysis. Circular A-4 also recognizes that "it is not always possible to express in monetary units all of the important benefits and costs" and that agencies should exercise "professional judgment in determining how important the non-quantified benefits or costs are likely to be in the context of the overall analysis." The guidance also notes that regulatory analyses include a "discussion of non-quantified as well as quantified benefits and costs." Included in the analysis of benefits and costs should be an assessment of distributional effects and equity.

The proposed rule is programmatic in nature and intended to guide future development of proposed actions in roadless areas. This rule does not authorize the implementation of any ground-disturbing activities, but rather it describes circumstances under which certain activities may be allowed or restricted in roadless areas. Before authorizing land use activities in roadless areas, the Forest Service must complete a more detailed and site-specific environmental analysis pursuant to the National Environmental Policy Act (NEPA) and its implementing regulations at 40 CFR 1500-1508. Because the proposed rule does not prescribe site-specific activities, it is difficult to predict changes in benefits under the different alternatives. It should also be emphasized that the types of benefits derived from uses of inventoried roadless areas in Colorado are far ranging and include a number of non-market and non-use benefit categories. As a consequence, benefits are discussed qualitatively in many sections of this report.

This document summarizes information about the benefits, costs, and distributional effects of the proposed rule. For details about resource and/or program-specific environmental effects, the reader is referred to the revised draft environmental impact statement (revised DEIS or RDEIS) for the proposed rule (USDA Forest Service 2010), as well as resource specialist reports cited in the RDEIS.

## Changes between the Draft EIS (2008) and the Revised DEIS (2010)

Since the release of the DEIS, court actions, changes to the State's petition, and updated inventories have revised the alternatives and language of the proposed Colorado Roadless Rule. These changes are described below.

<u>The No Action Alternative has changed from Alternative 1 to Alternative 3</u>

In the DEIS, the Forest Service considered "no action" or baseline conditions 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 will be managed according to direction set forth in the applicable forest plan (alternative 3).

<u>Effective Date of Alternative 1</u>

Because the 2001 Roadless Rule was set aside and enjoined, if this alternative is selected, it will become Colorado's state specific roadless rule. Therefore the provisions will 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

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 Colorado Roadless Rule.

(1) There have been changes to the boundaries of roadless areas. 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. In addition, there is a net increase of approximately 155,000 acres to be managed as CRAs under alternative 2.

(2) The proposed rule requires that the Regional Forester determine that all tree-cutting, sale, and removal within CRAs is consistent with applicable land management plans, that it meets one of the tree-cutting exceptions, and that one or more roadless area characteristics will be maintained or improved over the long-term (except for incidental and personal/administrative use circumstances). The July 2008 proposed Colorado Roadless Rule did not elevate the determination for tree-cutting, sale, or removal to the Regional Forester for any tree-cutting exceptions.

(3) 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 will 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 DEIS, 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 RDEIS, a temporary road can only be constructed within the first ½ mile of the CPZ to facilitate the projects.

(4) Tree-cutting, sale or removal in Colorado Roadless Areas must maintain or improve one or more roadless area characteristics. The July 2008 proposed Colorado Roadless Rule did not require that tree cutting, sale, or removal maintain or improve roadless characteristics except when the tree-cutting was for the management or improvement of wildlife or plant species habitat. The proposed Colorado Roadless

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 the tree-cutting, sale or removal is incidental to the implementation of a management activity not otherwise prohibited; or (2) is needed or appropriate for personal or administrative use.

(5) Tree-cutting, sale or removal is allowed within the CPZ or outside of the CPZ with Regional Forester concurrence where needed to suppress or prevent an insect or disease epidemic once four factors have been considered. In addition, if a temporary road is needed to facilitate tree-cutting, sale or removal for the prevention or suppression of an insect or disease epidemic it is only allowed within the first one-half mile of the CPZ. The July 2008 proposed Colorado Roadless Rule did not contain any of the four required considerations for tree cutting, sale or removal within the CPZs, provide direction on the appropriate responsible official for these activities, or describe clearly the circumstances where temporary road construction would be allowed to facilitate these activities.

(6) Linear Construction Zones (LCZs) and linear facilities have been defined and addressed. The July 2008 proposed Colorado Roadless Rule did not address linear facilities or LCZs. A linear facility includes pipelines, electrical power lines, telecommunications lines, ditches and canals. A 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 Colorado Roadless Rule generally prohibits the construction of LCZs unless the construction relates to a water conveyance structure, electrical power line or telecommunication line or oil and gas pipeline.

(7) Road construction in support of water conveyance structures, including reservoirs, is only allowed for those that have a pre-existing water court decree as of the effective date of the Rule. The July 2008 proposed Colorado Roadless Rule allowed for road construction for any existing or future authorized water conveyance structure. The proposed Colorado Roadless Rule limits road construction to only those water conveyance structures that have an existing water court decree.

(8) The area covered by the North Fork Coal Mining exception has changed. The July 2008 proposed Colorado Roadless Rule allowed for the construction of temporary roads in support of coal mining in the North Fork Coal Mining Area. The North Fork Coal Mining Area included approximately 9,000 acres of the Currant Creek CRA that remains in the CRA acreage but has now been removed from this exception.

(9) Any road construction or LCZ construction must not diminish existing native cutthroat trout habitat. The July 2008 proposed Colorado Roadless Rule did not specifically address native cutthroat trout. The proposed Colorado Roadless 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 a LCZ will not diminish conditions in the water influence zone and in the native cutthroat habitat.

(10) The Colorado Roadless Rule has identified Colorado Roadless Areas upper tier acres and provided a set of draft acreage and prohibitions for these acres for public

comment. The Colorado Roadless Rule identifies "Colorado Roadless Areas upper tier acres" which are specific portions of or entire CRAs. In the CRAs upper tier acres tree-cutting, sale or removal is prohibited unless the Regional Forester determines 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 CRAs upper tier acres unless it is needed pursuant to reserved or outstanding rights or as provided for by statute or treaty. Alternative 2 identifies 257,400 upper tier acres with an additional 304,900 acres being considered as upper tier.

(11) 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 will be termed temporary roads.

Alternative 4. There is a fourth alternative. Alternative 4 has the same prohibitions and exceptions as alternative 2. This 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 and follows the same prohibitions with exceptions as listed in #10 above.

**Purpose and Need**

The Department, the Forest Service, and the State of Colorado are committed to conserving and managing roadless areas on NFS lands in Colorado. The purpose and need for action is to respond to the Secretary of Agriculture's acceptance of the State of Colorado's petition for rulemaking on the management of the 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.

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.

(2) There is a need to accommodate state specific situations and concerns in Colorado's roadless areas. These include the following:

a. the risk of wildfire to communities or municipal water supply systems or insect and disease epidemics;

b. exploration and development of coal resources in the North Fork Coal Mining Area;

c. constructing or maintaining an authorized water conveyance structure operated pursuant to a pre-existing water court decree;

d. accessing current and future electrical power lines;

e. constructing oil or gas pipelines; and

f. accommodating existing permitted or allocated ski areas.

In summary, 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.

Roadless area characteristics and values, as defined in the 2001 rule preamble (66 FR 3244) and referred to in the final 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.
- Reference landscapes.
- Natural-appearing landscapes with high scenic quality.
- Traditional cultural properties and sacred sites.
- Other locally identified unique characteristics (e.g., uncommon geological formations, unique wetland complexes, unique social/cultural/historical characteristics, areas prized for collection of non-timber forest products, or exceptional hunting and fishing opportunities).

**Proposed rule and Alternatives**

*Description of Roadless Area Boundaries*

Alternatives 1, 2, and 4 each provide for a state specific roadless rule; however, the provisions of each alternative apply to different roadless inventories. The alternative 1 and 3 inventory generally retains the boundaries and acreage of the 2001 Roadless Rule. For alternatives 2 and 4, and as requested in the state's revised petition, 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. 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 1a 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 1a. Net change in roadless acreage by forest—from inventoried roadless area acres to Colorado roadless area acres**

| | 2001 Rule Total IRA Acres [1] | IRA acres in Colorado Database[2] | IRA acres not included within CRAs | Roadless acres added to CRAs | Total Roadless Acres to be managed under Colorado Rule | Net Change between 2001 IRA and CRA acres |
|---|---|---|---|---|---|---|
| **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.

## *Description of Alternatives*

The range of alternatives is designed to address the purpose and need and issues described above. Each alternative offers a different approach to conservation of roadless area characteristics, primarily by providing a different mix of prohibitions on land use activities; primarily 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.

The four alternatives analyzed in detail are:

- **Alternative 1: the 2001 Roadless Area Conservation Rule (2001 Roadless Rule)**[1]. This alternative establishes a state-specific roadless rule for Colorado that retains IRA boundaries[2] and roadless area management provisions contained in the 2001 Roadless Rule for management of roadless areas on NFS land in Colorado. If a decision is made to select this alternative, it will 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 this rulemaking.
- **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 petition submitted by the State of Colorado. It is based on the tenets of the 2001 Roadless Rule, but provides prohibitions and specific exceptions relevant to the State of Colorado. There are 257,400 acres identified as CRA upper tier with an additional 304,900 acres as an option to identify as upper tier under this alternative. If a decision is made to select this alternative, it will 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 rulemaking.
- **Alternative 3: No Action, Forest Plan Direction.** This alternative does not establish a state specific roadless rule for Colorado and all lands would be managed according to forest plan direction. The boundaries of the roadless areas are those designated in each forest plan 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 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 will 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 rulemaking.

Table 1b describes the attributes common to all alternatives, and Table 1c describes more detail about the attributes exclusive to each alternative.

1 "2001 Roadless Rule" is described in the Federal Register, Vol. 66, No 9, pages 3244 - 3273

[2] Congressionally designated acres as well as mapping errors associated with private lands and Wilderness have been eliminated from the IRA boundaries.

**Table 1b**

| Features Common to All Alternatives | |
|---|---|
| **Affected national forests in Colorado** | • Arapaho and Roosevelt<br>• Grand Mesa, Uncompahgre, and Gunnison<br>• Pike and San Isabel<br>• Rio Grande<br>• Routt<br>• San Juan<br>• White River<br>• Manti-La Sal – the 27,100 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 RDEIS. Those areas would not be subject to state-specific rulemaking. 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.<br>Rulemaking does not alter forest plans nor the ability to update forest plans through an amendment or revision process.<br>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 the NEPA and its associated regulations at 40 CFR §1500-1508. |
| **Reserved and outstanding rights, statutes or treaties** | • Alternatives allow road construction or reconstruction, tree-cutting, sale or removal and other activities in roadless areas that are associated with rights allowed by existing laws or treaties. This includes allowing road access, surface occupancy, and use of NFS land in roadless areas for purposes of:<br>• Accessing private lands within or adjacent to NFS land, as authorized under Alaska National Interest Land Conservation Act (ANILCA).<br>• 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.<br>• Accessing NFS lands for American Indian land uses, as authorized under various American Indian treaties.<br>• 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.<br>• 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, 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.<br>• No alternative affects decisions related to renewal, continuation, or transfer of existing authorizations.<br>• 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. This includes, but is not limited to, activities authorized for:<br>• Livestock grazing operations<br>• Utility operations<br>• Ski area operations<br>• Mineral resource extraction operations, pursuant to 36 CFR part 228 regulations<br>• 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. This includes, but is not limited to:<br>Prescribed burning<br>Trail construction or maintenance (motorized and non-motorized)<br>Public hunting, fishing, camping, or other dispersed recreation uses<br>Livestock grazing. |

**Table 1c - Comparison of Alternatives**

| Descriptor | Alternative 1 – 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 removing mapping errors identified as wilderness or private land. | • 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.<br>• Removing 8,300 acres of allocated ski areas and 458,800 substantially altered areas and mapping errors.<br>• Adding 409,500 acres of unroaded lands meeting roadless area criteria.<br>• Designating portions of or entire CRAs as upper tier acres.<br>• 257,400 acres as CRA upper tier (alternatives 2 and 4).<br>• Asking for comment on an additional 304,900 acres being considered for CRA upper tier designation (alternative 2).<br>• Designating an additional 2,614,200 acres as CRA upper tier (alternative 4) | • Same 4.24 million acres of IRAs as in alternative 1. |
| **Changes to roadless area boundaries** | • Does not provide a 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. | • Changes to IRA boundaries may be made through a forest plan amendment or revision process, subject to public review and comment, and other NFMA and NEPA regulations (36 CFR part 219 and 40 CFR §1500-1509). |

| Descriptor | Alternative 1 – 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).<br>• In some IRAs, forest plans add more restrictions related to conducting this activity, to protect other resource values.<br>• 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:<br>• The Regional Forester determines the activity is consistent with the forest plan and one or more of the roadless characteristics will 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.<br>• Forest plans in Colorado generally allow tree-cutting for non-timber purposes on any NFS lands, subject to specific resource management direction. Forest plans also 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:<br>• Where incidental to other management activities (e.g., road or trail construction or maintenance, minerals operations, and other authorized uses).<br>• 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. |
| **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.<br>• Generally small-diameter trees and will maintain or improve one or more roadless characteristics. | • This exception has been narrowed to 3 specific exceptions to address tree-cutting to reduce the wildfire hazard to an at-risk community or municipal water supply system and to address insect and disease outbreaks. They are described below. | • Tree-cutting is only limited by applicable management direction in forest plans. |

| Descriptor | Alternative 1 – 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, 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 characteristics.<br>• Limited to generally small-diameter trees and will maintain or improve one or more roadless area characteristics | • 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.<br>• Not limited to generally small diameter trees.<br>• Not allowed within CRA upper tier acres. | • Forest plans generally allow tree-cutting in IRAs to improve habitat for threatened, endangered, proposed, or Regionally designated sensitive species. |

| Descriptor | Alternative 1 – 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, sale or removal for prevention or suppression of an insect or disease epidemic** | • The exception to maintain or restore ecosystem composition, structure, and function could include treatments to prevent or suppress an insect or disease epidemic. | • This activity is allowed in CRAs within the community protection zones (CPZ) to prevent or suppress an insect or disease epidemic. Within the first ½ mile of the CPZ, there is an associated temporary road provision. Not allowed within CRA upper tier acres.<br>• Outside of the CPZ is the activity is allowed when the Regional Forester determines tree-cutting, sale or removal is needed to prevent or suppress an insect or disease epidemic. Not allowed within CRA upper tier acres.<br>• To determine whether tree-cutting, sale or removal is needed both within and outside of the CPZ, the Responsible Official, through site-specific NEPA analysis, will:<br>• determine the opportunity and effectiveness of the treatment for reducing insect or disease damage,<br>• weigh the potential effects of the insect or disease epidemic on roadless area characteristics over the long-term,<br>• weigh the potential effects of the insect or disease epidemic on resource values outside CRAs, and<br>• determine the beneficial and adverse effects of tree-cutting, sale or removal within a CRA.<br>• Such insect and disease projects are expected to be infrequent and focus on stand composition and structure. | • The areas are governed by the applicable management direction in forest plans. |

| Descriptor | Alternative 1 – 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, 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 will maintain or improve roadless area characteristics.<br>• Limited to generally small-diameter trees and prohibits associated road construction/reconstruction. | • This activity is only allowed within CRAs, except not in upper tier acres, where needed to reduce wildland fire hazard to an at-risk community or municipal water supply system<br>• Within the first ½ mile of the CPZ;<br>• Within the next one-mile of the CPZ if HFRA conditions are met and where projects would be within the area of a Community Wildfire Protection Plan. If no CWPP exists, no projects will be proposed in this next one-mile<br>• There is an associated temporary road provision within the first ½ mile of the CPZ.<br>• Outside of the CPZ this activity is allowed within CRAs, except not in upper tier acres, 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.<br>• Such projects will focus on small diameter trees to create strategic fuel breaks that modify fire behavior while large trees will be retained to the extent practical, as appropriate to the forest type,<br>• Projects outside of the CPZ are expected to be infrequent. | • Forest plans allow tree-cutting in most IRAs for purposes described in alternatives 1 or 2, with exceptions in some specific management areas.<br>• 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 – 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, sale or removal within newly designated roadless areas** | • These acres are not within the IRA inventory.<br>• No regulatory limitation on tree-cutting, sale or removal | • These acres are within the CRA inventory<br>• Tree-cutting, sale or removal is subject to the prohibitions in the Colorado Roadless Rule | • These acres are not within the IRA inventory<br>• These acres remain subject to forest plan direction |
| **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 or temporary roads.<br>• The NEPA document decisions would be made in accordance with NEPA requirements.<br>• Rule language does not include additional requirements for environmental analysis or NEPA documentation.<br>• Does not include specific provisions about decommissioning and closing roads. | • Generally prohibits road construction or reconstruction in CRAs, distinguishing between forest roads and temporary roads.<br>• The NEPA document decisions would be made in accordance with NEPA requirements.<br>• Includes additional environmental analysis and determination requirements for road construction determining that:<br>• motorized access without road construction is not technically feasible;<br>• within a native cutthroat trout catchment or identified recovery watershed, road construction will not diminish conditions in the water influence zone and in the native cutthroat habitat;<br>• road construction is consistent with the applicable forest plan;<br>• when proposing to build a forest road, a temporary road would not provide reasonable access.<br>• Includes specific provisions about decommissioning and closing roads.<br>• 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.<br>• The NEPA document decisions would be made in accordance with NEPA requirements.<br>• Does not include additional environmental analysis requirements for road construction. Includes some specific direction about road decommissioning and closures to protect resource values in specific areas. |

| Descriptor | Alternative 1 – 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 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).<br>• Ski areas within IRAs remain so. | • 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.<br>• Ski areas are excluded from CRAs. | • Same as alternative 2, except ski areas remain within IRAs. |
| **Roads construction in substantially altered lands (~458,800 acres)** | • Road construction or reconstruction on substantially altered lands in IRAs is prohibited.<br>• These acres are within the IRAs. | • These acres are excluded from CRAs.<br>• No rule-related limitations on road construction or reconstruction on the substantially altered lands; remain subject to forest plan direction. | • Same as alternative 2, except these areas are within the IRAs. |
| **Road construction in newly identified roadless acres (~409,500 acres)** | • These acres are not within the IRAs.<br>• 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.<br>• Road construction or reconstruction on newly identified roadless acres subject to provisions within the rule. | • These areas are not within the IRAs.<br>• These acres would remain subject to forest plan direction with no roadless designations. |
| **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:<br>• Prevent irreparable resource damage.<br>• Address road safety hazards<br>• Protect public safety from imminent threat of flood, fire, and other catastrophic events that may threaten loss of life or property. | • Same as alternative 1 within CRAs, except not within upper tier acres, and:<br>• 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.<br>• 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 – 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.<br>• Road construction is prohibited on leases issued after (the effective date of the Colorado Rule) | • Road construction or reconstruction related to oil and gas exploration and development in CRAs is limited to roads needed pursuant to rights granted under an existing lease (issued prior to the effective date of Colorado Rule) where lease stipulations and other regulations allow.<br>• Road construction is prohibited on leases issued after (the effective date of the Colorado Rule)<br>• Roads are temporary roads.<br>• Eight conditions are to be considered for inclusion in approved Surface Use Plans of Operation.<br>• Alternative 2 has no oil and gas leases within the upper tier or optional upper tier acres. Alternative 4 upper tier acres include current oil and gas leases. Road construction could occur where allowed by lease terms and considering conditions in bullet above. | • 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 – 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 included 5,900 acres within IRAs.<br>• No rule related language on location of buried infrastructure needed for capture, collection, and use of coal mine methane.<br>• 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.<br>• 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.<br>• Roads are temporary roads.<br>• Buried infrastructure needed for capture, collection, and use of coal mine methane will be located within rights-of-way.<br>• No proposed CRA upper tier acres are located in the North Fork coal mining area. | • Current forest plan direction does not limit road-building in areas where coal resources occur.<br>• Forest plans include management direction for areas where coal resources exist to protect sensitive surface resources.<br>• 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). | • 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.<br>• Not allowed within CRA upper tier acres. | • Road construction/reconstruction activities in IRAs would be governed by forest plan direction.<br>• Forest plan direction includes areas where road construction is prohibited, limited, discouraged, or unrestricted. |

| Descriptor | Alternative 1 – 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 to reduce the wildfire hazard to an at-risk community or municipal water supply to facilitate tree-cutting, sale or removal within the first one-half mile of the CPZ. Not allowed within CRA upper tier acres. | • Road construction/reconstruction activities in IRAs would be governed by forest plan direction. |
| **Road construction to facilitate tree-cutting for prevention or suppression of an insect or disease epidemic** | • Construction or reconstruction of a road is not allowed in IRAs for the prevention or suppression of an insect or disease epidemic. | • Construction or reconstruction of a temporary road is allowed with Regional Forester determination, based on a site-specific NEPA analysis, within the first one-half mile of the community protection zone to facilitate tree-cutting, sale or removal to prevent or suppress an insect or disease epidemic. Not allowed within CRA upper tier acres.<br>• The tree-cutting project for which the road is needed must meet the conditions described above under tree-cutting. | • Road construction/reconstruction activities in IRAs would be governed by forest plan direction. |
| **General linear construction zone provisions (LCZs)** | • Does not include any prohibition on LCZs<br>• Does not include additional environmental analysis requirements for LCZs.<br>• Does not include specific provisions about decommissioning and closing LCZs. | • Generally prohibits LCZs in CRAs.<br>• Includes additional environmental analysis and determination requirements for LCZs determining that:<br>• motorized access without LCZs is not technically feasible;<br>• within a native cutthroat trout catchment or identified recovery watershed, a LCZ will not diminish conditions in the water influence zone and in the native cutthroat habitat;<br>• a LCZ is consistent with the applicable forest plan;<br>• Includes specific provisions about decommissioning and closing LCZs. | • Some Forest plans provide direction to follow to protect resource values when proposing the use of a LCZ.<br>• Does not include additional environmental analysis requirements for LCZs.<br>• Does not include specific provisions about decommissioning and closing LCZs.<br>• |

| Descriptor | Alternative 1 – 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 a 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. | • Construction or a 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.<br>• There may be some forest plan direction restricting an electrical power line or telecommunication line from being located in an IRA. |
| **Use of a LCZs for construction or reconstruction of an oil and gas pipeline originating outside of a roadless area** | • There is no rule-related language prohibiting the use of a LCZ for this purpose. | • Use of a LCZ, with Regional Forester determination is allowed for the construction, reconstruction of an oil and gas pipeline that originates outside of a CRA and connects to infrastructure within the CRA.<br>• The location of the pipeline within the CRA must have been determined by the Regional Forester as the location which causes substantially less environmental damage than alternate routes outside of CRAs. | • Generally forest plan direction does not limit the use of LCZs. |

| Descriptor | Alternative 1 – 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** | • No prohibition on oil or gas pipelines through IRAs from sources outside IRAs. | • Prohibits construction of oil and gas pipelines through CRAs from a source or sources located exclusively outside the CRAs unless connecting to infrastructure within a CRA. Where an oil and gas pipeline would connect to infrastructure within a CRA, the Regional Forester must determine such a connection would cause substantially less environmental damage than an alternative route. | • Forest plans generally allow oil or gas pipelines through IRAs from sources outside IRAs |
| **Electrical power lines and telecommunication lines** | • No prohibition on electrical power lines or telecommunication lines through IRAs. No rule-related prohibition on LCZs. Associated road construction is prohibited.<br>• Forest plans generally allow electrical power lines and telecommunication lines through IRAs however, there may be some forest plan direction restricting an electrical power line or telecommunication line from being located in an IRA. | • Electrical power lines and telecommunication lines shall only be authorized in CRAs if it is determined there is no opportunity for the project to be implemented outside of a CRA without causing substantially greater environmental damage. | • Forest plans generally allow electrical power lines and telecommunication lines through IRAs however, there may be some forest plan direction restricting an electrical power line or telecommunication line from being located in an IRA. |

**Implications of Related Planning Efforts and Federal Direction**

The Council on Environmental Quality asks agencies to look at the effects of their similar and different actions to see if they may produce a cumulative effect greater than the sum of the effects (synergistic interaction). The Agency has reviewed the proposed Colorado Roadless Rule and its alternatives with the Federal direction listed below for any possible cumulative effects. The directions selected are those the Agency determined were most likely to have an influence on or from the Colorado Roadless Rule. While it is possible that changes to roadless area conservation could happen at a national scale, by future congressional or Executive action, these possibilities for change are too speculative and therefore, not analyzed. After review, the Agency found there would be no cumulative effect because all these directions are procedural and do not require a specific action to take place. However, as noted in the discussions below, the Agency has determined that the Colorado Roadless Rule, 2001 rule, and other state-specific rules may affect site-specific projects or plans designed to follow some of these procedural directions.

**Forest Service Budget**

The Forest Service budget is part of the annual budget appropriations for the Department of Interior and Related Agencies. From fiscal year (FY) 2000 through FY 2011, the portion of the Forest Service budget devoted to wildland fire management has steadily increased from 25% to over 40%. For the foreseeable future, the Agency expects to have a "flat" or declining budget, with nearly half of the budget going to fire management. A flat budget will not allow the Agency to increase funding for proposed projects in inventoried roadless areas over the current level nationally, regionally, and within the State of Colorado. There will also be little funding to deal with the backlog of road and facilities work. Priority is expected to continue to be given to projects and proposals in response the Healthy Forest Restoration Act of 2003 (HFRA) and the Energy Policy Act of 2005. Those effects are discussed below.

**Planning Rule**

On April 21, 2008, the Agency published 36 CFR 219 National Forest System Land Management Planning Proposed rule (the 2008 Planning Rule) in the **Federal Register**. However, the United States District Court for the Northern District of California invalidated the 2008 rule, holding that it was developed in violation of the NEPA and the Endangered Species Act. The district court vacated the 2008 rule, enjoined the USDA from further implementing it and remanded it to the USDA for further proceedings (*Citizens for Better Forestry v. USDA,* 632 F. Supp. 2d 968 (N.D. Cal. 2009)). . The Forest Service is currently operating under the transition provisions of the 2000 planning rule, as an interim measure until a new planning rule is issued. The 2000 planning rule allows forests to develop, revise, and amend forest plans using the procedures of the 1982 planning rule.

On December 18, 2009, the Agency issued a notice of intent to prepare an environmental impact statement for a new planning rule, starting a new planning rule revision. The new planning rule is expected to improve public participation in decisionmaking. The emphasis of the proposed rule on collaboration, use of science, and monitoring and evaluation will contribute to the long-term sustainability and health of NFS lands.

The current planning rule as clarified is procedural only, and does not cause NFs and grasslands to make decisions contrary to other national rules like the 2001 rule. However, the 2001 rule and any future state-specific rules will have an indirect effect on forest plan revision efforts under any Agency planning rule, as they would restrict certain types of actions on those lands affected by the rule. Agency line officers may not be able to change those restrictions during the land management plan revision process. Conversely, as with the 2001 rule, during individual forest plan development in Colorado, it is anticipated that forest supervisors and regional foresters would consider plan alternatives that would, in the long-term, more closely mirror the goals established under the Colorado Roadless Rule. This alignment would not increase or decrease acreage, but would better parallel the types of activities and/or restrictions allowed. It is not anticipated all lands affected by the rule would conform during land management planning for a variety of reasons, including wildlife management issues, recreational demands, fiscal concerns, and congressional action. This would also be true if other state-specific rules are promulgated.

The Council on Environmental Quality regulations implementing the procedural provisions of NEPA define a cumulative effect as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what Agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR § 1508.7).

For cumulative impacts to accrue there must first be an impact from the action under review that can then be added to the impacts of other past, present, or reasonably foreseeable future actions. The current planning rule establishes administrative procedures. It does not dictate how administrative units of the NFS are to be managed or the mix of uses on any or all units of the NFS. Consequently, there are no direct or indirect effects from the planning rule that can be aggregated with any effects of the Colorado Roadless Rule.

It is anticipated the Agency will continue with its "two-filter" approach for compliance with either the Roadless Area Conservation Rule or the State Petitions for Inventoried Roadless Area Management Rule and with the portion of land management plans covering those IRAs. This means, that no matter which roadless rule is in place, the procedures of the planning rule would not affect the provisions of the roadless rule. Neither would individual land management plans developed, revised, or amended under the planning rule affect provisions of the roadless rule. However, the Agency recognizes the 2001 rule or State-specific roadless rule would place constraints on individual IRAs in individual land management plans. In the case of the proposed Colorado Roadless Rule, the proposed rule seeks to narrow differences between the rule and land management plans. Therefore, a responsible official's discretion on the development, amendment, or revision of individual land management plans developed under any planning rule (all alternatives) would be constrained to ensure compliance with any roadless rule in effect for the specific IRAs.

**Travel Management Rule**

In response to its growing backlog in road maintenance and the increase of motorized cross-country travel, the Agency implemented its travel management regulations in November 2005. (70 FR 68264). This rule requires the designation of routes (roads and trails) on each NF and grassland. The public is allowed to participate. Motor vehicle use outside of designated routes will be prohibited. This is a procedural rule and there is no mandated outcome that would affect

this Colorado Roadless Rule. Additionally, the Governor of Colorado has specifically stated his desire to keep travel management separate from the State's roadless petition.

However, the Agency recognizes as each NF and grassland finishes their travel management process, there will be areas in IRAs where roads are determined to be no longer warranted. Eventually, these roads will be decommissioned and the area will recover or otherwise improve its roadless characteristics. Ecotypes which have faster growing vegetation will visually recover faster. These are generally found in the South, southeast Alaska, and areas west of the Cascades and Sierra Nevada Mountains (Pacific coast). If some of these areas are large enough or are adjoining existing roadless or wilderness areas, they may eventually be considered for wilderness recommendation through the Agency's forest plan revision process (Planning Rule). Because the 2001 rule did not provide for inclusion or exclusion of areas (36 CFR §294.14e) they would not be included under its prohibitions.[3] Changes to the 2001 rule prohibitions would come through individual rulemaking like this effort for Colorado.

**Forest Service NEPA Procedures**

The Agency has promulgated a procedural rule to guide its implementation of NEPA. Although the Final Rule includes some changes, most of the Agency's prior NEPA procedures found in agency directives were moved to regulation unchanged including categorical exclusions. No cumulative effects are expected from these actions because these are procedural requirements, which do not have effects on the human environment.

**Healthy Forest Restoration Act (HFRA) of 2003**

The Healthy Forests Restoration Act (HFRA) (Pub.L. 108-148), provides processes for implementing hazardous fuel reduction projects on certain types of "at-risk" NFS and Bureau of Land Management (BLM) lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. When implementing hazardous fuel reduction projects, HFRA protects existing old growth stands and "[f]ocuses largely on small diameter trees, thinning, strategic fuel breaks, and prescribed fire to modify fire behavior, as measured by the projected reduction of uncharacteristically severe wildfire effects for the forest type (such as adverse soil impacts, tree mortality or other impacts);" and "maximizes the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fires-resilient stands"[4]

The establishment of WUI areas and CWPPs helps to implement the Act. At the national-level, the majority of WUIs areas are not in IRAs; however, there are overlaps. WUI distances vary by individual CWPP.[5] These plans are developed following *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy (2001).*

---

[3] Section 294.14(e) states: The prohibitions and restrictions established in this subpart are not subject to reconsideration, revision, or rescission in subsequent project decisions or land and resource management plan amendments or revisions undertaken pursuant to 36 CFR part 219.

[4] See Sections 102(e) and (f) of HFRA

[5] The definition of Wildland-Urban Interface (WUI) is found at Section 101 (16) of the Healthy Forest Restoration Act of 2003

Except for the effects discussed in the body of the EIS on the implementation of the Act, the proposed rule and its alternatives will have no effect on hazardous fuel reduction projects outside the State of Colorado.

**Energy Policy Act of 2005**
Key provisions of the Act provide for the development of streamline procedures for energy exploration and development, but the Act does not direct energy development in areas, such as IRAs. In response to the Act, a programmatic EIS (PEIS) has been developed by a multi-agency team to designate a system of West-wide energy corridors. This PEIS recognizes the Agency's policy on IRAs. Any proposal derived from West-wide energy corridor designation will be subject to this rule.

## METHODS, DATA, AND ASSUMPTIONS

#### Scope of Analysis

The Office of Management and Budget (OMB) Circulars as well as guidance regarding E.O. 12866 indicate that regulatory impact analysis should include benefit cost analysis, as well as an assessment of distributional effects. This report summarizes the benefits, costs, and distributional effects of three alternatives referred to as follows: 2001 rule, the forest plans alternative, and the Colorado Roadless Rule (proposed rule) (see section "Proposed Action and Alternatives" for details about management direction under the alternatives). The term roadless areas, as used throughout this chapter, generally refer to both the IRAs and CRAs.

The scope of this rulemaking consists of broad regulatory management prohibitions and exceptions. This is not a proposal for implementing any site-specific projects or activities in roadless areas. When a specific action is proposed for implementation in a roadless area, it would undergo environmental analysis and public review pursuant to NEPA before implementation could be authorized.

Commensurate with the broad geographic scale of this rule—covering more than 4 million acres of land—and the lack of any site-specific proposed projects or activities; the potential effects are primarily described in qualitative and comparative terms. The analysis of potential effects relies on resource information readily available from geographic information system (GIS) map coverage, resource inventory databases, and resource specialist reports (see chapter 3 of the RDEIS (USDA Forest Service, 2010)).

The two primary activities that differ between the alternatives are (1) roading, and (2) tree-cutting and removal. These two activities have the greatest likelihood of altering and fragmenting landscapes with a result of immediate, long-term loss of roadless area values and characteristics. Thus, to set the stage for subsequent sections, this section describes the relative differences in the amount of tree-cutting and roading projected to occur in roadless areas over the next 15 years. Projecting the potential for future tree-cutting and roading activities in roadless areas beyond a 15-year time horizon would be overly speculative in the context of this analysis.

Budgetary constraints include an assumption that the congressionally appropriated budget would remain flat over the next 15 years. Forest plan direction is another factor that constrains activities in roadless areas. Roading and tree-cutting are restricted in roadless areas wherever the applicable forest plan direction is more restrictive than what is allowed under each alternative.

### Benefits and Costs

Because the proposed rule does not prescribe site-specific activities, it is difficult to predict the benefits and costs of the different alternatives. In addition, the types of benefits derived from roadless characteristics and the uses of roadless areas are far ranging and include a number of non-market and non-use benefit categories that are difficult to measure in monetary terms. The rule potentially affects opportunities associated with future resource access and availability. As a consequence, benefits are not monetized, nor are net present values or benefit cost ratios estimated. Instead, increases and/or losses in benefits are discussed in a quantitative or qualitative manner in the context of the following measures:

- Changes in private sector opportunities associated with activities permitted or precluded (e.g., coal, oil and gas),
- Changes in non-market goods and services, ecosystem services, and sources of non-use benefits (e.g., recreational opportunities, forest health and wildfire management conditions, water quality provision, wilderness characteristics, status of threatened species) indirectly affected by activities permitted or precluded on roadless areas under the alternatives, and
- Agency costs and revenues accruing to the Forest Service (e.g., financial efficiency) from activities directly affected by the proposed rule.

The assessment of benefits and costs begins by distinguishing between the *creation of potential opportunities* and the *projection of reasonably foreseeable activities*. Potential opportunities for generating goods and services are affected by the extent to which activities are permitted in roadless areas under each alternative. Projections of reasonable foreseeable activities take into account area-specific data and evidence regarding resource utilization and development trends, location of resources, and other factors affecting the likelihood that land will be used for specific uses. This information is aggregated into assumptions about reasonably foreseeable flows of goods (e.g., coal, oil and gas production), services (e.g., reduction of risks from wildfire in the wildland urban interface), and resource utilization and then used to project activity levels (tree-cutting, roading) for each alternative over a 15 year time period. See “Data Sources” for details about estimates of projected activity levels. Projected activity levels can also be used to describe potential changes in benefits derived from roadless characteristics. Details about the derivation of activity projections are described in the revised DEIS for the proposed action (USDA Forest Service 2010), as well as the resource specialist reports supporting the RDEIS, and are not reiterated in this regulatory impact analysis document.

Benefits and costs are organized and discussed in the context of ‘local resource challenges’ and ‘roadless characteristics’ in an effort to remain consistent with the overall purpose of the proposed rule, recognizing that benefits associated with local concerns may trigger indirect benefits in the roadless characteristics in some cases (e.g., forest health). Access and designations for motorized versus non-motorized recreation are topics raised in comments during

scoping, however, the proposed rule does not provide direction on where and when OHV use would be permissible and makes clear that travel planning-related actions should be addressed through travel management planning and individual land management plans.

A number of resource and service areas are assessed in detail in chapter 3 of the RDEIS, but the differences in impacts to or from many of these resources or services are found to be minimal or insignificant across alternatives and therefore not discussed in detail in this report. These areas include livestock grazing, saleable minerals, other leasable minerals), locatable minerals[6], recreational special uses (including outfitters and guides), and non-timber products.

### Distributional Effects

The details about economic impact analysis for this report are provided in the revised Economics Specialist Report (USDA Forest Service 2010b). Distributional effects are discussed in the context of (1) changes in jobs and income for sectors where measurable output differs significantly across alternatives, (2) changes in revenue sharing (payments to states and counties) associated with receipts from sectors where output differs significantly, and (3) changes in opportunities for protecting values at risk in communities and counties adjacent to roadless areas.

Economic impact analysis is used to evaluate potential direct, indirect, and induced effects on the economy. Economic impacts are estimated using input-output analysis. Input-output analysis is a means of examining relationships in an economy, both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy, all else constant. This examination is called impact analysis. IMPLAN (Minnesota IMPLAN Group 2003) translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. The IMPLAN modeling system allows the user to build regional economic models of one or more counties for a particular year. The regional model for this analysis uses the 2006 IMPLAN data to be consistent with the model used for the analysis of the first proposed Colorado Roadless Rule and DEIS completed in 2008. IMPLAN was used to estimate regional or local economic impacts and the data used are compliant with the Data Quality Act (Section 515 of Public Law 106-554). The IMPLAN multipliers are derived from a specific set of cross-sectional data regarding employment, output, and expenditures from a single point in time (i.e., year). There is uncertainty associated with predicted impacts from the use of multipliers, but the uncertainty is expected to have a consistent effect on projected impacts across alternatives. As a consequence, greater attention should be focused on the relative differences in impacts across alternatives, and not the absolute values or precision of the predicted impacts; projected impacts are approximations.

To provide a statewide context for the analysis, all Colorado counties were organized into four model areas. Table 2 summaries the counties in each of these model areas. Figure 1 is map displaying the county composition of each model area.

[6] None of the alternatives affect rights of reasonable access to prospect and explore lands open to mineral entry and development of valid claims under the General Mining Laws of 1872.

**Table 2. Colorado Counties by Economic Impact Model Area**

| Model Area | Counties |
|---|---|
| Energy Roadless* | Delta, Garfield, Mesa, Montrose, Rio Blanco |
| Rural Roadless* | 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^ | 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 |

*** 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.**
**^ Some counties contain roadless areas.**
**Appendix J contains a list of those counties with roadless acres in their boundaries**

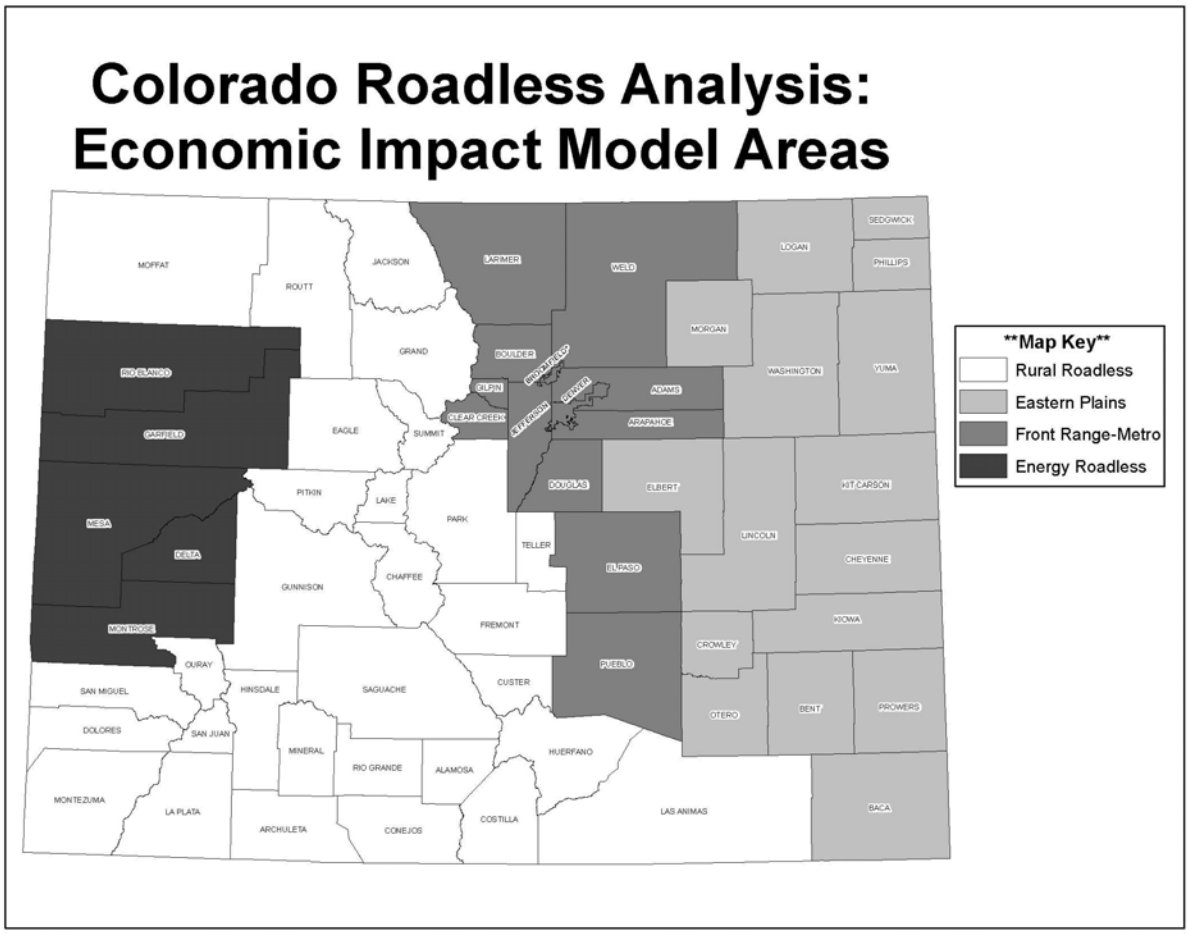


Figure 1. Colorado Roadless Analysis: Economic Impact Model Areas

Natural gas and coal industry sectors, potentially affected by roadless area management, are primarily in five western slope counties: Delta, Garfield, Mesa, Montrose, and Rio Blanco. The physical locations of natural gas and coal resources are found in other counties around the State of Colorado, but these locations are either (1) not affected by roadless management alternatives or (2) 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 in the northwest corners of Pitkin and Gunnison Counties[7]. Development of these resources would likely impact jobs and labor income in the five counties noted above rather than in the counties where the deposits are located. Labor and material flows to the resource locations, as well as production transport after extraction, are far more likely to impact Mesa, Garfield, and Delta Counties instead of Pitkin and Gunnison Counties. Two coal mining operations in Gunnison County currently provide a good example of these flows. Nearly all employees working at the mines

[7] Other counties within the San Juan basin (e.g., Archuleta, Mineral) have gas reserves and roadless area boundaries that change by alternative in Archuleta. However, oil and gas development is not projected to vary by alternative in the San Juan basin (see Energy and Minerals section of the RDEIS (USDA Forest Service, 2010)).

live in Delta, Montrose, and Mesa Counties. All the coal is transported out of the area down the North Fork Valley by rail.

For the reasons cited above, the economic impacts for oil, gas, and coal are modeled using only Delta, Garfield, Mesa, Montrose, and Rio Blanco Counties to represent changes in oil and gas production. Total annual production for the respective energy sectors (see "Distributional Effects: Economic Impacts" section for details about energy mineral production and output value estimation) are multiplied by current prices to estimate annual production value. The energy minerals model relies on annual production value to estimate employment (jobs/year) and labor income ($/year) contributed or supported by reasonably foreseeable projections of annual oil, gas, and coal production values.

For calculating fiscal impacts associated with revenue sharing (mineral lease payments – see Local Governments section), output values, by activity and alternative, have been allocated by county based on acres leased and/or available on which roads are allowed, as presented in the Energy Minerals section of the RDEIS (USDA Forest Service, 2010). The model[8] has been adjusted to fully account for all coal mining operations in Gunnison County. The Energy Roadless model area includes a variety of communities, ranging from small towns – such as Somerset – to the economic center of western Colorado – Grand Junction.

Protecting values-at-risk from wildfire in communities near roadless areas is a function, in part, of fuel treatment opportunities to reduce fuels in the wildland urban interface (WUI), as represented by the community protection zones (CPZs) which are defined as buffer areas ranging from 0.5 and 1.5 miles beyond at-risk communities. The communities that could potentially benefit from protection are assumed to be represented by those CPZs that overlap roadless areas where tree-cutting for fuel treatments is projected to be likely or highly likely under each alternative (see *Fire Ecology and Fuels* and *Economic Impacts* sections in this document for details).

[8] The model is developed using IMPLAN and is based on economic data from 2006. For details about the economic model development and application, see Economic section of the DEIS (USDA Forest Service, 2008).

**Baseline Description and Assumptions**

For the purpose of regulatory impact analysis, Forest Plan Direction (Alternative 3) is assumed to be the no action alternative to represent baseline conditions or goods and services provided by national forests and grasslands in the near future in the absence of the proposed rule. The baseline assumption is consistent with no action alternative used in the revised DEIS for the proposed rule (USDA Forest Service, 2010).

**Time Frame and Geographic Scope**

Environmental effects analysis for the different resource and service areas completed for the RDEIS for the proposed rule focuses primarily on a 15 year period, typical of a planning period. As such, the assessment of benefits, costs, and distributional effects (economic impacts) associated with projected activity levels also adopt a 15 year time period of analysis. The management direction associated with the alternatives applies to CRAs under the proposed rule and IRAs under the 2001 rule and the Forest Plans alternative. As such, the geographic scope of direct impacts from the proposed rule is primarily the State of Colorado; however, it is recognized that the scope of non-use benefits from roadless characteristics may extend well beyond local or State populations, up to the nation. Distributional effects and some benefit categories are characterized in the context of economic areas in Colorado, as noted above, to more accurately capture the direct, indirect, and induced effects of renewable and non-renewable commodity impacts.

**Data Sources**

The results discussed in this report are often based on analyses presented in the RDEIS for the proposed rule (USDA Forest Service 2010) as well as separate resource *Specialist Reports* (e.g., Minerals, Social and Economics, Recreation) completed to support and cited in the RDEIS. As such, this report makes frequent reference to the RDEIS and specialist reports to avoid the burden of reproducing analyses already presented in other supporting documentation; the reader is encouraged to review those reports and chapter 3 of the RDEIS for details about environmental effects as well as sources of data and information for effects analysis. Examples of data sources cited in specialist reports include:

Forest Service

- Region 2 INFRA database for roads
- Region 2 Cumulative Set Aside Program Analysis worksheets, by Forest unit
- LANDFIRE Rapid Assessment (RA) data for fire regime condition class
- Forest Health Composite Maps for insect and disease risk

Other Agencies

- BLM and USGS reports and leasable minerals databases for coal, and oil+gas reserves.
- USDA Natural Resource Conservation Service (NRCS) Soils Maps for Colorado

State of Colorado

- Colorado Department of Local Affairs (DOLA) – Employer and Employment Data for 2006

- Colorado Geological Survey: Leasable Minerals database.
- State 303(d)/305(b) Reports: Lists of Impaired Waters.

Public comments on the proposed rule were considered. In addition, each forest provided information regarding projected tree-cutting, harvest volumes, and roading that would likely occur in CRAs and substantially altered areas under each alternative for the proposed rule; no changes were made to this information for the proposed rule and RDEIS. Projections for activity levels consider flat budget trends. Each resource area section in the RDEIS provides further descriptions of the information used to project activity levels (USDA Forest Service 2010).

**Analysis Area for Road Construction and Tree-Cutting Projections**

The area of analysis is limited to National Forest System (NFS) lands 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 covers the same number of acres in order to compare the environmental effects of each alternative. The alternatives differ in terms of which acres would be managed according to a roadless rule and forest plan direction and which acres would be managed according to direction in the forest plan direction only. Table 3 displays the number of acres of the analysis area that would be managed according to a roadless rule and how many acres would be managed according to the forest plan under each alternative.

**Table 3 - Roadless Acres in Colorado by Alternative**

| | Total Analysis Area for all Alternatives = 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 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 the 2001 Roadless rule. The additional 409,500 acres within the analysis area that were found to contain roadless area characteristics would be managed according to the respective forest plans.

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 the forest plan and the Colorado Roadless Rule. 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 plans. This alternative designates 257,400 acres as CRA upper tier acres; with an additional 304,900 acres that are being considered for upper tier, labeled as optional upper tier acres.

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

Alternative 4 identifies 4.19 (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 forest plan and the Colorado Roadless Rule. 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 plans. This alternative designates 2,614,200 acres as CRA upper tier acres.

Projections of roading and tree-cutting activities are made based on the analysis area description above.

## Road Construction and Reconstruction (roading)

The projections are not equivalent to a proposal for an action. All projections for road construction or reconstruction are annual averages and can be expected to vary from year to year. The projections are based on the exceptions for road construction or reconstruction that may occur in roadless areas under the alternatives 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, and coal extraction, and for hazardous fuels reduction (adjacent to communities). Details are outlined below.

**Table 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 |
| Insect and Disease | 0.0 | 0.1 | 0.7* | 1.2 | 2.7 | 0.3* | 1.2 |
| Existing special use authorizations (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 |
| Existing Special Use Permits | 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 purposed 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 will be restored after use

Table 4 shows projected road construction across alternatives for 'general purposes'. Table 5 displays the annual projections for road construction and reconstruction by alternative that could occur in the analysis area for coal development.

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 acres analysis area. The 39,600 acre analysis area is 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 analysis 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 additional coal leasing within the entire 39,600 acre analysis area.

**Table 5. Distribution of average annual road construction and reconstruction projections in analysis area for each alternative, for coal 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 coal development | 1 | 1 | 3 | 0.1 | 5 | 3 | 0.1 |

Data source: Forest Service Region 2, August 2010.

Generally numbers rounded to nearest mile.

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, although it is not expected to happen.

Table 6 displays the total miles of roads constructed by alternative over the 15 year analysis period for coal development within the 39,600 acre analysis area.

**Table 6. Average road construction and reconstruction miles for coal development projected by alternative**

| Type of projected road construction or reconstruction | Average road construction and reconstruction – 15 years | | | | | | |
|---|---|---|---|---|---|---|---|
| | 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 ---------- | | | | | | |
| Temporary | 7 | 9 | 50 | 2 | 29 | 50 | 2 |
| Forest/Administrative* | 0 | 0 | 0 | 0 | 44 | 0 | 0 |
| Total Construction / Reconstruction (nearest mile) | 7 | 9 | 50 | 2 | 73 | 50 | 2 |

Data source: Forest Service Region 2, August, 2010.

Numbers rounded to the nearest mile. Totals may not add due to rounding

* These represent the highest level of road development, in some cases temporary roads may be used rather than a Forest or Administrative road.

Road construction and reconstruction for oil and gas development would occur almost exclusively on the Grand Mesa, Uncompahgre, and Gunnison (GMUG) and White River National Forests.

Overall, alternative 3 projects the greatest number of miles of road construction or reconstruction because under the other alternatives all future oil and gas leases as of the date of the Colorado Rule must have a no road construction stipulation. Under alternatives 2 and 4, roads for this purpose are only temporary and would not become forest or permanent roads.

Under alternatives 1 and 3 they are considered forest or administrative roads and could become permanent roads if determined appropriate according to the forest plan.

Table 7 displays the annual average projections for road construction or reconstruction for oil and gas development.

**Table 7. 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.

Table 8 displays a summary of the average total miles of road projected to be constructed or reconstructed annually under the alternatives for all activities, including oil and gas and coal exploration and development. Table 8 also displays the type of road (temporary or forest/administrative) that is projected to be constructed or reconstructed. Temporary roads are decommissioned when no longer needed or upon termination or expiration of the contract, authorization, permit. Generally, temporary roads are on the landscape for one to five years. Projected roads associated with oil and gas leases (listed in Table 8 as forest/administrative roads under alternatives 1 and 3 and temporary roads under alternatives 2 and 4) are on the landscape for the life of the well or approximately 30 years. A small portion of the temporary coal roads will be on the landscape longer than 5 years.

**Table 8. Average annual road construction and reconstruction miles projected by alternative**

| | 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 |
| Type of projected road construction or reconstruction | ---------- miles ---------- | | | | | | |
| Temporary | 1.7 | 1.6 | 6.6 | 2.7 | 11.0 | 4.8 | 2.7 |
| Forest/Administrative* | 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

* These represent the highest level of road development, in some cases temporary roads may be used rather than a Forest road.

## Tree-cutting and Removal

The projections are not equivalent to a proposal for an action. Projections are based on the exceptions under the alternatives where tree-cutting, sale and removal may occur in roadless areas under the four alternatives along with 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 each alternative, projections considered areas within the analysis area for the next 15 years. Table 9 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. The greatest number of acres where tree-cutting, sale or removal is projected to occur is under alternative 3 followed by alternatives 2, 4 and 1 respectively. More information about the likelihood of tree-cutting, sale or removal activities, including projected acreages for each aspect of the analysis area within each roadless area is contained in Appendix D of the RDEIS (USDA Forest Service, 2010).

**Table 9. 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 |
| Insect and Disease | 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.

## Benefits and Costs

#### Overview of Benefits Associated with Roadless Areas

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 NFs, 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 CRAs areas and/or who desire the retention of wildland characteristics for their children.

The word “value” can have a variety of meanings. In one sense, value can mean that which is desirable or worthy for its own sake. In another, value can mean a fair or equivalent in terms of money or commodities (Freeman, 2003). Economics considers value in the latter sense, using tradeoffs to determine the “equivalence.” Often these values and tradeoffs are expressed in monetary terms. At other times where monetary expressions are not available, value and tradeoffs are considered in qualitative terms. In this section, tradeoffs are discussed qualitatively.

In considering the financial benefits and costs of roadless area management alternatives in Colorado, revenues to the government can range from none to very high. Few revenues are typically obtained when road access is not permitted. At times, revenues in roadless areas might be limited to permit fees from outfitters and guides and livestock grazing. Conversely, road access can provide opportunities for large revenues, such as when leasable minerals are present and recoverable. Financial costs can also vary widely.

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.

**Preferences and Values Affected by Alternatives**

Since its inception, the Forest Service has managed NFS lands according to the principle of multiple-use. Multiple-use allows the Agency to manage land for a variety of uses, including amenity, commodity, noncommodity, recreation, and access. Designating certain areas for selected types of management requires consideration of not only the resources or commodities, but also of the full range of people's values. Because Americans show diverse orientations to these resources, the use, management, and designation of national forest lands is often inherently controversial. For details about the discussion below, see the Social Assessment section in chapter 3 of the RDEIS.

Likewise, management designation for roadless areas in Colorado is controversial. One of the central questions that frame the debate is commodity and noncommodity uses and how they can be balanced. Whereas people once valued NFs primarily for sources of commodities (e.g., timber, minerals, other goods traded in open markets), people's values for NFs have shifted toward recreation, environmental qualities, aesthetics, and amenities (e.g., non-market goods and services). Another central question for roadless area management is access, particularly for the designation of motorized and nonmotorized areas and how they can be balanced. This topic was raised in public comments for this rulemaking, but is better addressed in independent travel management planning (see section "Implications of Related Planning Efforts" in this report).

Forest values represent the importance and worth that people have assigned to CRAs. Forest values include, but are not limited to, aesthetic (e.g., scenery), biological diversity, cultural, economic/markets, bequest (consideration of future generations), ecosystem services/life sustaining, recreation, spiritual, subsistence, and existence/intrinsic (no direct or indirect use of forest is needed to gain value). 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 to different people.

The values and interests associated with roadless area management in Colorado can be identified from responses to comments the public has provided during the 2001 rule comment periods, the 2006 Colorado Task Force public hearings, and to the 2007 Colorado Roadless Rulemaking Notice of Intent and 2008 proposed rule comment periods. This is not a random sample; people who chose to respond to any 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. A total of nine broad categories of roadless values/interests are identified (see Table 10) and can be used to display the differences between alternatives, recognizing that value categories do not define specific individuals or groups.

**Table 10. Forest value/interest categories used for Colorado Roadless Area analysis**

| Value/Interest Category | Defined for Colorado roadless area analysis |
|---|---|
| Conservation | Values the balance of roadless area management between active management of resources for use and areas where natural processes dominate. |
| Industry Access | Values commercial activities in roadless areas such as timber, oil and gas development, mining, coal extraction, utilities, and other uses where appropriate. Value future access as needed to facilitate continued resource development and support of 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 values associated with actual use or visitation. |
| Recreational use – motorized | Value focuses 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, desire for additional roaded access is the preferred method of travel, the travel itself is the recreational experience. |
| Tourism (including ski resorts) | This category is another commercial interest, but capitalizing on the roadless areas as a natural amenity that attracts customers to the area for leisure activities. Scenery is of concern to this category, but the value of roading depends on the types of experiences the operation is providing. |
| Wilderness | Values roadless areas as roadless so those areas can be included in 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 or CWPP acres that overlap in roadless areas where vegetation treatments are desired to reduce hazards of wildfire. This category values reducing wildfire hazards to houses and communities no matter the location. This category does not focus on individuals living in the WUI. |

Table 11 demonstrates how individuals or groups who share or hold the respective values may respond to the alternatives. Some interests are more adaptable to differences between alternatives, and so more than one of the alternatives may be acceptable. Other interests are specific in their needs and values of roadless area resources, even small variations in potential impacts can result in undesired outcomes. The actual response of any group or individual to

activities related to roadless area management will depend on location, substitute sites, timing, mitigation measure, and other trends and events occurring outside Forest Service control.

**Table 11. Summary of social value and interest preference for alternatives by interest category**.

| Value/interest category | The 2001 rule | The proposed rule | Forest plans alternative |
|---|---|---|---|
| Conservation | | | Preferred |
| Industry Access | | | Preferred |
| Preservation | Preferred | Not acceptable | Not acceptable |
| Recreational use – motorized | | Preferred | |
| Recreational use – non motorized | Preferred | | |
| Roaded access | | | Preferred |
| Tourism | Nature/eco based, preferred | Acceptable | Motorized-adventure based and ski industry, preferred |
| Wilderness | Preferred | Not acceptable | Not acceptable |
| Wildland urban interface | | Acceptable | Preferred |

As noted in the section regarding "Purpose and Need," the proposed rule aims to provide greater management flexibility to address unique and local land management challenges while continuing to conserve roadless values and characteristics. State or local concerns revolve around commodity utilization (e.g., oil and gas, coal), access, forest health, and implications of forest health on community conditions (e.g., risk from severe wildfires). Roadless characteristics include a number of benefit categories involving a range of ecosystem services (e.g., water quality, biodiversity), primitive recreation, cultural sites, and other unique characteristics, many of which incorporate concepts of non-market or non-use values. The categories of benefits associated with local concerns and roadless characteristics clearly overlap in a number of cases (e.g., water quality protection), however, to facilitate discussion about the capability of the proposed rule to achieve a balance between local management challenges or concerns and roadless characteristics, benefits are grouped and presented according to these two areas.

## Analysis of Local Resource Concerns

### Timber (Wood Products) Supply

The National Forests in Colorado sold approximately 200 million board feet (MMBF) 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 available for timber management to achieve multiple use objectives and provide a sustainable supply of timber. 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 sometimes 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.

When considering the assumption that agency or program budgets will remain relatively flat, average total volume sold from NFS land may experience little change across all alternatives. Overall, the volume differences across alternatives are not anticipated to result in significant impacts to the wood products and forest service sectors[9].

### Minerals and Energy

Mineral and energy resources from IRAs can be of substantial value, and road access for exploration and development can have affect future development of these resources. On a national scale, mineral and energy contributions from IRAs are small, but, these contributions can have important economic impacts on local communities.

A wide variety of mineral and energy resources occur in CRAs. Mineral resources may be classified into three categories: locatable minerals, leasable minerals, and saleable minerals. Locatable minerals include commodities like gold, silver, molybdenum, copper, lead, zinc, cobalt, uranium, dimension stone, and certain varieties of limestone. Leasable minerals in Colorado include energy mineral resources such as oil, gas, coal and geothermal. Saleable minerals are common varieties of sand, stone, gravel, soil, and clay. Generally, they are widespread and of low value, primarily used for construction or landscaping materials. Their value is dependent upon market factors, quality of the material, and availability of transportation.

The lessees have exclusive rights to development of the Federal mineral estate covered by their lease, subject to standard lease terms, lease stipulations, and applicable regulations at the time of lease issuance. Under the referenced statutes, the Forest Service provides BLM with stipulations (operating constraints) to be included as needed for surface resource protection in leases on NFS lands. The Forest Service determines whether lease stipulations are needed during the environmental analysis that is completed for leasing.

This section addresses oil and gas, as well as coal and geothermal development; the effects of the proposed action on other minerals and energy sectors are expected to be minimal (see section “Other Resources, Services, and Programs”). For details as well as references and citations about

[9] Sectors include NAICS codes 113 (forestry), 1133 (logging), 1153 (Forstry Services), 321 (sawmills) and 322 (paper, pulp, and paperboard. Two Colorado mills are currently in operation and located in Montrose and Delta counties (USDA Forest Service, 2005).

the discussion below, see Leasable Minerals and Social and Economic sections in chapter 3 of the RDEIS (USDA Forest Service, 2010).

*Analysis of Alternatives: Oil and Gas*

Development of natural gas and oil resources generally consists of road and well pad construction, drilling of wells, and installation of infrastructure necessary for production. Roads are considered necessary for exploration and development of oil and gas. Clearing of vegetation and construction of well pads and right-of-ways for roads and pipelines are also necessary for development of oil and gas resources. Development activity (initial road and pad construction and drilling of wells) usually occurs intensively over a few months, or sometimes a few years in the case of large fields. Once production has been established, subsequent activity generally consists of well and road maintenance and inspections by operators and agency personnel. These activities usually occur on a regular, though not intensive (e.g., once weekly), basis as long as wells are in production. Producing wells and associated facilities and roads are likely to exist on the landscape for more than 15 years. Exploration wells that are dry holes (incapable of producing in paying quantities) are plugged and abandoned , and the well pad and access road are reclaimed, unless needed for other purposes.

Areas with high potential for oil and gas development to occur are in nationally significant natural gas-producing basins: the Piceance Basin (portions of the GMUG and White River National Forests) and the San Juan Basin (a portion of the San Juan National Forest). Natural gas resource development in these basins and roadless areas are active and there are leases currently being developed. Natural gas production from these lands contributes to supply necessary to meet demand locally, regionally, and nationally. The remainder of the analysis area is considered to have moderate to no potential for oil and gas occurrence, and low to no potential for development in the next 15 years.

Estimated projections of oil and gas wells, roads, and production carry a very high level of uncertainty about whether or not wells might be drilled and where they might be drilled. Projections do not represent any kind of binding limit on the number of future wells, but generally represent a maximum development scenario. 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 Reasonably foreseeable development scenarios (see Minerals section within Chapter 3 of the RDEIS).

Differences in oil production across the alternatives are relatively inconsequential. Projected oil production ranges from approximately 50,000 barrels under Alternatives 1, 2, and 4 compared to approximately 110,000 barrels under Alternative 3 over a period of 15 to 30 years (see Tables 16, 17, and 18).

The extent to which oil and gas production can occur in roadless areas varies by alternative as noted below. See “Distributional Effects: Economic Impacts” for additional discussion of oil and gas production and output across alternatives.

<u>Alternative 1 (2001 Rule)</u>

Under Alternative 1, road construction and reconstruction for oil and gas development would be allowed in IRAs only in conjunction with oil and gas leases that are issued before the effective date of the Colorado Roadless Rule and whose terms allow surface occupancy. Oil and gas leasing after the effective date of the Colorado Roadless Rule would be allowed per forest plans and leasing availability decisions, but road construction and reconstruction in conjunction with those leases would be prohibited. The newly identified roadless acres that are not within the IRAs under alternative 1, but included within CRAs under Alternative 2 and make up the remainder of the analysis area, follow forest plan and oil and gas leasing availability direction.

There are nineteen IRAs with more than 640 acres under lease (see Table 12). These 19 IRAs had approximately 154,200 acres leased as of September 2009. Roads would be allowed in conjunction with leases covering approximately 132,000 acres (85% of the leased area) and roads would be prohibited in conjunction with leases covering approximately 22,600 acres (15% of the leased area).

For effects analysis purposes, fourteen IRAs within the GMUG, White River, and San Juan NTs are considered to have high potential for oil and gas roads and development activity over the 15-year analysis timeframe and therefore be likely to have oil and gas development and associated road construction in conjunction with leases issued as of the effective date of the Colorado Roadless Rule.

**Table 12. Acres leased in IRAs as of September 2009[1] (**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-LaSal | Roc Creek[3] | 2,800 | 2,800 | 0 |
| Pike-San Isabel | Front Range[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 |
| **Totals** | | **154,200** | **132,000** | **22,600** |

Acres rounded to nearest 100. 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. 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.

[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.

Table 13 summarizes projections of oil and gas road miles, road acres, wells, well pads, pad acres, and production under Alternative 1 within IRA boundaries as well as for the analysis area as a whole which is the sum of land within IRAs and within new CRAs[10] (see Minerals section within Chapter 3 of the RDEIS for details about activity projections).

[10] Differences in projected production as well as activity levels within roadless area boundaries under the 2001 Rule compared to the proposed action, as originally reported in the RDEIS, were due to the differences in areas enclosed by IRA and CRA boundaries. When a consistent set of boundaries are used to represent an *analysis area* of equivalent size for all alternatives (i.e., IRAs plus new CRA roadless areas not included within IRA boundaries) for the GMUG, White River, and San Juan NFs, then production and development activity will be essentially the same for Alternatives 1 and 2. This result is supported by the fact that restrictions on road construction for oil and gas operations are the same for Alternatives 1 and 2 for their respective roadless areas. Given that IRAs exceed CRAs for the GMUG, CRAs exceed IRAs for the San Juan, and IRAs are approximately equal to CRAs for the White River NF, production and activity levels for the "analysis area" are approximated by taking the sum of production and activity levels for the GMUG and White River within IRAs for Alternative 1 and for the San Juan within CRAs for Alternative 2.

**Table 13 - Estimated 15-year projections of oil and gas production and development activities for the Analysis Area and within IRAs under Alternative 1.**

| | GMUG(1) | | San Juan (2) | | White River (3) | | Totals | |
|---|---|---|---|---|---|---|---|---|
| | Analysis Area (6) | IRAs Only | Analysis Area (6) | IRAs Only | Analysis Area (6) | IRAs Only | Analysis Area (6) | IRAs Only |
| Miles of Road | 19 | 19 | 25 | 11 | 100 | 100 | 144 | 130 |
| Acres of Road Disturbance (4) | 76 | 76 | 100 | 44 | 400 | 400 | 576 | 520 |
| Number of Wells | 43 | 43 | 63 | 36 | 580 | 580 | 686 | 659 |
| Well Pads | 19 | 19 | 49 | 22 | 83 | 83 | 151 | 124 |
| Pad Acres | 34 | 34 | 49 | 22 | 498 | 498 | 581 | 554 |
| Total Acres of Disturbance | 110 | 110 | 149 | 66 | 898 | 898 | 1275 | 1074 |
| Estimated Gas Recovery (bcfg)(5) | 152.0 | 152.0 | 226.8 | 129.6 | 667.0 | 667.0 | 1045.6 | 948.6 |
| Estimated Oil Recovery (barrels)(5) | 52500 | 52500 | 0 | 0 | 0 | 0 | 52500 | 52500 |

[1] GMUG: 13 wells on single-well pads of 1 acre each, 30 wells on 6 well pads of 3.5 acres each, average estimated ultimate per-well recovery of 0.8 BCFG and 3,500 BO from Mesaverde sandstones and 5 BCFG from Mesaverde coals.

[2] San Juan: Some wells are on multi-well pads. Well and pad numbers and average estimated ultimate per-well recovery of 3.6 bcfg verified by Walt Brown, San Juan National Forest, May 14, 2008.

[3] White River: All wells on 7-well pads of 6 acres each, average estimated per-well recovery of 1.15 BCFG.

[4] Road disturbance in acres is based on an estimated average disturbance of 4 acres/mile of road. Actual road miles and acres for an individual well may vary considerably from the average, depending on terrain and actual distance of the well from an existing road. Road miles include assumed co-located pipelines.

[5] Estimated ultimate recovery (EUR) is the estimated amount of oil or natural gas the projected wells could produce during average well life, which for the purpose of this reported is considered to be 30 years.

[6] The analysis area includes (1) land common to IRAs and CRAs, (2) substantially altered land within IRAs only, and (3) new roadless areas within CRAs only.

**Source:** As cited in Chapter 3 of the RDEIS (USDA Forest Service, 2010), projections are based on BLM RFDs, existing development decisions, existing lease terms allowing surface occupancy, and prohibitions on road construction and reconstruction in conjunction with future leases. Projections are considered maximums; actual activity levels could be less than shown.

The 308 IRAs that do not have existing leases are assumed to have 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.

The estimated effects over a 15 year timeframe include the following:

- There are a total of approximately 130 miles of roads and 1,074 acres of disturbance projected in IRAs. This level of disturbance constitutes about 1% of the acres in the 14 IRAs projected to have oil and gas roads and development, or about 0.03% of total IRA acres in Colorado. There are approximately 14 miles of additional roads and 200 additional acres of disturbance within the analysis area that are outside of IRAs

boundaries but within land that would be considered roadless (i.e., new CRAs) under Alternative 2.

  - If a consistent set of boundaries are used to represent the same *analysis area* for all alternatives (i.e., IRAs plus new CRA roadless areas not included within IRA boundaries), then production and development activity are approximated to be essentially the same for Alternatives 1 and 2. This result is supported by the fact that restrictions on road construction for oil and gas operations are the same for Alternatives 1 and 2 for their respective roadless areas.

- Access to an estimated 1046 bcfg of gas from the analysis area, including 949 bcfg from within IRAs and an additional 97 bcfg from lands outside of IRAs but within new CRAs.
- Though unlikely, there could be some non-quantified low level of activity, including roads, in conjunction with existing leases in IRAs with low development potential.
- Opportunities for exploration and development of oil and gas resources in all IRAs with potential for resource occurrence and not under lease prior to the effective date of the Colorado Roadless Rule would be foregone for the 15-year analysis timeframe.

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 surface occupancy and roads, similar to Alternative 1 with the exception that roadless boundaries differ. 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. The substantially altered acres that are within the analysis area but not within the CRAs under alternative 2 follow forest plan and oil and gas leasing availability direction.

There are twenty CRAs with more than 640 acres under lease on the GMUG, White River, and San Juan National Forests. These 20 CRAs had approximately 159,300 acres leased as of September 2009. Roads would be allowed in conjunction with leases covering approximately 136,700 acres (86% of the leased area), and roads would be prohibited in conjunction with leases covering 22,700 acres (14% of the leased area). For effects analysis purposes, fifteen CRAs on the GMUG, White River, and San Juan NFs (Table 14, CRAs in boldface) are considered to have high potential for oil and gas roads and development activity in the next 15 years and therefore projected to be likely to have oil and gas development as of the effective date of the Colorado Roadless Rule.

**Table 14 - Acres leased in CRAs as of September 2009**[1] (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 | Proposed 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 | 2,101 | 0 |
| | **Turner Creek** | 6,900 | 6,900 | 0 |
| Manti-LaSal | 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** | 12,000 | 8,900 | 3,100 |
| | **Reno Mountain** | 9,700 | 9,700 | 0 |
| | **Thompson Creek** | 15,600 | 15,600 | 0 |
| **Totals** | | **159,300** | **136,700** | **22,700** |

Acres rounded to nearest 100. Totals may not add due to rounding.

[1] CRAs with fewer than 640 acres under lease (including the S. San Juan CRA on the SJ NF) 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. 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.

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

[3] CRAs 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 CRAs.

Table 15 summarizes projections of oil and gas production and development activity under Alternative 2 within CRA boundaries as well as for the analysis area as a whole which is the sum of land within CRAs and substantially altered lands previously included within IRAs but excluded from CRAs.

**Table 15 - Estimated 15-year projections of oil and gas production and development activities for the Analysis Area and within CRAs under Alternative 2**

| | GMUG(1) | | San Juan (2) | | White River (3) | | Totals | |
|---|---|---|---|---|---|---|---|---|
| | Analysis Area (6) | CRAs Only | Analysis Area (6) | CRAs Only | Analysis Area (6) | CRAs Only | Analysis Area (6) | CRAs Only |
| **Miles of Road** | 19 | 16 | 25 | 23 | 100 | 100 | 144 | 139 |
| **Acres of Road Disturbance (4)** | 76 | 64 | 100 | 94 | 400 | 400 | 576 | 558 |
| **Number of Wells** | 43 | 40 | 63 | 61 | 580 | 580 | 686 | 681 |
| **Well Pads** | 19 | 16 | 49 | 47 | 83 | 83 | 151 | 146 |
| **Pad Acres** | 34 | 31 | 49 | 47 | 498 | 498 | 581 | 576 |
| **Total Acres of Disturbance** | 110 | 95 | 149 | 141 | 898 | 898 | 1275 | 1134 |
| **Estimated Gas Recovery (bcfg)(5)** | 152.0 | 141.2 | 226.8 | 219.6 | 667.0 | 667.0 | 1045.8 | 1027.8 |
| **Estimated Oil Recovery (barrels)(5)** | 52500 | 49000 | 0 | 0 | 0 | 0 | 52500 | 49000 |

1. GMUG: 10 wells on single-well pads of 1 acre each, 30 wells on 6 well pads of 3.5 acres each, average estimated ultimate per-well recovery of 0.8 BCFG and 3,500 BO from Mesaverde sandstones and 5 BCFG from Mesaverde coals.

[2] San Juan: Some wells are on multi-well pads. Well and pad numbers and average estimated ultimate per-well recovery of 3.6 bcfg verified by Walt Brown, San Juan National Forest, May 14, 2008.

[3] White River: All wells on 7-well pads of 6 acres each, average estimated per-well recovery of 1.15 BCFG.

[4] Road disturbance in acres is based on an estimated average disturbance of 4 acres/mile of road. Actual road miles and acres for an individual well may vary considerably from the average, depending on terrain and actual distance of the well from an existing road. Road miles include assumed co-located pipelines.

[5] Estimated ultimate recovery (EUR) is the estimated amount of oil or natural gas the projected wells could produce during average well life, which for the purpose of this reported is considered to be 30 years.

[6] The analysis area includes (1) land common to IRAs and CRAs, (2) substantially altered land within IRAs only, and (3) new roadless areas within CRAs only.

**Source:** As cited in Chapter 3 of the RDEIS (USDA Forest Service, 2010), projections are based on BLM RFDs, existing development decisions, existing lease terms allowing surface occupancy, and prohibitions on road construction and reconstruction in conjunction with future leases. Projections are considered maximums; actual activity levels could be less than shown.

Under Alternative 2, 343 CRAs 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 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.

The estimated effects of Alternative 2 over a 15-year time period include the following:

- There are a total of approximately 139 miles of road and 1,134 acres of disturbance projected in CRAs. This level of disturbance constitutes about 1% of the acres in the fifteen CRAs projected to have oil and gas roads and development, or about 0.03% of the total proposed CRA acres in Colorado. There are approximately 5 miles of additional roads and 141 additional acres of disturbance within the analysis area that are outside of CRA boundaries but within substantially altered IRA lands that would be considered roadless under Alternative 1.

- As noted for Alternative 1, if a consistent set of boundaries are used to represent the same *analysis area*, then production and development activity are approximated to be essentially the same for Alternatives 1 and 2. This result is supported by the fact that restrictions on road construction for oil and gas operations are the same for Alternatives 1 and 2 for their respective roadless areas.

- Access to an estimated 1046 bcfg of gas from the analysis area, including 1028 bcfg from within CRAs and an additional 18 bcfg from lands outside of CRAs but within substantially altered IRAs.
- Though unlikely, there could be some non-quantified low level of activity, including roads, in conjunction with existing leases in CRAs with low development potential.
- Opportunities for exploration and development of oil and gas resources in all CRAs with potential for resource occurrence and not under lease prior to the effective date of the Colorado Roadless Rule would be foregone over the 15-year analysis timeframe.

Alternative 3 (Forest Plan Direction, No Action)

Under Alternative 3, road construction and reconstruction for oil and gas development would be allowed in IRAs in conjunction with existing and future oil and gas leases whose terms allow surface occupancy and roads as well as the analysis acres that are not within the IRAs. Future oil and gas leases could be offered, sold, and issued under the direction of forest plans and oil and gas leasing availability decisions. 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, in contrast to Alternatives 1 and 2 where no waivers are allowed.

Oil and gas leasing with subsequent development could also occur in currently unleased IRAs 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.

Though IRAs or CRAs are not retained under Alternative 3, effects results for lands within IRA boundaries are discussed to provide comparison with other alternatives. There are 19 IRAs with more than 640 acres are under lease. These 19 IRAs had approximately 268,500 acres leased or available for leasing as of September 2009. Roads would be allowed in conjunction with existing and future leases covering approximately 173,100 acres (64% of the leased and available acres), and roads would be prohibited in conjunction with existing and future leases covering approximately 95,400 acres (36% of the leased and available acres). For effects analysis purposes, fourteen IRAs (see Table 16) 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 and therefore likely to have oil and gas development in conjunction with existing leases and future leases issued under direction of forest plans and leasing availability decisions.

**Table 16 - Acres leased and acres available for leasing under forest plans and oil and gas leasing availability decisions as of September 2009 under Alternative 3 (7).** (IRA lands 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 | IRA[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 | 32,600 | 10,500 |
| | **Raggeds[4]** | 2,100 | 13,300 | 12,300 | 1,100 |
| | **Salt Creek** | 1,000 | 11,000 | 1,400 | 9,600 |
| | **Springhouse Creek** | 17,600 | 17,500 | 17,600 | 0 |
| Manti-LaSal | Roc Creek[5] | 2,800 | 0 | 0 | 0 |
| Pike-San Isabel | Front Range[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 Park** | 8,900 | 8,900 | 8,900 | 0 |
| | **East Willow** | 4,600 | 7,100 | 7,100 | 0 |
| | 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 |
| Totals | | 154,200 | 268,500 | 173,100 | 95,400 |

**Acres rounded to nearest 100. Totals may not add due to rounding.**

**[1] IRAs 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 IRA.**

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

**[3] 51,658 acres of Priest Mountain Roadless Area is designated not available for leasing.**

**[4] 3,091 acres of Raggeds Roadless Area is designated not available for leasing.**

**[5] IRAs 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.**

**[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 IRAs.**

**[7] 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.**

There are 115 IRAs that are available for leasing, but have no existing leases or less than 640 acres leased in an individual IRA. 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 IRAs. 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 IRAs on the San Juan National Forest are not included 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 IRAs designated as available for lease.

Table 17 summarizes projections of production and development activity under Alternative 3 for lands that would have been included within IRA boundaries under Alternative 1, as well as for the analysis area as a whole which is the sum of land within IRAs and within new CRAs.

**Table 17 - Estimated 15-year projections of oil and gas production and development activities for the Analysis Area and within IRA boundaries under Alternative 3**

| | GMUG(1) | | San Juan (2) | | White River (3) | | Totals | |
|---|---|---|---|---|---|---|---|---|
| | Analysis Area (6) | IRAs Only | Analysis Area (6) | IRAs Only | Analysis Area (6) | IRAs Only | Analysis Area (6) | IRAs Only |
| **Miles of Road** | 27 | 22 | 25 | 11 | 113 | 113 | 165 | 146 |
| **Acres of Road Disturbance (4)** | 108 | 88 | 100 | 44 | 452 | 452 | 660 | 584 |
| **Number of Wells** | 55 | 50 | 63 | 36 | 655 | 655 | 783 | 741 |
| **Well Pads** | 27 | 22 | 49 | 22 | 94 | 94 | 170 | 138 |
| **Pad Acres** | 45 | 40 | 49 | 22 | 564 | 564 | 658 | 626 |
| **Total Acres of Disturbance** | 153 | 128 | 149 | 66 | 1016 | 1016 | 1318 | 1210 |
| **Estimated Gas Recovery (bcfg)(5)** | 174.2 | 170.2 | 226.8 | 129.6 | 753.0 | 753.0 | 1154.0 | 1052.8 |
| **Estimated Oil Recovery (barrels)(5)** | 108500 | 108500 | 0 | 0 | 0 | 0 | 108500 | 108500 |

[1] GMUG: 15 wells on single-well pads of 1 acre each, 35 wells on 7 well pads of 3.5 acres each, average estimated ultimate per-well recovery of 0.8 BCFG and 3,500 BO from Mesaverde sandstones and 5 BCFG from Mesaverde coals.

[2] San Juan: Some wells are on multi-well pads. Well and pad numbers and average estimated ultimate per-well recovery of 3.6 bcfg verified by Walt Brown, San Juan National Forest, May 14, 2008.

[3] White River: All wells on 7-well pads of 6 acres each, average estimated per-well recovery of 1.15 BCFG.

[4] Road disturbance in acres is based on an estimated average disturbance of 4 acres/mile of road. Actual road miles and acres for an individual well may vary considerably from the average, depending on terrain and actual distance of the well from an existing road. Road miles include assumed co-located pipelines.

[5] Estimated ultimate recovery (EUR) is the estimated amount of oil or natural gas the projected wells could produce during average well life, which for the purpose of this reported is considered to be 30 years.

[6] The analysis area includes (1) land common to IRAs and CRAs, (2) substantially altered land within IRAs only, and (3) new roadless areas within CRAs only.

**Source:** As cited in Chapter 3 of the RDEIS (USDA Forest Service, 2010), projections are based on BLM RFDs, existing development decisions, existing lease terms allowing surface occupancy, and prohibitions on road construction and reconstruction in conjunction with future leases. Projections are considered maximums; actual activity levels could be less than shown.

IRAs 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 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. All other IRAs (not available or not analyzed for availability) are considered to have low to no potential for development.

The estimated effects of Alternative 3 over a 15-year time period include the following:

- There are approximately 146 miles of road and 1,210 acres of disturbance projected in IRAs. This level of disturbance constitutes about 1% of the acres in the 14 IRAs projected to have oil and gas roads and development, or about 0.03% of total IRA acres in Colorado. There are approximately 19 miles of additional roads and 108 additional acres of disturbance with the analysis area that are outside of IRA boundaries but within new CRA boundaries that would be considered roadless under Alternative 2.
    - In contrast to Alternatives 1 and 2 where production and development activity is approximately equal for the analysis area, production and activity are projected to be somewhat greater under Alternative 3 due to the availability of additional acres not yet leased in IRAs with high potential for development (compare Tables 15 and 17.5).
- Access to an estimated 1154 bcfg of gas from the analysis area, including 1053 bcfg from within IRAs and an additional 101 bcfg from lands outside of IRAs but within new CRAs.
- Though unlikely, there could be some non-quantified low level of activity, including roads, in conjunction with existing leases in IRAs with low development potential.
- Opportunities for exploration and development of oil and gas resources in IRAs 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 IRAs in areas with potential for oil and gas resource occurrence.

Alternative 4 (Colorado Roadless Rule with Proposed Public Upper Tier)

The effect under alternative 4 would be the same as alternative 2, with the exception that of the upper tier discussion. The upper tier acres proposed by members of the public contain existing leases. While the upper tier acres for alternative 4 have a road construction/reconstruction prohibition, road construction/reconstruction would be allowed pursuant to reserved or outstanding rights as provided for by statute or treaty, which would include a valid existing mineral leases. Upper tier designation would have no effect on road construction or reconstruction prohibitions as roads would be authorized under existing leases. Any lands lease in a CRA (alternative 4 proposed upper tier), 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.

*Analysis of Alternatives: Coal*

This section presents information and effects on accessibility to coal resources on National Forest System (NFS) lands subject to roadless rulemaking in Colorado. This analysis presents estimated projections of activities that might occur in the areas that would be managed as

roadless under each alternative, as well as the activities that would occur outside of the alternative's roadless areas that are within 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 Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG NF). For details about the information presented below, as well as citations/references, please see the "Coal" section in Chapter 3 of the revised DEIS (RDEIS) (USDA Forest Service, 2010). For a discussion of effects related to projected length of time for mining operations (and roads), as well as employment, income, and mineral payments/royalties paid to federal, state, and local governments, see the "Distributional Effects" section in this document.

Five national forest units in Colorado acknowledge that coal resources may exist within their boundaries; the Pike - San Isabel NF, the Routt NF, the San Juan NF, the White River NF and the GMUG NF. 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. On the San Juan National Forest, an estimated 1.5 billion tons of coal reserves may exist in the Durango Known Recoverable Coal Resource Area (overlaps with Pagosa Springs coalfield) in IRAs, CRAs, and non-roadless lands according to the San Juan Forest Plan. 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 these reserves are estimated to occur in IRAs and CRAs.

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, of which about 7,100 acres are in IRA and/or CRAs. 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.

Three underground mines (West Elk, Bowie #2, and Elk Creek) produce coal from private lands and leases on federal lands. Collectively, the three existing mines currently produce about 15 million tons per year, which accounts for about 40% of the coal production in Colorado.

Approximately 75 miles of roads have been constructed or reconstructed since the 1960s in IRAs and CRAs on the GMUG NF for the purposes of coal exploration, methane drainage and monitoring activities. Approximately 65 of those miles have been decommissioned and reclaimed. Currently about 15 miles of roads are in place for coal-mining purposes. Based on experience in the West Elk IRA, the decommissioning and subsequent reclamation is well established two to three years after reclamation.

No active 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. The GMUG roadless area of analysis is 39,600 acres which includes the 7,100 leased acres.

This analysis assumes that roads will be necessary pursuant to issuance of coal exploration licenses, and to exercise the rights granted by a coal lease (whether existing or future). Certain coal-related surface facilities and associated roads may exist on the landscape for many years (20- 30) in the case of ventilation shafts and monitoring or other facilities, or be of shorter term (less than 2, or 3 to 5 years) in the case of exploration holes or methane drainage (vent) wells, and other short term uses. 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 roads are presented over a 15-year period. For all alternatives, roading and mining activities would be done in a way that minimizes adverse effects by complying with lease stipulations, forest plan direction, regulations, and laws.

Alternative 1 (2001 Rule)

Alternative 1, road construction or reconstruction in IRAs would be limited to areas under lease prior to the effective date of the Colorado Rule. About 5,900 acres of the 14,000 acres currently under lease are in IRAs, 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.

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 road construction is projected. About 7 miles of this temporary road construction is on the 5,900 acres of existing leases in IRAs.
    - Any road construction would be done in a manner that minimizes effects to resources, prevents unnecessary 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.
- 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.
- Access to approximately 157 million tons of coal reserves including (1) 108 million tons of in IRAs that are currently under lease, and (2) about 49 million tons on 2,700 acres of coal resources within CRAs that are not within IRAs.

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

- Lost opportunities for exploration and development of unknown quantities 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 (not leased), and the Pike-San Isabel, Routt, San Juan, and White River National Forests.
- Lost opportunity for exploration of 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. Recoverable coal reserves rendered inaccessible are estimated to be 568 million tons.

- 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 "Distributional Impacts" 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 proposed 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 4,000 acres of the CRA lands in the North Fork Coal Mining area are currently under lease, as well as about 15,600 acres of currently unleased lands in CRAs for a combined access to about 20,000 acres. On lands within the CRAs that are not currently under lease, only coal in the North Fork Coal mining area in the Somerset coalfield would be accessible. Coal resources outside CRAs, including those in substantially altered acres would remain accessible according to Forest Plan direction.

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:

- Access to approximately 514 million tons of coal reserves including (1) 130 million tons on existing leases on about 4,000 acres of CRAs, and 3,100 acres in IRA not in CRA, (2) 285 million tons on about 15,600 acres of unleased lands within CRAs, and (3) 97 million tons on about 5,305 acres of unleased land in the substantially altered acres outside the CRA.
- A total of about 52 miles of roads constructed, including 50 miles of coal-related temporary or long-term temporary road construction and reconstruction within CRAs and 2 miles of coal-related temporary or administrative road construction and reconstruction on IRA acres that are not part of a CRA. This road construction primarily would be for coal exploration and/or methane drainage purposes. Roads would be constructed in a manner that minimizes adverse effects consistent with Forest Plan direction, regulation and laws. These roads would be closed to the public. When no longer needed, 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 are expected to be decommissioned in the 15 year analysis timeframe.
- Within CRAs, coal mine methane capture operations would be restricted to using existing coal mine roads, and would be prohibited from constructing new roads solely for methane capture operations, unless roads were constructed pursuant to an oil and gas lease issued

prior to the effective date of the Colorado rule. 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.

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

- Lost opportunity for exploration of un-leased federal coal resources on about 11,600 acres of the GMUG NF in IRAs that overlap with the Somerset and Grand Mesa coalfields. Recoverable coal reserves rendered inaccessible are estimated to be 212 million tons.

- 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.

Alternative 3 (Forest Plan Direction, 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.

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

- Access to portions of 46,000 acres of coal reserves in the Pagosa Springs coalfield (estimated at 1.5 billion tons for whole coalfield) that would be included within CRA or IRA boundaries under the other alternatives on the San Juan National Forest for coal leasing. Management area prescriptions which allow for leasing with protections for specific resources, and either, allow road construction, limit or restrict road building in some areas, or require no surface occupancy for leases that are in roadless areas. A total of approximately 39,600 acres would be accessible for coal-related activities in the analysis area; 7,100 acres are under existing leases in CRAs and/or IRAs.

- Ability to consider lands in IRAs for leasing in the Trinidad coalfield on the Pike-San Isabel National Forest (accessible under current Forest Plan direction, and road construction would be allowed), Carbondale coalfield on the White River National Forest (some management area designations allow road construction, others do not; there are some management designations that restrict mineral development), and the Green River coal region on the Routt National Forest (variety of management area designations some of which allow road construction, others do not; there are also some management designations that restrict mineral development).
- Access to approximately 724 million tons of recoverable coal reserves including (1) 130 million tons on existing leases on CRAs and/or IRAs, and (2) an estimated 595 million tons of unleased recoverable coal resources in the analysis area.
- A total of 73 miles of road constructed including approximately 64 miles of temporary or administrative road construction and reconstruction on about 31,000 acres of IRAs in the Somerset and Grand Mesa coalfields and 9 miles of temporary or administrative road construction or reconstruction on about 2,700 acres that are not in IRA but are in the analysis area. 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. Road construction and decommissioning would be subject to the same forest standards and direction as noted for Alternatives 1 and 2.
- At least 6 miles of coal-related road decommissioning within the 15 year analysis 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.

*Analysis of Opportunities: 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. The extent of Colorado's geothermal resource potential has yet to be assessed fully, and there is no definitive data indicating where and to what extent geothermal resources might occur in the roadless areas.

As noted in the "Minerals and Energy" section in Chapter 3 of the RDEIS (USDA Forest Service, 2010), there is currently only one geothermal lease application for geothermal resources 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 addressed Forest Service-managed 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.

Because road construction and reconstruction in IRAs (and CRAs) would be prohibited under Alternative 1, as well as Alternatives 2 and 4, with some exceptions that do not include geothermal development (see "Proposed Rule and Alternatives"), and roads are assumed to be necessary for the development of geothermal resources, these resources would not be developed under these Alternatives. Opportunities for exploration and development of geothermal resources in all IRAs and CRAs would be foregone for the 15-year analysis timeframe, recognizing that recent interest in geothermal development on National Forest land is limited to one lease application (located outside of roadless areas).

Alternative 3 would allow for development of geothermal resources in IRAs and CRAs to the extent that forest plans would allow for the necessary development activities (road construction) in areas within IRA/CRA boundaries. Specific geothermal assessment information is insufficient to quantify or even qualify the extent and location of possible development.

Compliance with Executive Order 13211 (Statement of Energy Effects)

Based on guidance for implementing Executive Order 13211 (E.O. 13211) of May 18, 2001, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use, issued by Office of Management and Budget (Memorandum for Heads of Executive Departments and Agencies, and Independent Regulatory Agencies (M-01-27), July 13, 2001), this proposed rule constitutes a "significant energy action" as defined in E.O. 13211 because projected reductions in coal production under the proposed rule are in excess of 5 million tons per year after 2024.

Projections of natural gas production are discussed in the RDEIS and the "Minerals and Energy: Analysis of Alternatives – Oil and Gas" and "Distributional Effects: Economic Impacts" sections within this report. Based on those projections, it has been determined that natural gas production varies across alternatives for only two National Forests (the Grand Mesa, Gunnison, and Uncompahgre (GMUG) and White River National Forests). It has also been determined that there is no appreciable difference in projected natural gas production between Alternatives 1 (2001 rule) and 2 (proposed rule) or alternative 4. The difference in potential natural gas production between alternatives 1, 2, or 4 (27 billion cubic feet per year) and alternative 3 (no action) (31 billion cubic feet per year) is a decrease of only 4 bcf/year, or 4 million mcf/year, which is well below the E. O. 13211 criterion for adverse effects of 25 million mcf.

Projected oil production ranges from approximately 50,000 barrels under Alternatives 1, 2, and 4 to approximately 110,000 barrels under Alternative 3 over a period of 15 to 30 years. The corresponding reduction in oil production per day under alternatives 1 or 2 or alternative 3 (no action) is inconsequential compared to the E. O. 13211 criterion of 10,000 barrels per day.

Based on *average* annual coal production rates estimated for economic impact analysis purposes, annual aggregate production across the three mines operating in the affected area is projected to be the same under the proposed rule and the no action alternative (i.e., forest plans alternative)

for the first 24 years after implementation (2011 to 2034). Coal production and production schedules are also projected to be the same for the proposed rule and alternative 4. It is only after 24 years (2035) that annual coal production is projected to decrease under the proposed rule compared to the no action alternative by an amount of 5.6 million tons per year which is the average annual production from the Elk Creek mine which ends after 2034. A decrease of 5.6 million tons is only slightly above the E. O. 13211 criterion of 5 million tons per year for significant adverse effects. Production is estimated to decrease by 6.0 million tons per year under the proposed rule compared to no action by 2058 when production ceases for all mines under the proposed rule. Coal production is projected to continue for an additional 22 years (until 2079) under the no action alternative.

The total reduction in recoverable coal reserves from roadless areas that are made accessible under the proposed rule, relative to no action alternative, is estimated to be 210 million tons (i.e., 724 - 514 = 210 million ton reduction). In comparison, the recoverable coal reserves[11] reported for the State of Colorado by the US Energy Information Administration ranges from 629 million tons in 2002 to 328 million tons by 2007[12], recognizing that direct comparisons of accessible coal reserves under the alternatives with recoverable reserves estimated by USEIA are difficult due to differences in estimation procedures. However, the reduction of 210 million tons made accessible under the proposed rule is only 2% of the total estimated recoverable reserves[13] for the state of Colorado in 2007 (9,692 million tons) and less than 0.1% of total estimated recoverable reserves for the nation in 2007 (262,689 million tons).

The estimated reductions in the production life of affected mines under the proposed rule compared to the no action alternative may be significant, particularly when considering potential increases in demand for coal from western mines[14] and the Nation as a whole[15]. However, both the proposed rule and the no action alternatives are projected to sustain similar production rates over an extended period of 24 years after implementation of the rule, and there are many other factors that are likely to have a more significant effect on energy markets after that time, compared to the effect of reduced production under the proposed rule which begins 25 years after implementation of this rule would occur (i.e., 2034). It is also noted that approximately 67% of all coal produced from Colorado in 2008 (32.7 million tons) was exported to other states, suggesting that regional markets and prices are likely to be heavily influenced by national prices, supplies, and market trends.

---

[11] "Recoverable Coal Reserves" consist of the quantity of coal that can be recovered (i.e., mined) from existing coal reserves at reporting mines. Source: US Energy Information Administration (EIA), Independent Statistics and Analysis (Table 14 - Recoverable Coal Reserves and Average Recovery Percentage at Producing Mines by State, 2000 - 2007) http://www.eia.doe.gov/cneaf/coal/reserves/reserves.html

[12] "2008 Coal Production and Employment for Colorado" Colorado Mining Association, Denver CO. www.coloradomining.com

[13] "Estimated recoverable reserves" consist of coal in the demonstrated reserve base considered recoverable after excluding coal estimated to be unavailable due to land use restrictions or currently economically unattractive for mining. Source: US Energy Information Administration (EIA), Independent Statistics and Analysis (Table 15 - Recoverable Coal Reserves at Producing Mines, Estimated Recoverable Reserves, and Demonstrated Reserve Base by Mining Method, 2000 - 2007) http://www.eia.doe.gov/cneaf/coal/reserves/reserves.html

[14] In 2007, the Energy Information Administration called for a 5% per year increase in coal production from western mines, but revised this statement in 2009, suggesting a slower rate of increase.

[15] Demand for coal is anticipated to increase as a consequence of 153 new coal-fired electricity plants to be built by 2025, many of which will be in states such as FL, TX, IL, KY that import Colorado coal. ("Colorado Mineral and Energy Industry Activities, 2006", Colorado Geological Survey, Department of Natural Resources, Denver CO.)

The reduction in coal production under the proposed rule (as well as alternative 4), relative to the no action alternative is not expected to have adverse effects on the productivity, competition, or prices in the energy sector regionally (or nationally) due to the following observations:

- Potential reductions in coal production under the proposed rule, relative to no action are not projected to occur until 24 years in the future (2035) and estimated reductions after year 24 (i.e., 5.6 million tons/yr) exceed the criterion of 5.0 million tons per year by only a small fraction. A second decrease in production of similar magnitude (6.0 million tons per year) is projected to occur farther in the future (2059) when all mines cease operation under the proposed rule.
- The reduction in total accessible coal reserves under the proposed rule relative to the no action alternative amounts to a relatively small percentage of total estimated recoverable reserves in the State of Colorado (2%) and the nation (<0.1%), and
- The reductions in reserves and production rates under the proposed rule compared to no action are estimated to occur well into the future (e.g., 24 and 48 yrs), and the relative impact of these reductions is expected to be insignificant compared to the impact of other factors that could affect regional and national energy markets by that time.

The reductions in annual production under the 2001 rule, compared to the no action (reductions range from 5.6 million tons per year beginning as early as 2013 and increase to 11.6 million tons by 2019) are somewhat greater than the reductions noted for the proposed rule (and Alternative 4), and production life is anticipated to extend for only 7 to 10 years under the 2001 rule compared to a longer production life under the no action alternative.

There is a substantial reduction in annual production under the 2001 rule alternative compared to the no action alternative (reductions range from 5.6 million tons per year beginning as early as 2013 and increase to 11.6 million tons by 2019), and production life is anticipated to extend for only 7 to 10 years under the 2001 rule compared to a longer production life under the no action alternative. The production reductions under the 2001 rule (i.e., 11.6 million tons/yr beginning around 2019) exceed the criterion of 5 million tons per year for adverse effects (but reductions are still relatively small), and decreases in operating life of the mines as well as total reserves may suggest the potential for adverse effects to regional markets. The impacts of a number of other factors affecting energy markets and national market trends are still expected to outweigh the effects of implementing the 2001 rule alternative.

Alternative 1 has the greatest reduction in production, and alternatives 2 and 4 have some reduction compared to forest plans.

No novel legal or policy issues regarding adverse effects to supply, distribution or use of energy are anticipated beyond what has already been addressed in the RDEIS, or the Regulatory Impact Analysis (RIA). None of the proposed corridors designated for oil, gas, and/or electricity under Section 368 of the Energy Policy Act of 2005 are within Colorado Roadless Areas.

The proposed rule does not disturb existing access or mineral rights, and restrictions on saleable mineral materials are narrow. The proposed rule also provides regulatory mechanism for consideration of requests for modification of restrictions if adjustments are determined to be

necessary in the future. As this action is a significant energy action, the above constitutes the Statement of Energy Effects.

.

Forest Vegetation and Health

Forest health is the perceived condition of forests based on age, structure, composition, function, vigor, level of insect and disease, presence and absence of exotic organisms, and resilience to disturbance including wildland fire. The following is a summary of information provided in the vegetation and forest health section of the RDEIS (USDA Forest Service, 2010).

Roadless areas provide a diverse array of forest vegetation, ranging from warm, dry pinyon-juniper woodlands to cold, moist sub-alpine forests. Approximately 28 percent of the Colorado roadless rule areas consist of non-forest cover types, composed of grasslands and meadows, shrublands, areas devoid of vegetation such as exposed bedrock, and a minor amount of surface water. The remaining 72 percent is forest, dominated by various species of trees.

Forest health conditions in roadless areas in Colorado are highly variable, with some areas considered healthier than others. 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. Fire suppression in the 20th century reduced tree mortality and resulted in forests with much higher tree density than existed historically. 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. 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 epidemic and spruce beetle epidemic. 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 affected fire frequency in some areas.

Recent outbreaks of insects and disease in Colorado have been larger than most historical outbreaks, although a spruce beetle outbreak in the 1940s and 1950s affected hundreds of thousands of acres on the White River Plateau In addition, recent outbreaks have been more synchronized than in the past, affecting different forest types. Recent outbreaks are attributable to stand conditions with high portions of susceptible, mature trees and a warmer climate. Some of the forest pests of high concern include the mountain pine beetle (activity was detected on over 200,000 acres in roadless areas within the analysis area in 2009; the current epidemic threatens to kill most mature lodgepole pine in Colorado and affects ponderosa pine that encompasses 183,000 acres as well as other pines), spruce beetle (activity was detected on approximately 27,000 acres in 2009), subalpine fir decline (a combination of forest pests have affected approximately 53,000 acres of subalpine fir in roadless areas as of 2009), and sudden aspen decline (SAD is estimated to occur on over 70,000 acres of aspen in 2009). Other insect and disease effects have been documented in relation to douglas fir beetle and white pine blister rust.

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: (1) thinning to improve stand health (important long-term strategy for mitigating bark beetles and fire); (2) sanitation (very effective in small isolated infestations, but may not be effective in outbreak conditions); (3) felling and treatment on site (very effective in small isolated infestations, but may not be effective in outbreak situations); (4) trap trees (baited with aggregation pheromones to attract large numbers of beetles).

Lower elevation mountain forests, primarily composed of ponderosa pine and douglas-fir, are generally considered outside their historical range of variation in terms of stand density. These forests are at risk of uncharacteristic, high-intensity fire and other forest health concerns. Management typically includes thinning of smaller trees and prescribed burning to reduce hazardous fuels, improve forest health, and restore ecological processes. Mastication is often used as a thinning method where there are no roads or no timber removal objective; roads are used when timber is removed and to increase the economic feasibility of treatments.

More moist (mesic) forest ecosystems, primarily lodgepole pine and spruce-fir, generally have too much biomass to use mastication to achieve management objectives. The current mountain pine beetle epidemic exceeds the Forest Service's ability to control it. Management in these forest types is limited to reducing hazardous fuels and salvaging dead and dying trees to recover economic value. The removal of large mature spruce trees within 2 years of being windthrown can prevent spruce beetle outbreaks. For details about forest cover, recent trends in forest cover and health, treatment methods, and analysis of forest health, see chapter 3 of the RDEIS (USDA Forest Service, 2010).

*Analysis of 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.

2001 Rule (Alternative 1)

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) necessary 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, 2,300 acres per year are projected to have tree-cutting activities for hazardous fuels reduction and other forest management purposes. This includes 1,200 acres in IRAs and 1,100 acres in CRAs that are not in IRAs. Tree-cutting on approximately 500 of the 2,300 acres is expected to be for protection against insect and disease outbreaks. Tree-cutting and road construction have more restrictions on the majority of the IRA acres. The restrictions on these activities under this alternative are more restrictive than restrictions for 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 will not substantially improve forest health and hazardous fuel conditions.

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. From a cumulative perspective, the 2001 rule would have an additive impact on reduced opportunities to improve forest health on forest lands as a whole when considering that similar activity constraints are in place in other protected areas such as wilderness and designated special areas, some of which are adjacent to roadless areas.

Colorado Roadless Rule (Alternative 2, 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. These exceptions would not be allowed within the 562,300 upper tier acres.

Tree-cutting to reduce the wildfire hazard to an at-risk community is restricted to within 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 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 and tree-cutting to prevent or suppress an insect or disease epidemic is 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 will greatly restrict what tree-cutting will be accomplished for forest health purposes.

Approximately 7,000 acres per year (5,800 acres within CRAs and 1,200 acres in the substantially altered acres within IRAs but not within CRAs) are projected to be treated by tree-cutting practices for hazardous fuels reduction and/or forest health purposes. Approximately 1,000 of the 7,000 acres are expected to focus on protection against insect and disease outbreaks.

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 community protection zones. 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 will impact forest health treatments, particularly within the CPZ.

Similar to the 2001 rule, the proposed rule would, to a slightly lesser extent, have an additive impact on reduced opportunities to improve forest health on forest lands as a whole when considering that similar activity constraints are in place in other protected areas such as wilderness and designated special areas, some of which are adjacent to roadless areas.

Forest Plan Direction (Alternative 3, 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.

Approximately 16,900 acres per year within the analysis area are projected to be treated with tree-cutting practices for hazardous fuels management and/or forest health purposes. An estimated 3,700 of the 16,900 acres are expected to be implemented for the purpose of protection against insect and disease outbreaks. 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.

Colorado Roadless Rule with Public Proposed Upper Tier ( Alternative 4, No Action)

This alternative provides greater opportunities to improve forest health to meet desired vegetation conditions compared to 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 within the CPZ. The CPZ within one-half mile of communities is approximately 285,000 acres; 43% or 122,000 are upper tier acres. Where the CPZ meets the requirements 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. 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 prevent or suppress an insect or disease epidemic 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 will greatly restrict what tree-cutting will be accomplished for forest health purposes.

Approximately 3,000 acres per year (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) are projected to be treated using tree-cutting practices for hazardous fuels reduction and/or other forest health purposes. An estimated 800 of the 3,000 acres are expected to be treated for insect and disease 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 in large portions of roadless areas.

Similar to Alternatives 1 and 2, Alternative 4 would have an additive impact on reduced opportunities to improve forest health on forest lands as a whole when considering that similar activity constraints are in place in other protected areas such as wilderness and designated special areas, some of which are adjacent to roadless areas.

## Fire Ecology and Fuels

This section addresses potential effects of each alternative on ability to treat hazardous fuels primarily within the wildland urban interface (WUI) and municipal watersheds because these are the major focus areas of the National Fire Plan, Healthy Forest Restoration Act (HFRA), Healthy Forest Initiative and congressional budget direction. The information in this section is primarily a summary of material presented in the "Fire and Fuels" section within Chapter 3 of the Revised EIS (USDA Forest Service, 2010); refer to that section for additional details.

A WUI refers to those areas where flammable wildland fuels are adjacent to homes and communities. The management of roadless areas under each alternative has different exceptions for road construction or reconstruction and tree-cutting, sale or removal which can affect the amount of hazardous fuels, frequency and intensity of wildfire, and responses to wildfires. This section is related to other vegetation and forest health topics which are addressed in the previous section of this report. The Fuels and Fire section of the RDEIS (USDA Forest Service, 2010) contains details about the material presented below and should be referred to for more information and references about fire ecology and fuels.

In April 1999, the General Accounting Office (GAO) published a report titled *Western National Forests: a Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats* (GAO 1999). In the report, the GAO asserts, "The most extensive and serious problem related to the health of national forests in the interior West is the over-accumulation of vegetation." In response to this study, as well as other studies and multi-agency initiatives, a report titled *Managing Impacts of Wildfires on Communities and the Environment* was published by the US Department of Agriculture and US Department of the Interior in 2000, describing a National Fire Plan. The National Fire Plan addresses: firefighting resource availability, rehabilitation, hazardous fuels reduction, community assistance, and accountability. It established a long-term hazardous fuels reduction program to reduce the threat of catastrophic wildfire to people, communities, and natural resources, while restoring forest and rangeland ecosystems to closely match their historical structure, function, and dynamics. As a result, hazardous fuel reduction treatments on NFS lands became a national priority. 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.

### *Fire Conditions and Fuel Treatments*

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 regime" refers to the nature of fire occurring over long periods and the prominent immediate effects of fire that generally characterize an ecosystem. The analysis area for this rule-

making generally falls into two fire regimes: III (less frequent, mixed severity); and IV (less frequent, high severity). Approximately 60% of the analysis area acreage, within 1½ miles of at-risk community, are in Fire Regime III and 20% are 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 leaving communities at-risk vulnerable to the negative impacts and potentially adverse consequences of wildland fires.

Fire Regime Condition Class, 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; fuel composition, fire frequency, severity, and pattern; and other associated disturbances, such as insect and disease mortality, grazing, and drought. Condition Class 1 refers to ecosystems still within estimated historical ranges of variability where there is low risk of losing key ecosystem components in the event of fire. Condition Classes 2 and 3 exhibit moderate and high departure and risk of losing key ecosystem components respectively.

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 lightening 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 nearly 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 will burn.

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 impacts from 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. 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.

While fuel treatments in themselves will 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. Some key findings from recent studies include:

- 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 that create irregular forest structures and compositions, both within and among stands (macro and micro mosaics), tend to produce wildfire resilient forests.
- Fuel treatment longevity and effectiveness are dependent on location, dead and live fuel ratios, and rate, composition, and structure of vegetation recovery. 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.

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 from High Severity Wildfires". 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."

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 was 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.

*Wildland Urban Interface (Community Protection Zones)*

At-risk communities (ARCs) are generally those with homes or other structures with basic infrastructure and services (such as utilities and roads), in or adjacent to Federal land, in which conditions are conducive to a large-scale wildfire that may cause a significant threat to human life or property. 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) (see USDA Forest Service, 2010) analysis is used as a proxy for communities-at-risk. The FOTE data maps communities at-risk in Colorado in the year 2000 and projects the communities at risk in the year 2030, based on projections of housing growth.

Census blocks identified as Rural II or Exurban/Urban (i.e., lands with 17 or more housing units per square mile) 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:

- Has 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 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 ARCs. 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.

By 2030, it is projected that 35% or greater of the roadless acres on each of the forests will 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.

*Analysis of Alternatives*

All fuel treatments; whether in roaded or roadless areas are performed to modify burning conditions. The 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 impacts from wildfire impacts. Fuel treatment projects around and within communities are performed to reduce fire hazard, thus reducing the potential damage to community resources and to increase the safety for the public and firefighters.

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; restrictions on roads affects capacity to implement a combination of treatment practices involving prescribed fire and mechanical treatments. Prescribed fire alone, without mechanical treatments, is not likely to be a primary fuels treatment within the WUI due to risk of escape.

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:

- No alternative 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.
- Less 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. Areas where there have been fuel treatments present suppression opportunities that otherwise may not be available.
- 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 community or municipal water supplies.

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. For details about potential changes in the likelihood of fuel treatments within CPZ areas (acres), by county, see the “Local Governments: Fuels Treatments” section within “Distributional Effects” in this report.

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. Precise magnitude and rate of climate change is uncertain, especially at finer scales. General conclusions in the western United States include temperature and precipitation increases, but also high variability in annual precipitation, including severe drought. As a majority of forest ownership in Colorado is on Federal lands, national forests are important for carbon storage.

2001 Rule (Alternative 1)

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 timber 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. 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 will generally consist of prescribed burning, mechanical treatments using existing roads, and hand treatments.

Under this alternative the Forests project approximately 900 acres per year of mechanical fuels treatments (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. The Forests project an additional 500 acres per year of tree-cutting for purposes other than hazardous fuels reduction that may or may not modify fire behavior to meet desired conditions (not including incidental, administrative or personal use tree-cutting). 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 will 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.

Indirect effects of this alternative include increased exposure of firefighters and/or contract workers to possible injury due to reliance on hand treatment methods. Further, the reduction of priority treated acres over time is likely to impact the ability to reduce threats to at-risk communities and other WUI values which may result in increase fire suppression costs, property loss and other economic impacts. The restrictions on treatments and road construction could result in fewer tactical options being available to fire management personnel (e.g., fewer roads to serve as fuel breaks, suppression firelines, anchor points, and most importantly as safety zones for firefighters). By modifying fire behavior, fuel treatments present suppression opportunities that otherwise may not have been available. The lack of established or temporary travel-ways may directly affect the efficiency and timeliness of wildland fire suppression response should it occur within an IRA.

With the limited level of fuel treatments projected in this alternative, fire severity may be higher and fires may be larger. The higher severity and larger fire size could (1) adversely affect critical resources such as wildlife habitat, vegetation, critical watersheds, and cultural resources, (2) result in the need for extensive and costly restoration and rehabilitation needs within roadless

areas, and (3) result in increased adverse post fire effects due to erosion and slower vegetation recovery on community or agricultural water supplies as compared to other alternatives. The 2001 Rule places the most limits on capacity to more strategically locate treatment areas on the landscape to improve the efficiency and effectiveness of efforts to reduce wildfire risks associated with National Forest lands as well as cumulatively across all ownerships.

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

There will 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 will impact suppression opportunities and could result in the need for extensive and costly restoration and rehabilitation.

The cumulative effect of climate change and excess fuels on wildfire severity and insect and disease outbreaks is relatively higher under the 2001 rule compared to the other alternatives.

Colorado Roadless Rule (Alternative 2, Proposed Action)

This alternative is less restrictive than alternatives 1 and 4, but more restrictive than alternative 3 in treating hazardous fuels. 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 these treatments will 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 will generally consist of prescribed burning, mechanical treatments, and hand treatments.

Under this alternative, the Forests project approximately 5,300 acres per year of mechanical fuels treatments (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. This percentage increases to 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, have a projected 600 acres per year of mechanical fuels

treatments. The Forests project an additional 1,100 acres per year of tree-cutting for purposes other than hazardous fuels reduction that may or may not modify fire behavior to meet desired conditions (not including incidental, administrative or personal use tree-cutting). 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 treated per decade with an additional 2.6% of the "substantially altered acres" treated per decade according to forest plan direction.

The increased flexibility for temporary road construction in the first 0.5 mile of the CPZ as opposed to alternative 1 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 these 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. The alternative limits the purpose of hazardous fuels reduction outside of the CPZ to reducing the wildfire risk to municipal water supply systems only. Upper tier acres of the CRAs cannot have fuel treatments.

There will 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 has shown that under moderate fire weather conditions, gusts of 20 mph produce spotting distance of over ½ miles 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.

The higher severity and larger fire size could result in increased adverse post fire effects from erosion and slower vegetation recovery on community or agricultural water supplies as compared to other alternatives. Short term consequences may include potential impacts on wildlife, especially during periods of use; localized soil disturbance, and aesthetic qualities of the area.

Although this alternative does not restrict the management response to a wildfire, the restrictions on treatments and road construction outside the CPZ could result in fewer tactical options being available to fire management personnel in these areas. With the level of treatments projected in this alternative there will be fewer areas that firefighters could utilize in suppression efforts than Alternative 3 but more than Alternative 1. Suppression opportunities will be impacted by the restrictions on tree-cutting and road construction. During the active life of the temporary roads constructed for hazardous fuels treatments, they will provide short term increased firefighting efficiencies in the event a fire starts in that area. In the event of a wildfire, there could be the need for extensive and costly restoration and rehabilitation.

Other longer term environmental consequences may include loss of vegetation within the temporary road corridor and decreased aesthetic qualities associated with roadway closure

through obliteration and rehabilitation. Additional effects, though likely to be minimal due to the temporary nature of the road, may include increased soil erosion, sedimentation, and compaction; and conduits for moving organisms across the landscape including invasive species. In contrast, roads may also serve as barriers that prevent or impede movement of some organisms.

The cumulative effect of climate change and excess fuels on wildfire severity and insect and disease damage would be slightly reduced under Alternative 2, compared to Alternative 1 and 4, but greater than Alternative 3.

Forest Plan Direction (Alternative 3, No Action)

This alternative is the least restrictive of the four alternatives in treating hazardous fuels. Under this alternative, tree-cutting, sale or removal and road construction follows the direction in the forest plans. Depending on the forest plan direction, this alternative provides the most management flexibility of the three 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 forest projections, approximately 13,100 acres per year of mechanical fuels treatments (tree-cutting, sale or removal) is projected to occur in the analysis area. The forests project an additional 3,600 acres per year of tree-cutting for purpose other than hazardous fuels reduction that may or may not modify fire behavior to meet desired conditions (not including incidental, administrative or personal use tree-cutting). Projections show 3.6% of the analysis area will be treated per decade under alternative 3.

The increase in treatments being implemented reflects the ability of the forests 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. Alternative 3 places the fewest limits on capacity to strategically locate treatment areas on the landscape to improve the efficiency and effectiveness of efforts to reduce wildfire risks associated with National Forest lands as well as cumulatively across all land ownerships.

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 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. There may be more areas that firefighters could utilize in suppression efforts with a reduction in firefighter exposure. 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.

The cumulative effect of climate change and excess fuels on wildfire severity and insect and disease damage would be reduced the most under Alternative 3, compared to the other alternatives.

Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

This alternative is less restrictive than alternative 3, but more restrictive than alternatives 1 and 2 in treating hazardous fuels. 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 will generally consist of prescribed burning, mechanical treatments, and hand treatments.

Under this alternative the Forests project approximately 1,600 acres per year of mechanical fuels treatments (tree-cutting, sale or removal) 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. This percentage increases to 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, have a projected 600 acres per year of mechanical fuels treatments. The Forests project an additional 800 acres per year of tree-cutting for purposes other than hazardous fuels reduction that may or may not modify fire behavior to meet desired conditions (not including incidental, administrative or personal use tree-cutting). 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 are treated per decade with an additional 2.6% of the "substantially altered acres" treated per decade according to forest plan direction.

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 this purpose is prohibited.

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

Public Health and Safety

Under all alternatives, roads may be constructed or reconstructed in the roadless areas: (a) where needed to protect public health and safety in cases of threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property (temporary roads only

under the proposed rule); (b) where needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 311 of the Clean Water Act, or the Oil Pollution Act; and (c) where needed to improve road safety of a forest road determined to be hazardous on the basis of accident experience or accident potential on that road. The Forest Service will therefore continue to respond, under all alternatives, to all potential public health and safety situations in roadless areas including response to wildfires, chemical or oil spills, abandoned mine hazards, road-design hazards, hazard trees, and others. Roads may be constructed or reconstructed in roadless areas for required health and safety responses. The roads built for these purposes would generally be temporary.

The key difference among alternatives with respect to effects on public health and safety is related to how differences in the amount of roads in roadless areas influence agency response to public health and safety emergencies in those areas. Under the 2001 rule, the lower number of road miles projected to occur in roadless areas would continue to limit the responsiveness and timeliness to emergency health and safety situations that may arise in those areas. Under the Alternative 4, the proposed rule (Alternative 2), and even more so under Alternative 3, the respectively increasing number of road miles projected to occur in roadless areas may facilitate responses to emergency health and safety situations, however, upper tier acres in Alternatives 2 and 4 do not have a specific public health and safety exception for road construction, as does alternative 1.

In addition, as the projected road miles increase under Alternative 4, the proposed rule, and Alternative 3 respectively, there would be associated increases in the amount of management activities and vehicle traffic in those roadless areas. As the amount of management activity and traffic increases, so does the potential for increases in safety hazards and accidents.

For mitigating risks associated with safety hazards at abandoned mines and some other non-CERCLA safety issues, it is expected that most of these can be handled by means that do not require additional roading.

Special Use Authorizations: Non-Recreational

In Colorado, there are approximately 3,900 lands-related special use authorizations on NFS lands authorized to individuals, business entities, State and local governments, and other Federal agencies (for detailed discussion of special uses, see Lands – Special Use Authorizations in chapter 3 of the RDEIS). These uses include roads, reservoirs, weather and climate monitoring stations, communication lines and sites (for cellphone, radio, television, microwave, or other transmissions), railroads, service buildings of all types, electric transmission and distribution lines, oil and gas pipelines, ditches and other water conveyance facilities (see Recreation and Ski Areas sections for specials uses associated with recreation). These authorized uses provide a variety of products to individuals and the general public and are part of the multiple-use management mission of the Forest Service. The number of land use authorizations in the roadless areas in Colorado is not known at this time because of incomplete GIS spatial (map) information for each authorization. However, personnel from each NF in Colorado provided projections for

new roads that would likely be needed to support current or anticipated land use authorizations in roadless areas.

Where these kinds of special land use authorizations occur in the roadless areas in Colorado, they can result in both beneficial and detrimental effects on roadless area characteristics and values, depending on the use, the requirements and administration of the authorization, the responsibility taken by the holder of the authorization, environmental conditions, and personal values.

The Alaska National Interest Lands Conservation Act (ANILCA) requires the Agency to provide access to private properties on public lands based on the reasonable use and enjoyment of the property. There are currently some private properties that require road access authorizations through portions of roadless areas. Additionally, there are currently authorized third-party-owned facilities in roadless areas that require some type of access in parts of some roadless areas. Roads built to access privately owned facilities or properties are constructed to minimum standards, based on site-specific analysis and resource conditions, and the planned use of the property. These roads are generally closed to public vehicle traffic. Proposed uses in the near future may include irrigation ditches, wells and other water systems, fences, access roads, powerlines, or other facilities.

Temporary roads are sometimes built in roadless areas for emergency fire suppression purposes, other emergency situations, or as needed for public health and safety purposes. All alternatives would continue to allow temporary roads in roadless areas for those circumstances.

The Department of Energy and BLM are leading the preparation of an EIS regarding designated energy corridors on Federal lands in 11 contiguous western states including Colorado. The RDEIS (USDA Forest Service, 2010) does not indicate that energy corridor designations would go through IRAs or CRAs in Colorado. Currently there is one proposal for authorized use of NFS land in a roadless area (on the Routt NF) for development and operation of wind energy facilities.

The Agency anticipates an increase in proposals for new reservoirs and associated water conveyance systems on NFS lands in the future. There is also the potential for proposals for new microwave, radio, or television communication facilities on NFS lands in roadless areas.

Incidental tree removal occurs in roadless areas as needed to support special use authorizations for pipelines, utilities, water conveyance systems, and all other needs. Incidental tree-cutting would continue to be allowed in roadless areas under all 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. Forest plan direction that discourages or restricts the location of certain SUA facilities is followed in all alternatives and does not vary by alternative.

The following land SUA facilities are evaluated in this report: 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 for existing leases within roadless areas are analyzed in the oil and gas section of this EIS.

*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 does not vary by alternative.

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.

2001 Roadless Rule (Alternative 1)

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.

Proposed Colorado Roadless Rule (Proposed Action, Alternative 2)

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 will 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. Forests project 0.7 miles of LCZ annually to construct oil and gas pipelines from sources outside of CRAs.

If it is determined that the pipeline will 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.

Forest Plan Direction (No Action; Alternative 3)

This alternative is the same as alternative 1. Forests project 1.1 miles of LCZ annually to construct oil and gas pipelines from sources outside of roadless areas.

Proposed Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

This alternative is the same as alternative 2. Forests project 0.7 miles of LCZ annually to construct oil and gas pipelines from sources outside of CRAs.

*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.

2001 Roadless Rule (Alternative 1)

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. Forests project 2.0 miles of LCZ annually to construct electrical power lines or telecommunications lines within IRAs.

Not allowing roaded access to future proposed uses could create economic consequences and environmental effects if siting is located outside of IRAs (e.g., longer and more expensive construction of the linear facility, difficulty connecting to electrical grid, etc.).

Proposed Colorado Roadless Rule (Proposed Action, Alternative 2)

Electrical power lines and telecommunication lines shall 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 will 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. Forests project 2.0 miles of LCZ annually to construct electrical power lines or telecommunications lines within CRAs.

Not allowing roaded or LCZ access to future proposed uses could create economic consequences and environmental effects if siting is located outside of IRAs (e.g., longer and more expensive construction of the linear facility, difficulty connecting to electrical grid, etc.).

Forest Plan Direction (No Action; Alternative 3)

Other than forest plan direction that 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 by placing the electrical power line or telecommunication line in the most

economically viable location for connection to the electrical grid. Forests project 2.0 miles of LCZ annually to construct electrical power lines or telecommunications lines within the analysis area.

Proposed Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

This alternative is the same as alternative 2. Forests project 2.0 miles of LCZ annually to construct electrical power lines or telecommunications lines within CRAs.

*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. 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.

2001 Roadless Rule (Alternative 1)

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. Forests project 0.5 miles of LCZ within IRAs for this purpose.

If roaded access is necessary, future water conveyance structures would not be located in IRAs. Not allowing roaded access to future proposed uses could create economic consequences and environmental effects if siting is located outside of IRAs (e.g., longer and more expensive construction of the linear facility, difficulty connecting to electrical grid, etc.).

For currently authorized water conveyance structures, estimates are for 0.8 miles of road construction/reconstruction annually for IRA acres. No construction/reconstruction is estimated for the additional CRA acres that are not roadless under this alternative.

Proposed Colorado Roadless Rule (Proposed Action, Alternative 2)

If uses are authorized in CRAs in the future, the Regional Forester must determine if road construction and linear construction zones are allowed and this is 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. Forests project 0.5 miles of LCZ within CRAs for this purpose.

If roaded or linear construction zone access are necessary for future water conveyance structures that do not currently have a pre-existing water court decree, those conveyances cannot be located in CRAs. Not allowing roaded access to future proposed uses could create economic consequences and environmental effects if siting is located outside of IRAs (e.g., longer and more expensive construction of the linear facility, difficulty connecting to electrical grid, etc.).

For currently authorized and future authorized water conveyance structures operated pursuant to a pre-existing water court decree, estimates are for 0.3 miles within CRAs and 0.5 miles within the remainder of the analysis area of road construction/reconstruction annually. This will be beneficial to the proponents for these new facilities because it does not limit their most modern means of construction, operation and maintenance.

Forest Plan Direction (No Action; Alternative 3)

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.

For currently authorized and future water conveyance structures within the analysis area, estimates are for 1.0 miles of road construction/reconstruction and 0.5 miles of LCZ annually.

Proposed Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

This alternative is the same as alternative 2 with the exception that there are more upper tier acres under Alternative 4 compared to Alternative 2. Water conveyance structures in the upper tier acres can only use linear construction zones for their construction, reconstruction or maintenance. Forests project 0.5 miles of LCZs within CRAs annually for this purpose.

If roaded or linear construction zone access are necessary for future water conveyance structures that do not currently have a pre-existing water court decree, those conveyances cannot be located in CRAs. Not allowing roaded access to future proposed uses could create economic consequences and environmental effects if siting is located outside of IRAs (e.g., longer and more expensive construction of the linear facility, difficulty connecting to electrical grid, etc.).

For currently authorized and future authorized water conveyance structures operated pursuant to a pre-existing water court decree, estimates are for 0.2 miles of road construction/reconstruction annually within the CRAs and 0.5 miles within the remainder of the analysis area.

*All Other Special Land Uses*

As alternative energy sources are explored, proposals for wind energy testing and eventual build out, and solar facilities may become more prevalent. Proposals for wind, solar, and geothermal development seem to focus 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, wind and solar facilities, and other SUA uses could be allowed under all alternatives. 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.

2001 Roadless Rule (Alternative 1)

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 is necessary, future water conveyance structures would not be located in IRAs. Not allowing roaded access to future proposed uses could create economic consequences and environmental effects if siting is located outside of IRAs (e.g., longer and more expensive construction of the linear facility, difficulty connecting to electrical grid, etc.). However, by not allowing road construction in IRAs, greater assurances are provided for preserving roadless area characteristics.

For other uses authorized prior to [the effective date of the rule] estimates are for 0.4 miles of road construction/reconstruction annually. No roads are projected for the additional CRA acres that are not within the roadless areas in this alternative.

Proposed Colorado Roadless Rule (Proposed Action, Alternative 2)

Alternative 2 does not allow for roaded access or linear construction zones for any other future uses. This will 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 lands 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 will allow for mitigation for potentially conflicting adjacent uses.

For other uses authorized prior to [the effective date of the rule] estimates are for 0.1 miles of road construction/reconstruction annually within the CRAs and 0.3 miles annually in the substantially altered acres that are not within the CRAs in this alternative.

Forest Plan Direction (No Action; Alternative 3)

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. For other uses estimates are for 0.6 miles of road construction/reconstruction annually within the analysis area in this alternative.

Proposed Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

This alternative is the same as Alternative 2 with the exception of greater numbers of upper tier acres. For other uses authorized prior to the effective date of the rule, no miles of road construction/reconstruction are projected within the CRAs and 0.3 miles annually in the substantially altered acres that are not within the CRAs in this alternative.

Ski Areas

This section evaluates effects of the alternatives on developed ski area recreation opportunities and experiences. Developed ski areas are all those areas authorized under the Ski Area Permit Act of 1986 and have constructed facilities. For details about the evaluation of ski area impacts, see "Developed Ski Areas" section of the RDEIS (USDA Forest Service, 2010).

Ski resorts are one of the major land use authorizations permitted on NFS lands in Colorado. Colorado has the highest number of ski areas under permit on NFs (22 areas) and the highest number of annual skier visits on NFs of any state, with 12.56 million skier visits for the 2006-07 season, spending approximately 2.6 billion dollars annually.

With the population growth in many of the key western ski states, as well as overall income growth, 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 in line with the developed end of the recreation opportunity spectrum (ROS). Some NFS lands adjacent to developed ski areas in Colorado are roadless and fall into the semi-primitive non-motorized, or semi-primitive motorized, ROS classes. This means expansions of ski areas may directly impact the adjacent NF lands roadless characteristics and move these areas into the more developed end of the ROS spectrum in the winter. Summer use in and around ski resorts is also growing, which may also push the ROS class in the summer to the more developed end of the spectrum.

*Analysis of Alternatives*

2001 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 at 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 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.

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 may occur outside the existing permit boundary established prior to the date of this rule; including those areas that have been allocated under forest plans.

Ski area development can still occur without road construction in IRAs. 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 roadless areas may occur without road construction in areas that are not currently under permit, but it would be limited.

Under alternative 1, although there would be limitations on future ski area expansion, backcountry skiing would continued to be enjoyed by those users who prefer roadless opportunities.

Colorado Roadless Rule (Alternative 2; 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.

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 and 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 regular CRA acres.

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. 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.

If road construction and tree removal are authorized in 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.

Forest Plan Direction (Alternative 3; No Action)

Under this alternative the potential to construct roads, cut trees, and develop more ski facilities in the ski areas would be the same as under alternative 2 or 4. If a currently undeveloped ski area is developed in the future under alternative 2, 3, or 4, there would be a higher potential for semi-primitive non-motorized setting to shift to semi-primitive motorized or roaded natural setting. Benefits to the developed ski area recreation resource would be the same as described in alternative 2 or 4.

Under alternative 3, ski areas can potentially construct roads to expand their permit boundaries in any direction, without a rule-related roadless area constraint. Under alternative 2, 3, or 4, forest plan management direction may still constrain road construction or tree-cutting activities related to ski area development or expansion.

Colorado Roadless Rule with Public Proposed Upper Tier

The effects are the same as 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.

Other Resources, Services, and Programs

*Livestock Management*

Livestock grazing is managed in portions of many of the roadless areas. 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. Authorized livestock grazing use occurs less extensively in the roadless areas compared to many other portions of the NFs and national grasslands in Colorado due to forage cover type.

Under the 2001 Rule, the proposed action (Alternative 2), and Alternative 4, road construction exceptions do not exist for the purpose of livestock grazing. However, those who have grazing permits for allotments in roadless areas have been effectively managing their livestock in those areas over long time periods without the necessity of additional roads. They typically rely on pack and saddle stock to manage the livestock and maintain their range improvement structures. Range management personnel on the NFs 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 (see “Livestock Management” in chapter 3 of RDEIS).

Road and tree-cutting activities can affect rangeland vegetation and result in detrimental effects to livestock management. However, under any of the alternatives, there would be a low likelihood that the projected new roads would significantly affect authorized livestock management use in the roadless areas. Recent tree-cutting activities such as for fuel reduction or forest health treatments have not typically resulted in significant adverse impacts on permitted grazing management in those affected allotments. While the Forest Plans alternative would pose the highest potential for adverse impacts on livestock grazing management in roadless area allotments, 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 in roadless areas.

*Saleable Minerals*

A small fraction of this production from NFS lands, if any, is estimated to have come from roadless areas (a specific spatial breakdown of amounts of mineral materials generated from IRAs is not available). This minor production from roadless areas would likely have been free use disposals for public road projects, or for local Forest Service use, and then only where roads already exist or are being constructed under an allowed exception. The projected amount of saleable materials that would come from within roadless areas during the next 15 years is assumed to be little to none, and no roads would likely be constructed or reconstructed for the purpose of developing commercial mineral material sites, suggesting that there are no significant differences in effects to this sector across alternatives.

*Locatable Minerals*

Locatable minerals (e.g., base and precious metals: gold, silver, zinc) are appropriated through the location of mining claims under the General Mining Law of 1872, as amended (Mining Law). This law provides U.S. citizens a possessory right to these minerals, use of the surface reasonably incident to mining, and a right to reasonable access to these minerals across Federal land. IRAs are not withdrawn from the location of new mining claims and these new mining claims will have the same rights under the mining laws as mining claims outside IRAs. None of the alternatives differ in projections for roading related to future locatable mineral activity in roadless areas. Under all alternatives, less than ¼-mile per year of roading is projected by the forests to occur in the roadless areas during the next 15 years for the purposes of locatable mineral exploration or development. Overall, the alternatives do not differ in permissions or prohibitions related to extraction of locatable minerals.

**Analysis of Roadless Area Characteristics**

Scenic Quality

Roadless area characteristics and values typically include “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, as noted in chapter 1 of the RDEIS (USDA Forest Service, 2010). Scenic quality is based on two definable elements, landscape character and scenic integrity. 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 and tree cutting and removal activities in a roadless area can affect the scenic integrity of that landscape. The positive effects on scenic quality that can result from management activities that reduce insect and disease mortality in forest stands or the severity of a wildfire, may be offset by the negative effects of road construction and vegetative treatments. However, wildfire events, insect or disease infestations, avalanches, and other natural events are considered a part of that landscape’s natural processes. Within the Forest Service’s scenery management classification

system, such natural disturbance events and resultant landscape changes (even if visually unappealing) are consistent with high or very high levels of scenic integrity.

All resource management activities in roadless areas in Colorado strive to achieve long-term sustainable landscape character goals in the scenic integrity objectives (SIOs) identified in the land management planning process using the Scenery Management System (SMS) or with establishment of visual quality objectives (VQOs) using the Visual Management System (VMS). These visual or scenic management objectives define allowable levels of change on specific land areas (see "Scenic Quality" section of the revised DEIS (USDA Forest Service, 2010) for details about these systems and scenic quality analysis).

Generally, the current condition of roadless areas in Colorado does not show extensive evidence of management activities. Thus, the roadless areas currently have a high degree of scenic integrity. There is evidence of some roads, past tree cutting and other management activities in portions of the IRAs. In many of those areas, the scenic integrity has likely been modified and the resulting scenic integrity is considered moderate to low. The substantially altered areas in IRAs do not meet the desired scenic quality conditions for maintaining roadless area characteristics and values.

*Analysis of Alternatives*

When considering the effects described below, it should be noted that population growth and increasing development on lands adjacent to roadless areas can have a cumulative impact on scenic quality.

2001 Rule (Alternative 1)

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 SIO's or Retention to Preservation VQO's.

The 2001 Roadless Rule would allow road construction under limited situations. About 11 miles per year of road construction/reconstruction are projected to occur within the IRAs and an additional 3 miles per year 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 will 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 the 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 High/Retention and Very High/Preservation scenic integrity. Where tree-cutting, sale or removal and road construction is projected to occur, the SIO/VQO's could change on those acres from High/Retention to Moderate/Partial Retention.

By not allowing new roading to improve forest health or reduce hazardous fuels, this alternative would pose a higher risk of having large-scale insect-disease outbreaks and high-severity wildfires, compared to the other alternatives. However, natural disturbance events that change the landscape appearance would not change the scenic integrity level.

Colorado Roadless Rule (Proposed rule; Alternative 2)

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 4 miles within the remainder of the analysis area. Most of these roads are temporary roads, including those temporary roads associated with existing oil/gas and existing and future coal leases within the North Fork coal mining area and all 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 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 will 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, 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 SIO/VQO's 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. These treatments would minimize impacts to communities by applying SIOs and VQOs 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 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.

Forest Plans (No Action; Alternative 3)

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, 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.

Management prescriptions similar to Wilderness/Primitive settings are likely to retain their High/Retention to Very High/Preservation SIO/VQO's 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 and 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 will 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.

Potential effects in all IRAs would be moderated because of priority treatment of hazardous fuels around communities and by applying SIO and VQO guidelines from the forest plans alternative.

Colorado Proposed Rule with Public Proposed Upper Tier (Alternative 4)

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, 14 miles of road construction are projected within the CRAs and an additional 4 miles within the remainder of the analysis area. Most of these roads are temporary roads, including those temporary roads associated with existing oil/gas and existing and future coal leases within the North Fork coal mining area. All 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 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 will increase over time, commensurate with the revegetation. Those acres within the upper tier acres that have existing oil/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 the purpose of incidental, personal, or administrative, must maintain or improve one or more of the roadless area characteristics over the long-term and would be limited to those acres not within 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 SIO/VQO's 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 SIOs and VQOs 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 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.

Wilderness and Recommended Wilderness

In 1964, Congress established a National Wilderness Preservation System, composed of federally owned areas designated by Congress as "wilderness areas" (16 U.S.C. 1131–1136, 78 Stat 890). 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, and where motorized equipment and transport, development, and commercial enterprise are prohibited. In addition, a wilderness is said to 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.

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.

Recommended wilderness areas are lands identified in land management plans as having undeveloped character and wilderness potential through forest planning. Forest plan management direction calls for managing recommended wilderness areas to maintain wilderness characteristics and values until such time as Congress acts upon the Agency recommendation or a different agency recommendation is made.

There are a total of 35 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 87**,**500 acres within the roadless analysis area have been recommended for wilderness in land management plans (see "Wilderness" in chapter 3 of the RDEIS).

*Analysis of Alternatives*

None of the three alternatives, including the proposed action, will have a direct effect on designated wilderness, because these areas are outside of IRAs or CRAs. The effects to areas recommended as wilderness in land management plans, likewise, do not differ across alternatives, because land management plans generally prohibit road construction and tree-cutting and removal activities in those areas.

2001 Rule (Alternative 1)

The 2001 rule generally prohibits tree cutting and road building in IRAs and therefore, retains the existing roadless area characteristics, so it would not detract from wilderness characteristics (e.g., solitude, scenery) in the adjacent wilderness areas. However, the amount of projected road construction and tree cutting activities, and road-related increases in energy resource operations in roadless areas under the 2001 rule would affect some wilderness characteristics in wilderness areas adjacent to IRAs where activity occurs, due to the increases in noise and human disturbances in the IRAs that may be heard or seen by people in the adjacent wildernesses. However, it is likely that very few projects would occur adjacent to wilderness.

The restrictions on activities in IRAs under this alternative provide a greater opportunity to maintain future options for recommending roadless acres as wilderness, compared to the proposed action or the forest plans alternative.

Alternative 1 would not directly affect any of the recommendations made in forest plans for recommended wilderness areas as existing plans generally exclude tree-cutting and road construction activities in recommended wilderness unless a site-specific amendment was completed.

Colorado Roadless Rule (Proposed Action; Alternative 2)

Like the 2001 rule, the general prohibitions on roading and tree cutting under the proposed action would minimize the potential risk of detracting from wilderness characteristics or experience in adjacent wilderness areas. However, the risk of potential impacts would be higher than under the 2001 rule due to increases in the projected levels of roading, tree cutting, and energy resource operations in CRAs, and the corresponding potential for increases in noise and human disturbance that may be seen or heard from adjacent wilderness. In particular, the projected activities in the North Fork Coal Mining Area would potentially impact the solitude and other wilderness experience opportunities in the adjacent West Elk wilderness.

By allowing more roading and tree-cutting activities in CRAs, this alternative could reduce the number of roadless acres that might have characteristics that could support future wilderness recommendations, compared to the 2001 rule.

For those acres included as upper tier in alternative 2, they will also be more consistent with future wilderness designation than either alternative 1 direction or general forest plan direction due to the additional restrictions on activities.

Implementation of the alternative 2, with 562,300 acres assigned to upper tier roadless areas, would help establish a uniform approach to managing areas already identified in forest plans and draft forest plans as being recommended for wilderness or being similar to wilderness in management. It should be noted that upper tier acres may not necessarily meet the conditions for recommended wilderness as defined by the Forest Service handbook. Any changes to that direction would require a rule-making effort.

Forest Plans (No Action; Alternative 3)

In general, Alternative 3 allows more risk of potential impacts from tree-cutting and road construction than alternatives 1, 2 or 4. The risk of detracting from wilderness characteristics in adjacent wilderness areas would be highest under Alternative 3 due to the higher levels of road construction and tree-cutting activity projected for IRAs. In particular, the projected activities in the North Fork Coal Mining Area would potentially impact the solitude and other wilderness experience opportunities in the adjacent West Elk wilderness.

The relative amount of projected activity (road construction and tree-cutting) under Alternative 3, could affect a greater number of roadless acres that could potentially be considered for wilderness in the future, compared to other alternatives.

Under some existing forest plans, recommended wilderness has been identified and those areas will continue to be managed as recommended wilderness. Currently, there are 12 areas (approximately 87,500 acres) identified in existing plans as recommended for wilderness designation within Colorado. Other Colorado Roadless Areas were not recommended for wilderness because they fall short of the Agency's recommended wilderness evaluation criteria, (FSH 1909.12, Chapter 70). Effects on roadless characteristics in light of the prohibitions on these other Colorado Roadless Areas are evaluated in the other sections.

Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

In general, alternative 4 impacts will be similar to alternative 2. There will be additional acres included as upper tier in alternative 4, but these acres may not necessarily meet the conditions for recommended wilderness as defined by the Forest Service handbook, but some acres will be subject to additional restrictions of the upper tier. The upper tier acres in alternative 4 do overlap with existing oil and gas leases that allow for road construction, such activities will be allowed to continue under the conditions of the rule language, but over the long term, these areas will be managed for upper tier roadless area characteristics.

Implementation of the alternative 4 with 2.6 million acres in the upper tier would establish a uniform approach to managing over half the CRA acres (similar to the 562,300 upper tier acres under Alternative 2). Any changes to that direction would require a rule-making effort. The selection of the alternative 4 upper tier acres is not specifically based on wilderness criteria.

### Other Congressionally or Administratively Designated Areas and Trails

There are six congressionally designated areas in Colorado, established by the 1980 or 1993 Colorado Wilderness Acts, and the James Peak Wilderness and Protection Area Act of 2002 (P.L. 107-216). These areas include about 165,500 acres, 147,600 acres are in the 2001 rule IRA boundaries. Colorado has only one congressionally designated river, the Cache la Poudre River on the Arapaho-Roosevelt NF. There is a small part of the congressionally designated river in the Comanche Peak Adjacent Area and the Green Ridge East roadless areas (IRA and CRA). 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. Congress has also enacted the National Trails System Act (P.L. 90-543) on October 2, 1978, which established a nationwide trail system, including the Continental Divide National Scenic Trail, part of which is in Colorado.

The congressionally designated areas are not included in IRAs being analyzed in this EIS. There would be no difference in management of these protected areas under any of the alternatives. In addition, none of the alternatives would directly impact any of these congressionally designated areas, outside roadless areas. Similarly, none of the alternatives would directly impact the stretches of the wild and scenic river corridor classified as “wild” or “recreation,” because the statute designating the river is equally or more restrictive compared to any of the alternatives in terms of roading and tree-cutting (i.e., the law does not allow activities that would degrade those values for which the river corridor was designated). Due to similar statutory precedence, none of the altenatives would alter the management or scenic values of the Continental Divide National Scenic Trail.

However, there could be indirect effects from projected activities that vary by alternative, on the characteristics or values of the adjacent designated areas noted above. Indirect impact would be minimal under the 2001 rule, greater under the proposed rule, and greatest under the forest plans alternative, based on the relative amounts of roading, tree-cutting and road-related energy development activities projected to occur in the adjacent roadless areas[16].

[16] Exceptions being 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

None of the alternatives project roading, or tree-cutting activities in the administratively designated areas such as research natural areas (RNAs) or special interest areas (SIAs). Thus, there would be no difference in effects predicted to occur in roadless area RNAs or SIAs under any of the alternatives. Under the forest plans alternative, road building could potentially occur in the future in RNAs or SIAs in roadless areas, where it is not entirely prohibited. Some land management plans allow roads or facilities to be built in RNAs or SIAs, although the values for which the area was established would need to be maintained.

Soils, Water, and Air

Roads are recognized a significant human-caused source of soil and water disturbances in forested environments, and water quality also affects the value or water-based recreation activities. Air quality affects human health as well as visibility and scenic quality. This section addresses potential effects of the alternatives on water, soil, and air resources, focusing on key differences in foreseeable activities under each rulemaking alternative. For details about the discussion below, see the physical resources section in chapter 3 of the RDEIS.

*Analysis of Alternatives: Soil*

Soil in the potentially affected CRAs is generally in satisfactory condition. There do not appear to be large acreages of excessive soil erosion, detrimental soil disturbance, or landslides attributed to management activities. Localized areas devoid of vegetation and subject to accelerated soil erosion occur on relatively small, scattered acreages where human activities have routinely occurred. At higher elevations the rate of soil formation is much slower than in the more temperate lower elevations. High-elevation soils are generally not as well-developed or as fertile as those occurring at lower elevations.

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. During project-level analysis, areas sensitive to surface erosion are identified and appropriate mitigation measures are used to reduce surface erosion and sediment production. Implementation of a well-prepared surface erosion and sediment control program in conjunction with road building and forestry activities can mitigate the potentially degrading impacts of surface erosion.

The relative percentage of each erosion hazard class for soil types in the roadless areas (IRAs and CRAs) under all alternatives is 35 percent high, 50 percent moderate, and 15 percent is low.

2001 Rule

The 2001 rule would have the least potential for accelerated rates of erosion in roadless areas because of the general prohibitions on roading and tree-cutting activities.

---

activities in adjacent roadless areas would not be expected to significantly detract from the values for which those areas were designated.

There would be little risk of significant amounts of soil movement or loss of soil quality from increases in soil erosion or landslides. Roads would typically not be on steep slopes (over 40 percent) because some areas are more prone to landslides on steep slopes. The likelihood would be low that project road construction would occur on highly sensitive soils and result in a substantial increase in soil erosion. Maintaining the 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.

No major long-term impacts on soil resources would be anticipated to occur as a result of projected new development in ski areas. 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 the future. The potential for post-fire erosion and other wildfire-related impacts on soil quality in roadless areas would remain high under this alternative.

Other ongoing activities in roadless areas that would continue to affect soil resource conditions include: prescribed fire and wildfire use, some hard-rock mining, livestock grazing, recreational use, and many other ongoing activities. These activities are known to contribute to localized impacts on soil quality. However, these activities would not be measurably different under any of the alternatives.

Colorado Roadless Rule (Proposed Rule, Alternative 2)

Compared to the 2001 rule, the proposed rule would result in slightly higher risk of affecting the soil resource. Like the 2001 rule, changes in soil conditions would be limited to relatively small acreages, geographically scattered over millions of acres of roadless areas. Temporary roads and other disturbed areas would be revegetated after a project is completed.

Similar to the 2001 rule, the soil resource in the roadless areas would remain in a functioning condition, with no significant loss of long-term soil productivity under the proposed rule.

The new roads projected to be constructed under this alternative would cause a slightly higher increase in soil erosion and disturbance in roadless areas compared to the 2001 rule. While the roads remain in place, prior to decommissioning, there would be a temporary loss of soil productivity on those affected acres. Because nearly all the future roads in CRAs would be decommissioned, there would be very little permanent loss of soil productivity in the roadless areas. A temporary but longer-term loss of productivity would occur on roadless acres devoted to new oil, gas, and coal drilling pads and associated roads because the life of these commitments would be expected to continue for many decades. However, because of the mitigation measures anticipated to protect soil quality, the post-project rehabilitation of disturbed soils, and the localized nature of projected activities, the activities projected under the final rule that would differ from the 2001 rule would not be expected to result in significant increases in soil erosion rates that would reduce long-term soil productivity in the roadless areas. Modifications and clarifications regarding permissions for road construction and tree-cutting made to the proposed rule in developing the proposed rule provide additional assurances about soil protection.

Overall, there would not be a significant reduction in long-term soil productivity in the roadless areas resulting from higher levels of tree-cutting activities or energy resource development activities in roadless areas.

Projections of greater roading under the proposed rule would result in a slightly higher risk of road-related soil erosion compared to the 2001 rule, although those impacts would be mitigated to a large extent. The new roads in those substantially altered areas would be removed from soil productivity while they remain as roads, prior to decommissioning.

Not including ski areas in the CRAs under the proposed rule would not be anticipated to result in more or less soil resource impacts on those ski area acres. Ground-disturbing activity projected to occur over the next 15 years in those ski areas would not significantly differ by alternative.

The addition of 409,000 acres of unroaded areas into CRAs under this alternative would reduce the potential for road-related impacts on soil quality in those areas. The potential for wildfire-related impacts on soil quality in roadless areas would be lower under the proposed rule compared to the 2001 rule.

Forest Plans (No Action, Alternative 3)

The level of projected road construction, tree-cutting, and energy development activities under this alternative may result in higher risk to soil quality, compared to the 2001 rule and the proposed rule, however the overall 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. Soil impacts would be minimized for the reasons previously described for the other alternatives.

Like the other alternatives, the soil resources on a landscape scale in the roadless areas would remain in satisfactory condition under the forest plans alternative, with no significant loss of long-term soil productivity. However, there would be an increased risk of localized and short-term soil impacts because there would be more acres of soil disturbance in this alternative.

A higher risk of road-related soil erosion in substantially altered areas under the forest plans alternative compared to the 2001 rule, and would be essentially the same as impacts described below for the proposed rule. Impacts on soil quality in ski areas in IRAs would be essentially the same as described for the other two alternatives.

Soil quality impacts on the unroaded areas not included in IRAs under the forest plans alternative would be the same as described for the 2001 rule. Like the 2001 rule, there would be a higher potential for adverse soil quality impacts from future roading and other development activities in these unroaded areas.

The potential for post-fire accelerated erosion and other wildfire-related impacts to soil quality in roadless areas would be slightly reduced under this alternative compared to the 2001 rule.

Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

Alternative 4 would result in slightly higher risk than 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 acres, the forests project less tree-cutting and road construction 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.

*Analysis of Alternatives: Water*

Colorado has approximately 95,500 miles of rivers and streams (Table 3-6), of which 12,800 miles (13 percent) are listed in the 305(b) report as impaired stream miles as provided by the Colorado Department of Public Health and Environment (2008). Only 13 percent of the stream miles in Colorado are listed as impaired, and only 1 percent of those impaired stream miles occur in roadless areas (IRAs or CRAs). There are only 3,700 lake or reservoir acres on NFS lands in Colorado, or less than 1 percent of the 252,300 acres of lakes and reservoirs in Colorado, and a much smaller fraction of those occur in the roadless areas. Very few miles of streams (5,810 miles) in roadless areas (IRAs or CRAs) are listed as impaired (150 to 155 miles). The most common sources of potential water quality impacts in the roadless areas are: roading, mining, oil-gas or coal development and operations, off-highway vehicle use, livestock grazing, dispersed camping, and activities related to tree-cutting (such as log skidding), especially if these activities occur near streams or lakes.

Despite the potential for water quality degradation from management activities in roadless areas, the streams and lakes in roadless areas in Colorado generally have good to excellent water quality, as previously described. This is partly because 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 (FSM 2532). Water quality impacts are also mitigated through application of the Forest Service regional watershed conservation practices handbook (FSH 2509.25).

Approximately 68 percent of the water yield in Colorado originates on NFS lands and much of this is from within the roadless and wilderness areas. More than 95 percent of the roadless areas (IRAs and CRAs) in Colorado overlap one or more source water assessment areas, which are watersheds, identified by the State around public surface and groundwater supply sources, according to Colorado Department of Public Health and Environment and Source Water Protection databases.

The wide-spread mountain pine beetle epidemic that is killing lodgepole pine and other pine species throughout Colorado is likely contributing to some temporary increases in water yield. Many roadless areas will continue to be affected by continued pine tree mortality, together with potential wildfires, resulting in future short-duration increases in water yield.

Large, high-severity, stand-replacing wildfires are known to cause temporary increases in water yield and peak flows on NFS lands in Colorado. Short-duration, high-intensity rainstorms following a fire can produce high peak flows and flash floods that can change channel structures and adversely affect water quality because of high sediment loads. The risk of post-fire floods during summer convective storms is greatest in the first 2 or 3 years following the fire.

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.

2001 Rule (Alternative 1)

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 direct adverse effects on water quality from these activities. 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 projects the least amount of coal-drilling activity in roadless areas. It would have the lowest risk of accidental spills or other water quality impacts compared to the other three alternatives.

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 indirect effects to water quality from flash floods and increased sedimentation in streams is increased. Implementing the BAER program (Burned Area Emergency Response) 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.

Colorado Roadless Rule (Proposed Action; Alternative 2)

This alternative projects an increased level of both tree-cutting and road construction than alternatives 1 and 4, but less than 3. There is a slightly greater risk of direct adverse impacts on water quality in CRAs from these activities. 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 compared 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 BAER 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 will be extremely limited. 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.

Forest Plans (No Action; Alternative 3)

Alternative 3 projects the highest level of tree-cutting and road construction than the other alternatives. There is a slightly greater risk of direct adverse impacts on water quality in CRAs from these activities. 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 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 BAER 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.

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 direct 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 under Alternative 4 compared to Alternative 2 because of the smaller amount of projected fuel reduction treatments. Fewer water conveyance structures will 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.

*Analysis of Alternatives: Air*

The Forest Service coordinates with the State of Colorado to help 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 parts of roadless areas in Colorado, no areas are currently designated as “non-attainment” for particulate matter.

There are 11 class I areas within a 10-mile radius of roadless areas. Class I areas are typically large wilderness areas and other large congressionally designated areas. Most of the roadless areas lie adjacent to wilderness areas, many of which are class I areas. Class I areas must be managed to meet more stringent air quality levels compared to other areas. All class I areas however, have existing visibility impairment and do not meet the national visibility goal of having no anthropogenic (human) caused visibility impairment.

All Alternatives

Differences in effects on air quality do not substantially differ among alternatives. Based on the projected land management activities that differ among alternatives, as described in the analysis framework, atmospheric emissions in 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 estimate of potential impact is based on the estimated magnitude, extent, and duration of atmospheric emissions from those activities, as projected for each alternative.

Alternative 3 allows for a higher level of oil and gas development than the other three alternatives, increasing the risk to air pollution. Forest projections indicate a slight increase under this alternative; however, analysis will occur when a development proposal is received by the Forest Service as part of the NEPA analysis.

The alternatives do not differ in the amount of prescribed burning that is allowed in roadless areas, so there would be little to no difference in effects from prescribed burning among alternatives. Prescribed burning in the roadless areas would continue to produce short-duration increases in particulates, carbon monoxide, nitrogen oxides (NOx), organics, and hydrocarbons.

The difference among alternatives is relatively minor in terms of the potential for smoke from large wildfires in roadless areas. Air quality impacts from dust emissions would be negligible and would not vary significantly by alternative.

Threatened, Endangered, and Sensitive Species

Details about information below about the occurrence of effects to threatened, endangered, proposed, candidate, and sensitive, as well as MIS in Colorado's roadless areas are provided in detail in chapter 3 of the RDEIS (USDA Forest Service 2010).

*Analysis of Alternatives: Botanical Resources*

This section focuses on the effects to threatened, endangered, and sensitive (TES) plants. For details about the following discussion, see section threatened, endangered, and sensitive plants in chapter 3 of the RDEIS (USDA Forest Service, 2010).

One threatened plant species is known to occur in CRAs: penland's eutrema (*Eutrema penlandii*)[17]. Based on projections of foreseeable activities in roadless areas where this species exists (Hoosier Ridge, White River NF; Silver Heels, Pike San Isabel NF) under any alternative, there is no likely potential for oil, gas, or coal development, new roads, or tree-cutting activities in the penland's eutrema habitat that occurs in roadless areas.

Consultation with the U.S. Fish and Wildlife Service in accordance with section 7 of the ESA has been initiated and is ongoing for this proposed rule-making action. As part of the section 7 process, the estimated effects on federally listed plants from the preferred alternative will subsequently be documented in a biological assessment and submitted for U.S. Fish and Wildlife Service concurrence, once a preferred alternative has been clearly identified (between the draft and final EIS).

Forest Service sensitive species are those designated by a regional forester for which population viability is a concern. There are 44 sensitive plant species known or likely to occur in the roadless areas in Colorado. Inventories of sensitive plant species on NFS lands in Colorado are incomplete, especially in roadless areas. However, based on available information from the Colorado Natural Heritage Program and personnel on the NFs, approximately 31% of existing

[17] Two other plants are listed under the ESA were thought to occur, but have since been shown not to occur in roadless areas (see Chapter 3 of the RDEIS (USDA Forest Service, 2010).

IRAs and 27% of CRAs are known or likely to support sensitive plants. New plants designated as sensitive during the next 15 years that are identified as occurring within roadless areas would likely be addressed during project-level analysis.

Sixteen sensitive plant species that are known or likely to occur in IRAs or CRAs are considered endemic, because they occur only in Colorado. Endemic species may be at higher risk of extinction because of small population number and very limited geographic range. Two sensitive plants, one of which is endemic and a candidate for TE status under ESA, occur in portions of IRAs under Alternative 1 that are not included in CRAs under Alternative 2, while three sensitive species, one of which is endemic, occur in portions of CRAs that are not included in IRAs.

Projects may also be designed to have beneficial effects on sensitive plant populations. For example, projects implemented for forest health, fuel reduction, or other purposes where management activities may occur in roadless areas could be designed to correct poor road alignments 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 44 sensitive plant species known or likely to occur in roadless areas, five sensitive plant species (roughly 10 percent of the total sensitive plant species) grow in forest habitats that might benefit from tree-cutting to reduce the risk of severe stand-replacing wildfires. 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).

Forest Service Manual (FSM) direction requires that potential adverse impacts to sensitive species be avoided or minimized so as not to result in loss of viability or create trends toward federal listing. Under all alternatives, management actions such as roading or tree-cutting and removal typically include mitigation measures that adjust locations of these activities to avoid populations of sensitive plants. However, the manual direction also provides 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.

Past, present, and reasonably foreseeable activities and events in roadless areas as well as surrounding lands of all ownerships can contribute to cumulative impacts to TES plant species. 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 effects can vary widely depending on a species' breeding system, capacity for migration, and other factors. Habitat fragmentation can also affect plant populations through a loss of genetic diversity within populations. The relative risk of fragmentation to sensitive plant species is lower under Alternative 1 and 4 and somewhat higher for Alternatives 2 and 3. Climate change may also have a cumulative effect on the distribution of plants and other species. Some species will be more vulnerable to the effects of climate change than others. Some of these changes are unlikely to occur to a measurable extent over the next 15 years, but other changes

have already been documented. Changes in land use can challenge the ability of plants to adapt to climate change. The effects of these past, present, and reasonably foreseeable activities or events would likely combine with the effects described below for each of the alternatives to raise the risk to T&E or sensitive plants. These adverse cumulative effects cannot be quantitatively described in this programmatic evaluation.

The overall relative risks to T&E and sensitive plant species are summarized in Table 18 (as presented in Chapter 3 of the Revised DEIS (USDA Forest Service, 2010); details about risks are presented below.

**Table 18. 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.

2001 Rule (Alternative 1)

As mentioned above, there would be no expected direct impacts on the threatened or endangered plant (Penland's eutrema) from roading, tree-cutting and removal activities, or energy resource development activities in IRAs, because these activities are not projected to occur in the roadless areas where this plant occurs. There is some risk of indirect impacts on the TE plant from the spread of invasive plants that could increase as a result of activities on more distant roadless areas, however this risk is the lowest for Alternative 1 because of the tighter restrictions on road construction and tree-cutting. Continued management under Alternative 1 could benefit TE plants because of these activity restrictions within IRA boundaries.

For sensitive plant species, various types of activities are projected to be likely under provisions of the 2001 Rule in some portion of 25 out of 101 IRAs where sensitive plants are known or likely to occur. Examples of these projections include road construction for oil and gas leases or access to private inholdings, as well as tree-cutting and removal to reduce wildfire hazards. Under Alternative 1 (the 2001 Rule), sensitive plants in the balance of the analysis area (outside of IRAs) would be managed under existing forest plans. This would include 19 locations proposed for inclusion in CRAs under Alternative 2, seven of which have proposed activities (e.g., cutting trees, or road construction). The overall risk of adverse impacts on sensitive plants

from projected activities in the analysis area would be lower under Alternative 1 compared to Alternatives 2 or 3, because of the lower number of management activities projected to occur in the IRAs that are known or likely to support sensitive plants.

In general, the limitations on road construction and other activities under Alternative 1 would result in less risk of adverse effects to sensitive plants from invasive plants than would be expected under Alternatives 2 and 3.

Under any alternative, there would be some level of risk of accidental damage to sensitive plants or their habitats during project implementation, or indirect impacts from increases in invasive plant populations. Those risks would be lowest under Alternative 1 because of the smaller number of roadless areas supporting sensitive plants where activities are projected to occur over the next 15 years, compared to Alternatives 2 or 3.

There would be small potential beneficial effects on sensitive species from projected forest health and fuels treatment activities. However, treating approximately 800 acres per year in IRAs to maintain or restore characteristics of the ecosystem would not likely be of sufficient magnitude to have measureable effects.

Overall, Alternative 1 may adversely affect individual sensitive plants but is not likely to result in a loss of viability for sensitive plant species, nor cause a trend toward federal listing for the sensitive species analyzed for this rule.

Colorado Roadless Rule (Proposed Action, Alternative 2)

Similar to Alternative 1, no activities (road construction, tree-cutting, or energy resource development) are projected to occur in roadless areas supporting the one TE plant species known or likely to occur in CRAs. The only difference among alternatives would be a slightly higher risk of indirect effects from invasive plants that could spread from distant activity areas in other areas into threatened plant habitat within CRAs. This increased risk is due to the additional circumstances under which road construction and tree-cutting activities are allowed under Alternative 2, compared to Alternative 1.

Based on activity projections in roadless areas, 34 of the 97 CRAs (35%) that are known or likely to support sensitive plants are projected to be likely to have road construction, tree-cutting, or energy resource development under provisions of the Colorado Roadless Rule, compared to 25% of IRAs under Alternative 1. 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, 10 of which are projected to be likely 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.

Under all alternatives, the Forest Service would try to avoid adverse impacts to sensitive plants during project implementation, or would apply appropriate mitigation measures. However, there would be a risk of unintended adverse impacts related to the level of projected activities in the CRAs known or likely to support sensitive plants.

Indirect adverse impacts on sensitive plants from the expected spread of invasive non-native plants (noxious weeds) 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 fuels/forest health treatments in CRAs under Alternative 2 would have a better chance of reducing the potential for severe wildfires to eliminate a sensitive plant population and its seed bank. But, only about five of the 44 sensitive plant species in roadless areas (11%) occur in forests or similar habitats that would benefit from projected treatment activities.

Overall, Alternative 2 may adversely affect individual sensitive plants but is not likely to result in a loss of viability for sensitive plant species or cause a trend toward federal listing for the sensitive plant species analyzed for this rule-making.

Forest Plan Direction (Alternative 3, No Action)

Similar to Alternatives 1 and 2, no activities (road construction, tree-cutting, or energy resource development) are projected to occur in roadless areas supporting the one TE plant species known or likely to occur in CRAs. However, Alternative 3 would result in a slightly higher risk of invasive plants affecting T&E plants due to a higher level of activities, compared to Alternative 1, and the potential for their spread into areas supporting T&E plants. This risk would be approximately the same as described for Alternative 2.

The effects on sensitive plants under Alternative 3 would be essentially the same as those described for Alternative 2, because under Alternative 3, one third of the analysis area is projected to include road construction, tree-cutting, or energy resource development activities under forest plans over the next 15 years.

The potential for indirect effects from invasive plants would be similar to Alternative 2, because the level of activity in roadless areas where sensitive plants occur would be roughly the same under both alternatives. 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 or cause a trend toward federal listing for the sensitive plant species analyzed for this rule-making. In terms of relative risk, the risk of adverse impacts on sensitive plants would be higher under Alternatives 2 and 3 compared to Alternative 1 primarily because of: (a) the higher likelihood of invasive plants spreading into sensitive plant communities, and (b) the higher likelihood of inadvertent mistakes that may be made during

implementation of a larger number of projects. These differences in risk are correlated with the differences in the amount of projected activities in roadless areas that support sensitive plants.

Colorado Roadless Rule with Proposed Public Upper Tier (Alternative 4)

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 the 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.

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 less 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 treatments in CRAs under alternative 4 would have a better chance of reducing the potential for extremely hot 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.

*Analysis of Alternatives: Aquatic Habitat and Species*

This section addresses the activities that are identified as part of the roadless rule alternatives for Colorado and associated risks. Specific activities, including vegetation management; road construction; oil, gas and mineral development; and ski area development have been identified as possibly affecting aquatic habitat and associated biota between alternatives. For details regarding the discussion below, see Aquatic Habitat and Species section in chapter 3 of the RDEIS.

One threatened or endangered (T&E) fish species (greenback cutthroat trout) is known or likely to occur in any of the roadless areas and is known to occur on two of the NFs in Colorado: (1) Pike and San Isabel, and (2) Arapaho and Roosevelt NFs. There are no fish species identified as proposed under ESA, nor any designated critical habitat for T&E fish, in Colorado.

Where there are more roadless area acres in close proximity to large population centers in Colorado, such as on the Arapaho and Roosevelt or Pike and San Isabel NFs, there is a higher potential for cumulative impacts to aquatic species and habitat. Various land use activities where they occur in the same vicinity may cumulatively limit the potential for reestablishment of greenback cutthroat trout on these two NFs.

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 (FSM 2670.5). There are five sensitive fish species that occur or are likely to occur in roadless areas: two trout species (Rio Grande cutthroat trout in addition to the threatened greenback cutthroat trout) and three sucker species (flannelmouth, bluehead, and mountain suckers). Through a variety of human influences, including stocking of non-native trout and habitat fragmentation and reduction, the trout populations are primarily limited to areas such as wilderness, roadless, national parks, and other relatively remote areas of the State. All three of the suckers are apparently being out-competed by more common western white suckers (Catostomus commersoni) and longnose suckers (Catostomus catostomus) that have been introduced west of the Continental Divide. While the exact mechanism for this replacement is only beginning to be understood, it appears that competition, hybridization, habitat fragmentation and stocking have contributed to this problem.

There are four T&E fish species (razorback sucker, bonytail chub, Colorado pike minnow, and humpback chub) that occur downstream of NFS lands in the Colorado River and some of its larger tributaries that could be indirectly affected by activities in the roadless areas. These residents of relatively large river systems have become increasingly rare, mostly due to dramatic changes in hydrology, water quality, and habitat conditions. 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 affect their habitat conditions.

There are aquatic habitats in many of the roadless areas in Colorado that have been identified as being ecologically important as well as "rare." Fens act as carbon sinks, are typically produced at the toes of slopes, and are often associated with high elevation glaciated valleys. Wetlands are also an important habitat for many species and have been reduced in Colorado by as much as 50 percent of their historic extent, through numerous management activities. 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.

Management Indicator Species (MIS) are species identified in land management plans for each NF, as indicators of the effects of management activities on specific habitat types or features, as

a means of compliance with the NFMA. There are 36 MIS animal species (terrestrial and aquatic) represented for the NFs in Colorado excluding those selected for national grassland ecosystems: 11 mammals, 23 birds, 1 amphibian (toad), and 1 invertebrate (insect). All 36 MIS are likely to occur in one or more roadless area, and therefore are relevant to this analysis. Aquatic MIS identified in Forest plans in Colorado include: six specific species of fish (trout), one mammal (American beaver), and the array of benthic (bottom-dwelling) macro invertebrates (such as insects, mollusks, or crayfish).

For all alternatives, Forest Service authorized roading (as well as the projected tree-cutting activities) would be designed to avoid or mitigate direct impacts to aquatic habitat and species. Thus, the main threat to T&E species, sensitive species, and MIS would be from the potential increase in invasive species associated with the new roads and other activities projected to occur under this alternative.

### 2001 Rule (Alternative 1)

The roading and tree-cutting restrictions under the 2001 rule would be expected to adequately protect the roadless area characteristics and the T&E species, sensitive species, and MIS found in the IRAs. The potential for impacts to aquatic species and habitat in IRAs would be less than for the other alternatives. The majority of the IRAs would continue to provide adequate protection for aquatic ecosystems and the species that inhabit them. The 2001 rule would be expected to have no adverse impacts on TES species in roadless areas or downstream from roadless areas. Additionally, there would be no adverse impact on MIS, or the wetlands and other aquatic habitat characteristics.

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 relatively high percentage of roadless areas with T&E or sensitive species within the AR, GMUG, Routt, SJ, and WR National Forests suggests that these areas are “strongholds” for native populations and/or native trout reintroduction/improvement areas. The 2001 Rule is expected to have no adverse effects on T&E and sensitive species, MIS, downstream T&E, wetlands and fens, riparian areas, or the use of roadless areas for future native fish species recovery in roadless areas across all National Forests in Colorado. Under Alternative 1, as well as the other alternatives, appropriate mitigation measures and best management practices would help avoid or minimize impacts from the activities permitted in roadless areas.

### Colorado Roadless Rule (Alternative 2, Proposed Action)

The primary difference between this alternative and the 2001 rule is related to the amount of new roads allowed and projected to occur in the roadless areas, as well as in the differences in the CRA boundaries compared to IRA boundaries. In the substantially altered and other IRA acres outside the CRAs (467,100 acres), there would be a greater potential for impacts to aquatic habitat and species compared to the 2001 rule. However, this alternative includes unroaded acreage in CRAs (409,500 acres) that is outside IRAs, which would afford greater protection from potential impacts from new roads in those additional CRA acreages. Another significant

difference is that Alternative 2 requires that any road or linear construction zone (LCZ) construction must maintain or improve existing native cutthroat trout habitat; Alternative 2 therefore provides greater protection for cutthroat trout compared to Alternatives 1 and 3. Similar to Alternative 1 (and 3), the primary risk is associated with potential increases in invasive species.

The risks of impacts to individual fish populations and wetlands/fens are predicted to be greater in the roadless areas where oil, gas, and coal development activities and/or tree-cutting are projected to increase under the Alternative 2 compared to Alternative 1, but decrease relative to No Action (Alternative 3), particularly in roadless areas on the GMUG, as well as the San Juan and White River National Forests. Tree-cutting is projected for many roadless areas within the Pike/San Isabel NF, but mitigation measures are expected to be adequate to protect aquatic species. The additions of new unroaded areas to CRAs may offer increased protection for aquatic habitat in those areas, but mitigation strategies may not be adequate to protect sensitive species in some substantially altered areas on some forests (e.g., San Juan).

The increases in activities projected in CRAs and substantially altered areas (removed from roadless area protections under the rule) would be expected to increase risks to individual fish populations but would not likely result in measurable declines in overall population trends on any NF for any of the aquatic TES species or MIS. The unroaded acres added to CRAs that are not in IRAs would provide more protection of aquatic habitat compared to the 2001 rule and the forest plans alternative for those acres, due to the limitations on roads and tree-cutting in those areas.

Some of the IRA acres that are not included in CRAs (i.e., substantially altered areas) under Alternative 2 may have more new roads and associated management activities approved by responsible officials under the governing forest plans. The IRA acres and stream miles that are not included in CRAs are greatest on the GMUG NF administrative unit. Across all forest units, there would be 19 fewer stream miles in CRAs, compared to IRAs under Alternative 1. The biggest potential impact in substantially altered areas as a result of increased human activity might be to wetlands and fens.

Compared to the 2001 rule, where projected activities increase for this alternative and T&E or sensitive species occur, there would be an increased risk of negative impacts. The roadless areas on the GMUG, San Juan, and White River NFs are where the risk may be highest due to the increases in roads to support additional oil, gas, and coal development activities, in addition to other fuels or forest health projects projected in those same affected areas under Alternative 2 compared to Alternative 1; risks are expected to be lower relative to Alternative 3.

The MIS or sensitive species population viability would not be significantly affected on any of the NFs, assuming that appropriate mitigation and BMPs would be applied at the project level.

Overall, population trends would not be negatively affected, although there would be impacts in roadless areas where invasive species are introduced, human activity are increased, or inadvertent accidental damage to aquatic habitat occurred as a result of management activities

The increasing potential for adverse impacts associated with Alternatives 2 and 3 respectively would add to the existing cumulative impacts from all the other land use activities discussed. While these alternatives would not individually result in highly significant adverse impacts, they

would contribute negatively to cumulative effects in these aquatic ecosystems in the roadless areas.

Forest Plan Direction (Alternative 3, No Action)

The general effects of the projected roading, tree-cutting and road-related oil, gas, and coal development activities under existing land management plans would be similar to those described for Alternative 2. However, the extent of those projected activities in roadless areas would be greatest under this alternative. Thus, this alternative poses the greatest risk of impact to aquatic species and habitat. There are relatively more roadless areas with projected activities and T&E and sensitive species on some forests (e.g., Pike San Isabel, San Juan, and White River), implying an increased risk of adverse impacts on individual populations as well as habitat, wetlands, and riparian areas in this forest compared to Alternatives 1, 2, and 4.

One beneficial effect of this alternative would be associated with the increased amount of fuel reduction treatment acres in IRAs, which could reduce wildfire severity in the roadless areas resulting in beneficial effects on aquatic habitat and species.

Overall, this alternative would result in reduced "resiliency" and population fitness of some MIS species, potentially impact populations of aquatic T&E and sensitive species, and further reduce wetland and riparian abundance and health. This alternative could potentially create more impact to aquatic species and ecosystems compared to the other two alternatives, as the forest plans alternative is generally less restrictive on more acres of IRAs/CRAs, and there are more projected activities under this alternative.

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.

Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

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, there is more protection in alternative 4 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 will provide additional restrictions on management activities thereby reducing the risks described above that are associated with tree cutting, sale or removal or road construction and reconstruction below those risks for alternative 1.

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 4.

*Analysis of Alternative: Wildlife*

This section evaluates effects of the alternatives on terrestrial (land-based) animal habitats and species including birds and invertebrates. For details about the discussion below, see the terrestrial habitat and species section in chapter 3 of the RDEIS (USDA Forest Service, 2010).

Roadless areas provide large, relatively undisturbed blocks of important habitats for terrestrial animal species and communities. Because roadless areas are usually more than 5,000 acres in size, often border wilderness areas, and are largely unroaded and undeveloped, they typically provide travel corridors, habitat connectivity, habitat diversity/complexity, seclusion for reproduction, island of refugia, and viability assurances given loss of habitat in adjacent lands.

Roadless area characteristics and values relevant to terrestrial species and habitats include the following:

- A diversity of native and desired non-native plant and animal communities, due to the absence of disturbances caused by roads and accompanying activities.
- Conservation of native biodiversity by serving as a bulwark against the spread of non-native invasive species.
- Habitats for threatened, endangered, proposed, candidate, Forest Service sensitive species, and Colorado priority species, and for species dependent on large, undisturbed areas of land.
- Biological strongholds and refuges for many species, including terrestrial and aquatic plant and animal species.

Roadless areas in Colorado are composed predominantly of coniferous forests in mountainous terrain (7,000 to 14,000 feet). Habitat structural types range from early through late successional stages, dominated by coniferous forest. Most roadless areas provide high-quality late-successional habitat, supporting a rich array of species that depend on the abundance of snags and down logs, large trees, and dense canopy cover. Virtually all the roadless areas (except two or three) have a threatened, endangered, or sensitive species or habitat in them, based on known species occurrences and habitat requirements.

There are six federally listed threatened or endangered (T&E) terrestrial animal species known or likely to occur in the analysis area. Critical habitat has been designated by the U.S. Fish and Wildlife Service for two of the potentially affected T&E species: Preble's meadow jumping mouse and Mexican spotted owl in two National Forests. Four roadless areas on the Arapaho and Roosevelt NFs and two roadless areas on the Pike and San Isabel NFs have critical habitat for the preble's mouse. Nine roadless areas on the Pike and San Isabel NFs have critical habitat for Mexican spotted owl. There are no species proposed for listing that occur in Colorado, and two species are identified as candidates for listing and are included in the list of 'sensitive' species.

There are 34 sensitive animal species that occur or are likely to occur in roadless areas. These consist of 19 birds, 10 mammals, 3 amphibians, and 2 invertebrate (insect) (see the terrestrial habitat and species section in chapter 3 of the RDEIS for list of species and habitat

requirements). Inventories of sensitive species on NFS lands are incomplete, especially in roadless areas.

There are 36 terrestrial MIS animal species represented for the NFs in Colorado excluding those selected for national grassland ecosystems: 23 birds, 11 mammals, 1 amphibian (toad), and 1 invertebrate (insect). All 36 MIS are likely to occur in at least one roadless area and therefore are relevant to this analysis. Four MIS are also identified as T&E species.

Of the 53 important bird areas (IBAs) (defined by National Audubon Society) designated in Colorado, two are in roadless areas or their adjacent wilderness areas on the White River NF: Hanging Lake IBA (in Grizzly Creek IRA), and Alfred M. Bailey Bird Nesting Area IBA (in Eagles Nest Wilderness adjacent to the Maryland Creek Roadless Area). Potential threats to the Hanging Lake IBA are habitat disturbance from recreational rock and ice climbers. The Alfred M. Bailey Bird Nesting Area IBA was so-designated because it is one of the most diverse mountain bird breeding sites in Colorado, with approximately 44 species of breeding birds identified. Audubon has identified potential threats to this IBA as habitat conversion of the surrounding forest by logging.

Roadless areas provide important habitats for wild ungulates (elk, deer, bighorn sheep, mountain goats), and black bear and mountain lion. Deer fawning and/or elk calving habitat has been documented to occur within more than 40 percent of IRAs in the state, and about one-third contain seasonal migration corridors for big game animals.

All Alternatives

The discussions in this section focus on the potential for adverse effects from roads and other management activities that differ by alternative. Those potential adverse effects are expected to be either avoided or minimized during project planning and implementation through compliance with standards and guidelines in land management plans and other applicable laws, regulations, and agency policy.

Each new undertaking on NFS lands requires evaluation of effects on T&E and sensitive species, MIS, and migratory bird species. Appropriate conservation measures must be considered in the decisionmaking process. The actual extent of effects would be based on site-specific factors such as location, timing, duration, frequency, and magnitude of the ground-disturbing activities.

Road construction and road use can affect habitat availability. Construction and reconstruction of roads can contribute to an immediate loss of habitat by removing existing vegetation and altering the substrate. 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. The higher road densities that exist outside roadless and wilderness areas increase the role of roadless areas and wilderness 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 reduction in habitat effectiveness can be substantial; even a limited amount of administrative traffic behind closed gates is sufficient to reinforce the avoidance behavior.

The effects of roads, tree-cutting, and minerals/energy activity on animal habitats can be organized into the following categories: habitat availability and effectiveness; habitat fragmentation; invasive species; and human caused disturbance and mortality. These categories

are not mutually exclusive as they represent many interrelated effects. Beneficial effects on terrestrial species from tree-cutting and associated activities are derived from projects where the primary objective considers creating or maintaining some specific habitat condition (e.g., age-class diversity, ecosystem condition improvement, reduced risk of large stand-replacing insect and disease outbreaks, and severe wildfire).

The effects from all alternatives may combine with effects from other activities or land uses in or adjacent to roadless areas to result in a cumulative effect. Considering the population 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. Development of non-Federal lands displaces mobile animals to adjacent NFS lands. Other events that may contribute to cumulative effects include climate change and increases in energy demand.

2001 Rule (Alternative 1)

The 2001 rule would provide the highest level of protection to T&E species, sensitive species, MIS, and migratory bird species, compared to the other alternatives, due in large part to lower levels of permitted and projected activity in roadless areas. 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. 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. Potential detrimental effects would be less likely to involve measurable adverse impacts on any of the potentially affected species.

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 access private lands or infrastructure under special use permit would likely remain.

New road construction within roadless areas would be very limited, primarily related to oil and gas operations under existing leases. Tree-cutting would also occur only under very limited circumstances, 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.

Overall for T&E species, based on the very protective guidance that would apply to the 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, with the potential for minor, local adverse effects to the Southwestern willow flycatcher, Mexican spotted owl, Pawnee montane skipper, Canada lynx, and Preble's meadow jumping mouse, 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.

For sensitive species, because of the limited amount of road construction anticipated under this alternative, the probability of adverse effects is low or minimal for species associated with wetland, stream, lake, waterfalls, subalpine conifer forest (including ptarmigan), aspen (purple martin), cave/cliff/talus/canyonland, grassland, meadow, and sagebrush habitats. Adverse effects are also unlikely for lower elevation coniferous forest species (e.g., flammulated owl, northern goshawk), but treatment of fuels and emphasis on removal of small diameter rather than large diameter trees could be beneficial for maintaining habitat for these species over time.

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. 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.

The 2001 rule would also not likely affect the Forest Service's ability to adhere to requirements under the Migratory Bird Treaty Act of 1918 or the executive order for protection of migratory birds.

In general, the road construction and tree-cutting allowed under the exceptions could potentially have detrimental effects. 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. It is estimated that the 2001 rule may affect individuals but is not likely to adversely affect populations of any of the T&E species identified as known or likely to occur in the roadless areas. The 2001 rule may adversely affect individual sensitive species but is not likely to result in a loss of viability or cause a trend toward Federal listing for the sensitive species populations on any of the NFs. There are not likely to be any significant changes in population trends for MIS because of the highly protective nature of the 2001 rule.

Alternative 1, when combined with other cumulative effects, would be beneficial to maintenance of biological diversity, including species habitats, populations, and landscape diversity. Conservation of roadless areas will be increasingly important with the growing population and pressures on the land in Colorado.

Colorado Roadless Rule (Alternative 2, Proposed Action)

By continuing to limit human activities in CRAs through general prohibitions and limitations, this alternative would help maintain important protections for T&E species, sensitive species, MIS, and migratory birds and their habitats.

Under this alternative, most roads within CRAs are temporary, used only for the permitted activity, and decommissioned immediately after completion of the activity. However, 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.

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.

This alternative adjusts the CRA boundaries to remove existing roadless acres that fall within current ski area permit boundaries or Forest Plan Management Areas that have ski area emphasis. Three areas are of particular concern for wildlife habitat connectivity: Williams Fork Ptarmigan Adjacent (Loveland ski area on Arapaho-Roosevelt NF) serving as a land bridge for large carnivores and other species, Game Creek (Vail ski area on White River NF) serving as a corridor or linkage area for lynx, deer, and elk, and Porcupine Creek (Arapaho Basin ski area on White River NF) serving as a lynx linkage and critical movement areas between Arapahoe Basin and Keystone Ski area. Any future development within these areas will be subject to project-level analysis that will carefully consider impacts on habitat connectivity.

For T&E species, as described for Alternative 1, the Pawnee montane skipper and Mexican spotted owl could benefit from fuels treatments that restored more natural conditions. Temporary road construction and energy development could remove some habitat and cause displacement, although site-specific analysis and design would likely reduce those potential impacts. 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 compared to Alternative 1, this elevates the risk to lynx. However, in accordance with the Southern Rockies Lynx Amendment decision, 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. Overall, the level of protection for roadless areas under the Colorado 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, and Preble's meadow jumping mouse, 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.

The effects to sensitive species 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 energy development, and adjoining certain ski areas. Road construction would have the greatest potential to have negative effects on seven sensitive species associated with wetland, stream, lake and waterfall habitats. Because of 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 five sensitive bird species. There is low risk of adverse effects associated with subalpine forests (e.g., boreal owl, American marten), however, there could be local impacts on these species from increasing edge effects, fragmentation and invasive species. There is potential for additional oil and gas development to occur, which could have local adverse effects on purple martin if the activities occur in its aspen habitat. Most fuels treatments would

occur at lower elevations, but ski area expansion and oil and gas development could cause some additional impacts to white-tailed ptarmigan, although at a generally low level under this alternative. Only minor disturbances to sensitive species associated with cliffs/caves/canyons, grasslands, meadows, and shrublands would be expected.

Given the large acreage afforded 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 energy resource exploration and development, as described previously.

Overall, there would be no increased risk to IBAs in roadless areas, and the Forest Service's ability to adhere to requirements under the Migratory Bird Treaty Act or the executive order for protection of migratory birds would not be affected.

Alternative 2, with its exceptions development and treatment activities, when combined with other cumulative effects would be less beneficial to biological diversity, including species habitats, populations, and landscape diversity, than Alternative 1. However, designating approximately 4.2 million acres of roadless area will represent a net benefit to T&E species, sensitive species, and other terrestrial wildlife.

Forest Plan Direction (Alternative 3, No Action)

The higher levels of road construction and vegetation management under Alternative 3 would allow direct habitat reduction and disturbance and fragmentation that would negatively affect terrestrial species. 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 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 under Alternative 3. The increased mileage of road construction would facilitate recreation uses such as hiking, biking, and horseback riding in the backcountry. This could increase impacts related to human disturbance 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. Reducing fuel loading and wildland fire hazard in beetle-killed stands in areas of high importance to T&E and sensitive species could be beneficial because of the reduced fire severity expected.

The amount of road construction associated with energy 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 energy development.

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 higher 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.

Potential effects to T&E species under Alternative 3 are often forest-specific. Under the current Pike-San Isabel Forest Plan, management direction is less restrictive for all roadless areas where the Pawnee montane skipper and its habitat are known to occur than under the other two alternatives. 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, while 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 two species could benefit from fuels treatments that restored more natural conditions and the use of prescribed fire, if applied to the appropriate areas and at the proper time of year.

A review of the roadless areas that contain known populations or habitat for the T&E species Uncompahgre fritillary shows much less restrictive management direction under the current Forest Plans for the GMUG and Pike-San Isabel NFs, with generally comparable direction for the Rio Grande and White River Forest Plan, compared with the other two 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 to 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. Projects would consider the recommended management guidance for lynx in their design. 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 that are utilized by the Preble's meadow jumping mouse. 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 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 Grand Mesa, Uncompahgre, and Gunnison; Pike-San Isabel; Manti-La Sal; and San Juan National Forests.

Potential risks of adverse effects to sensitive species would be higher under Alternative 3 compared to 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.

Road construction is the activity that would have the greatest potential to have negative effects on these species associated with wetland, stream, lake and waterfall habitats. As described for the other alternatives, fuels treatments within lower elevation conifer forests could have long-term benefits to sensitive avian species (e.g., flammulated owl, 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.

Similar to Alternative 2, there is potential for additional oil and gas development to occur within the GMUG and White River NFs, which could have local adverse effects on purple martin if the activities occur in its aspen habitat. There is a also higher potential under this alternative for adverse impacts to white-tailed ptarmigan. Only low or minor disturbances or impacts would be expected for species associated with cliffs/caves/canyonlands, grasslands, meadows, and shrublands.

Based on the effects on sensitive species and habitats described above, Alternative 3 may adversely affect individuals 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.

There would not be any changes expected in MIS habitat or population trends projected under the current Forest Plans. Some local adverse habitat modifications or species impacts could occur from road construction and reconstruction, tree-cutting activities, and energy resource exploration and development. 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.

The status and protection of important bird areas within roadless areas differ with Alternative 3 with respect to one designated IBA. Under Alternative 3, the Maryland Creek Roadless Area may experience some timber management 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.

The effects of Alternative 3, with fewer restriction on land use activities in roadless areas, when combined with other cumulative effects activities (increased population/recreation/energy demand, climate change), would pose a higher risk of affecting biological diversity, species habitats, and populations than the other alternatives. However, these effects will not be uniform across forests or roadless areas. As previously described, some forest plans place more

restrictions 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.

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 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 will 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 as 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, there is less than 5 acres per year is 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.

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 higher risk for the Mexican spotted owl over the long term of adverse impacts from 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.

Alternative 4 will have similar effects to Alternative 2 for sensitive species. As this alternative contains more acres upper tier within the Colorado Roadless areas, there is a lower risk of

adverse effects as a result of temporary road construction and other resource management activities to sensitive species in these areas. However, the removal of the provision allowing tree cutting, sales or removal for habitat improvement of threatened, endangered or sensitive species may result in higher risk over the long term of adverse impacts from uncharacteristically severe wildfires in lower elevation montane forests, shrublands and grasslands.

Given the large acreage afforded roadless protection under this alternative and the upper tier acres where little if any activity will 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 as a result of temporary road construction and other resource management activities to management indicator species in these areas.

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.

Biodiversity

Based on current literature (see the terrestrial habitat and species section in chapter 3 of the RDEIS (USDA Forest Service, 2010), 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 short term (20 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.

The local, regional, and national cumulative beneficial effects of conserving roadless areas on threatened, endangered, and sensitive (TES) species and biodiversity could include:

- Conserving and protecting large contiguous blocks of habitat that provide habitat connectivity and biological strongholds for a variety of terrestrial and aquatic plant and animal species including TES species.
- Providing important local and regional components of conservation strategies for protection and recovery of listed TES species.
- Providing increased assurances that biological diversity would be conserved at a landscape level, including increased area of ecoregions protected, improved elevational distribution of protected areas, decreased risk of additional timber harvest and road caused fragmentation, and maintenance and restoration of some natural disturbance processes.
- Providing increased assurance that biodiversity would be supported in IRAs including the maintenance of native plant and animal communities where non-native species are currently rare, uncommon, or absent.

The value of roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude elsewhere. Many roadless areas are adjacent to wilderness, national parks, and other designated areas that provide large contiguous habitat blocks with national significance for biodiversity conservation.

Some of the potential beneficial effects to biodiversity under the 2001 rule include:

- Protected large contiguous blocks of habitat providing habitat connectivity for a variety of species that need large connected landscapes.
- Protected large contiguous blocks of effective habitat providing for solitude and freedom from disturbance that is required by some species.
- Decreased risk associated with fragmentation and isolation from timber cutting, roading, and leasable minerals activities.
- Conservation and protection of biological strongholds and other important habitats for terrestrial animals, including TES species.
- Decreased risk associated with invasive species introductions and spread.
- Maintenance of native animal communities where non-native-species are currently rare, uncommon, or absent.
- Provision of increased assurances that biological diversity would be conserved, both in the area and the overall landscape in which it is found.
- Provision of important components of conservation strategies for protection and recovery of Federally listed proposed, threatened, and endangered species and NFS regional forester sensitive species.
- Maintenance or restoration of some level of natural disturbance processes at local and landscape levels, which are important controls for ecosystem composition, structure, and function.

The types of potential beneficial effects under the proposed rule and Alternative 4 would be similar to those listed for Alternative 1. Relative increases in projected road construction and tree-cutting activities in roadless areas under Alternatives 2 and 4 may have adverse effects, but corresponding opportunities for fuel treatments and insect and disease outbreak mitigation afforded by road construction and tree-cutting could have offsetting beneficial effects.

The forest plans direction alternative (Alternative 3), because of fewer restrictions of land use activities in roadless areas, may pose a higher risk of affecting biological diversity, species habitats, and populations. However, these effects will not be uniform across forests or roadless areas. As previously described, some land management plans are more restrictive of land uses in roadless areas than other land management plans. For forests with plans that are less restrictive on activities in IRAs, effects from activities outside the IRA boundary would add to the potential adverse effects described for this alternative. Potential for beneficial effects resulting from fuel treatments and insect and disease mitigation also exists under Alternative 3.

Invasive Plants

Invasive plants for purposes of this discussion include non-indigenous plant species that adversely affect the habitats they invade economically, environmentally, or ecologically. Invasive plants become established after seed or other plant parts have been imported to an area through roads, vehicular traffic, and/or other ground-disturbing activities, and where suitable environments exist. They often become detrimental to resource values, and the effects are often irreversible. Details regarding the background, analysis, and references for the discussion below can be found in the invasive plants section of the RDEIS (USDA Forest Service, 2010).

Opportunity for invasive plant infestations have been created by soil disturbance where native vegetation was temporarily removed and weeds invaded the site. Although roadless areas have substantially fewer acres of disturbed sites and invasive plants than roaded areas, there are localized sites in roadless areas that provide increased opportunity for invasive plant introduction and spread, such as where the following activities have occurred or continue to occur: wildfires and prescribed burning; mining; timber harvest activities including creating skid trails and landings; concentrated livestock grazing; road-building; and recreation activities including hiking, horseback riding, camping, and off-road vehicle use. Areas of disturbed soil, especially where open to sunlight, can serve as long-term vectors that aid the spread of invasive plants.

Numerous natural mechanisms also spread invasive plants, including wildlife, wind, and flowing water. Birds and rodents ingest seed from invasive plants and disperse them in their feces. Big game animals carry seed or other propagates on their fur or hooves. Seed ingested by larger mammals is carried in the gut, and deposited in the feces, enabling germination in a new location. After seed is imported into an area, invasive plants are often able to successfully establish in certain habitats even without ground disturbance, because of their aggressive nature and adaptability. Once new populations are established by wind, then wildlife or subsequent increases of human activity and ground disturbance have been proven to accelerate the spread.

To minimize spread of invasive plants in roadless areas and other NFS lands, the Forest Service follows direction in the Invasive Species Executive Order 13112**.** This E. O. directs Federal agencies to use relevant programs and authorities to (1) prevent the introduction of invasive plants; (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 plants. To further minimize the risk of invasive plant establishment and spread during road building, decommissioning, or other projects, BMPs for invasive plant prevention are typically followed.

Although roads can be a contributing factor to invasive plant invasion, roads are often an asset to managing and controlling invasive plant populations. For example, the traditional cost of chemical or mechanical treatment in Colorado’s forests on an acre of invasive plants is approximately $50 to $75 where there is a reasonable amount of road access. Comparatively, remote infestations cost five to eight times that amount when hiking, horseback riding, or other means of transport need to be used.

*Analysis of Alternatives*

Since no site-specific activities or effects are proposed as part of the analysis, the potential for invasive plants to spread is expressed in general terms, with no site-specific information provided. Future planned activities in any of the areas would undergo site-specific analysis to assess the localized impacts at that time.

As of 2001, according to the Colorado Department of Agriculture, approximately 3 percent of all lands in Colorado were estimated to be occupied by invasive plants at some density. It is estimated that on average, NFs in Colorado are treating approximately 5 percent of known infestations per year. Current invasive plant management programs on Colorado NFs are at best staying even with, rather than reducing, total acres of invasive plant populations, because of competing priorities. Substantial increases in invasive plants on a broad scale are likely to have a measurable effect on long term health of forest and rangelands on all NFs. A critical factor in the site-specific planning and implementation of future projects is the degree to which prevention and early detection/rapid response measures are used.

Rates of spread for invasive plants are variable according to species, habitat, and a variety of other factors. Annual spread-rate estimates as high as 14 percent have been documented but may be more conservatively estimated to be 5 percent. The amount of acres disturbed can be assumed to be 2.9 acres of disturbance per mile of roading. It is difficult to quantify the actual number of acres potentially affected by the establishment of invasive plants, however, it can be assumed that one half of 1 percent of acres disturbed would actually be invaded.

Equally under all four alternatives, invasive plant populations would continue to become established and spread in roadless areas as a result of natural dispersal mechanisms.

A number of human developments and project activities that are ongoing or expected in the foreseeable future, as listed in the appendices for the RDEIS, would contribute to the cumulative increases in opportunities for invasive plant infestations. Particularly as human populations continue to increase adjacent to roadless areas, these developments and human activities will likely increase invasive plants. The invasive plants that become established in the WUI areas would likely spread into adjacent roadless areas.

2001 Roadless Rule (Alternative 1)

Under Alternative 1, ground disturbance in the roadless areas resulting from potential future road construction and other management activities are the lowest of the four alternatives under consideration except for the upper tier acres in Alternatives 2 and 4. By maintaining a high level of limitation on future road construction or reconstruction, tree-cutting activities, and leasable minerals development 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, invasive plants could be introduced. For those areas not included in roadless area classification under this alternative, 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.

Proposed Colorado Roadless Rule (Proposed Action, Alternative 2)

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 slightly 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 forest health and community protection purposes. Coal development is higher under this alternative than 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 will 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 will likely have some increased management activities and may see elevated levels of invasive plant establishment and spread.

Forest Plan Direction (No Action; Alternative 3)

Alternative 3 has the highest amounts of potential ground disturbance due to projected road construction/reconstruction, tree-cutting, fuels management, and 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.

Proposed Colorado Roadless Rule with Public Proposed Upper Tier (Alternative 4)

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 due to the activities projected.

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 will 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 will occur. The acres that have been removed from the CRAs will likely have some increased management activities and may see elevated levels of invasive plant establishment and spread.

### Recreation

Nationally, the top five activities pursued on NFS lands are viewing natural features, general relaxation, hiking, viewing wildlife, and driving for pleasure. The roadless areas in Colorado often provide outstanding dispersed recreation opportunities, such as camping, canoeing, cross-country skiing, fishing, hiking, hunting, picnicking, wildlife viewing and OHV trail use. Roadless areas in Colorado also provide some of the best gold-medal stream fishing and big-game hunting opportunities in the United States. While hunting and fishing can occur in areas managed for the more developed end of the ROS class spectrum, roadless areas typically provide a semi-primitive setting, which is important to some hunters.

As noted in the human dimensions: recreation section of the RDEIS (USDA Forest Service, 2010), the standard Forest Service recreational opportunity spectrum (ROS) classification system is used as the basis for analyzing the effects of alternatives on various types of recreation opportunities and settings. In general, roadless area characteristics and values include primitive, semi-primitive non-motorized (SPNM), semi-primitive motorized (SPM), and recreation classes of dispersed recreation in the ROS. However, the presence of motorized trails may provide more Roaded Natural (RN) environments.

Dispersed recreation refers to recreational activities that do not require constructed facilities such as toilets, camping pads, tables and grills, and other structures. Dispersed recreation includes non-motorized activities such as hiking, biking, and backcountry skiing, as well as motorized activities such as snowmobiling and OHV use. Dispersed recreation generally occurs in ROS settings classified in the Forest Service as primitive, semi-primitive non-motorized, and semi-primitive motorized classes. Thus, dispersed recreation activities occur primarily outside developed campgrounds, picnic grounds, ski areas, and other developed recreation sites that have constructed facilities. Much of the dispersed recreational value of roadless areas lies in the unique primitive, SPNM, and SPM recreation opportunities and settings they offer. While hunting and fishing can occur in areas managed for the more developed end of the ROS class spectrum, roadless areas typically provide a semi-primitive setting, which is important to some hunters.

In contrast, developed recreation refers to activities that occur at sites with developed or modified settings. 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 ROS class opportunities and settings. The roadless areas in Colorado do not generally contain developed recreation sites, except for portions of developed ski areas, discussed in a subsequent section. However, access roads, campgrounds, and trailheads at roadless area boundaries provide services and entry points into roadless areas.

*Analysis of Alternatives: Developed Recreation*

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. Other than one mile of road projected for construction to facilitate campground access under the Alternative 3, the effects of reasonably foreseeable activities on developed recreation opportunities in roadless areas do not substantially differ across alternatives. Under Alternative 3, there would potentially be additional opportunities for development of recreational sites or facilities in IRAs in accordance with forest plan direction. However, as noted, only one mile of new road is currently projected for recreation over the next 15 years.

*Analysis of Alternatives: Dispersed Recreation*

Under all alternatives, no new roads would be expected to be built in areas allocated in the forest plans alternative to a primitive ROS setting, implying that areas with this ROS setting are not likely to be affected by any of the alternatives.

2001 Rule (Alternative 1)

By maintaining the restrictions or limitations on future road construction or reconstruction, tree-cutting activities, and leasable minerals development within roadless areas, opportunities for dispersed recreation in a semi-primitive setting would remain substantially unaltered by future management activities. The limited road construction and reconstruction exceptions could change the dispersed recreation opportunities within a given area. This level of disturbance would not measurably change the dispersed recreation opportunities in any given area.

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.

The 2001 Roadless Rule prohibits tree-cutting, sale or removal, with a few exceptions. Generally, incidental timber cutting would retain roadless characteristics and would be natural-appearing, especially after a couple of years when the vegetation has regrown. The projected levels of tree-cutting activity would not measurably alter roadless area characteristics or ROS classes currently identified, especially over time.

IRAs would continue to provide excellent habitat for wildlife and fisheries; 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 ROS 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.

None of the projected activities under the 2001 rule would be expected to reduce the quality of hunting and fishing opportunities. Retaining substantially altered areas and developed ski areas inside roadless boundaries would continue to create conflict or inconsistency with desired and expected roadless characteristics and values regarding semi-primitive settings.

Overall, the 2001 Roadless Rule alternative contains large areas with roadless characteristics based on limited activities that maintain Primitive and SPNM ROS classes. Also included in these IRA boundaries are areas of substantially altered landscapes from previous tree-cutting activities and permanent roads that maintain SPM ROS class.

Colorado Roadless Rule (Alternative 2, Proposed Action)

Most of the projected road construction and tree-cutting activity would likely occur in the semi-primitive motorized areas, with lesser amounts in semi-primitive non-motorized and primitive roadless areas.

Projected road construction/reconstruction could change dispersed recreation opportunity settings in some areas from a SPM to RN; however, when roads are decommissioned and obliterated after use then the change in ROS would be more temporary in nature. The proposed Colorado Rule requires the use of temporary roads or where applicable, linear construction zones (LCZs), unless there is specific reason to warrant a permanent road.

Projected Tree-cutting within the CRAs over the next 15 years may change the natural appearance of some areas for a period of time until the area regenerates. Under the Colorado Roadless Rule, tree-cutting would primarily be done for hazardous fuels management. A majority of the tree cutting activities would be within one-half mile of community protection zones (CPZs) that are close to communities in Rural, RM, and RN classifications. 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. Based on projected levels 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 feeling of remoteness and solitude may change in some locations for a period of time.

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 and the large amount of NFS lands not altered by these activities.

The additional roadless acres added into the CRAs under this alternative would help maintain the semi-primitive setting and associated dispersed recreation opportunities in the total roadless acreage over time. The removal of substantially altered acres and developed ski areas from

CRAs would help insure that roadless areas appear more natural, less developed and more consistent with the typical roadless area characteristics and values. Many of the areas associated with commercial ski activity that are removed from roadless boundaries could be developed with roads, pending NEPA; removal of these areas would reduce inconsistency with desired and expected roadless characteristics and values regarding semi-primitive settings.

In general, under Alternative 2, previously designated roadless areas of limited activity would remain Primitive and SPNM ROS classes. Areas of substantially altered landscapes are removed from CRAs and other acres with roadless area characteristics are added resulting in an overall increase of Primitive and SPNM ROS classes. Mitigation techniques would be used to maintain ROS classes when tree cutting activities focus on hazardous fuel reductions and temporary road construction.

Forest Plan Direction (Alternative 3, No Action)

The higher likelihood of roading, tree-cutting, and energy development under the land management plan alternative would create the greatest potential for changes from semi-primitive recreation settings to settings that reflect a higher level of development and human activity. However, based on the forest plan restrictions on activities in the IRAs, together with topographic or economic constraints, new roads and tree-cutting would be projected to occur only an a small percentage of roadless area acreage.

Under existing forest plans road construction/reconstruction, tree-cutting, and discretionary mineral activities are generally not permitted on areas with management prescriptions of Primitive, SPNM and SPM. Some tree-cutting could occur in the RN theme but would likely not be done to a degree that would change the roadless character.

The projected levels of road construction/reconstruction could change dispersed recreation opportunity settings in some areas from a SPM to RN; however, if roads are decommissioned after use then the change would be more temporary in nature.

Projected tree-cutting over the next 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 on the existing forest plan prescriptions and visual quality requirements (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 feeling of remoteness and solitude may change for a period of time.

Portions of previously designated roadless areas under Alternative 3 could be subject to increased tree-cutting, sale or removal and road construction activities that could result in substantially altered landscapes not consistent with roadless characteristics. Based on these activities, ROS classes could have the potential to be modified from current SPNM and SPM ROS classes to SPM and RN ROS classes.

Colorado Roadless Rule with Public Proposed Upper Tier

Under alternative 4, tree-cutting, sale or removal and road construction/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 associated with fuel treatments within the CPZ, for existing oil/gas leases, and within the North Fork Coal mining area for coal removal. No new road construction is projected within the upper tier acres. An additional 4 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, with lesser amounts in SPNM and Primitive settings in roadless areas.

This level of road construction/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) will also be decommissioned after use. Those roads remaining on the system are generally associated with access to private inholdings and will 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 mile from at-risk communities in more developed recreation settings outside of the upper tier acres. The acre in 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 feeling 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 will limit the impact to wildlife and fish habitat with decommissioning of the road will be completed as soon as the use is completed.

Recreation Special Uses

Recreation special use authorizations consist of permits, leases, or other written instruments that authorize a range of commercial recreational activities, both motorized and non-motorized, in dispersed and developed recreation settings. Generally, there is little infrastructure aside from

existing developed sites that is needed for the permitted activity – with the exception of hut systems.

There are about 1,390 recreation special use permits currently authorized in NFS lands in Colorado (Region-2 INFRA-SUA database April 2008). These permits include outfitter and guides for hunting, fishing rafting, backpacking, sightseeing, jeep tours, day hiking, ATV tours, and educational tours, as well as huts systems, educational camps, resorts/lodges, recreation events, and others. Outfitter and guide permits account for about 75 percent of all the recreation special uses on NFS lands in Colorado, and some are likely to occur in roadless areas.

There is little difference between alternatives with respect to recreation special use authorizations in roadless areas, because limitations on roading and tree-cutting under any alternative would not be likely to affect ability to obtain or use a recreation use authorization. Because the 2001 rule, the proposed action (Alternative 2), and Alternative 4 do not allow for roading to facilitate recreation activities, the special use authorizations in IRAs or CRAs would be limited to uses that do not need new roads. Under Alternative 3 (Forest Plans), recreation use authorizations could include activities facilitated by new roads in IRAs or CRAs, however, as noted in the "Recreation" section above, only one mile of new road is currently projected for recreation over the next 15 years.

The agency has also prepared an assessment of small entity impacts ("Opportunities for Small Entities (Revised)") (USDA Forest Service, 2010a) as part of the project record to comply with the Regulatory Flexibility Act and subsequent amendments (SBREFA). The section regarding Special Use Permits: Recreation in that report states that it is possible that projected road development (the majority of which will be termporary) and tree-cutting under the proposed action could change some of the semi-primitive recreation opportunity spectrum (ROS) settings in the CRAs toward roaded natural settings, implying a change in the feeling of solitude and remoteness for some period of time. These effects may have adverse impacts on the capacity for some outfitters and guides to provide a quality outdoor experience. However, these effects are spread out across 4 million acres of CRAs, and additional areas are added to CRAs under the proposed rule, thereby increasing the level of protection of areas currently known to have roadless characteristics. Correspondingly, 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 and the large amount of NFS lands not altered by these activities under the proposed action. As a consequence, it is unlikely that the adverse impacts to special use permit holders reliant upon dispersed or primitive recreation settings will be significant.

Other Resources, Services, and Programs

*Geological and Paleontological Resources*

Geological resources include such features as large rock formations, craters, and caves. The Forest Service often develops geologic interpretive sites or designates special areas based on outstanding geologic features. Paleontological resources are fossils of plants, animals, and other organisms that lived in former geologic (prehistoric) times. Paleontological resources are

recognized as important both for their scientific value and intrinsic natural resource value. Paleontological resources on NFS lands are protected by laws, regulations, and policies.

The estimated effects on geological and paleontological resources described in the RDEIS (USDA Forest Service, 2010) are not expected to vary by alternative. None of the projected roading, tree-cutting, and energy resource operations in roadless areas that vary by alternative would be likely to adversely affect these geological or paleontological resources.

*Cultural and Heritage Sites*

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.

For cultural and heritage sites, prior to management actions taking place on the ground under any alternative, resource inventories and appropriate mitigation are required by law. Increasing risk to cultural resources may occur under Alternatives 1, 4, 2, and 3 respectively, as a result of increasing activity projections; however, the risk of adverse effects from uncharacteristic wildfire is lowest under the forest plans alternative. In general, the effects on cultural resources are not significantly different among the three alternatives.

*Non-timber Products*

Current access for the harvest of non-timber products is not expected to change under the proposed rule. Conserving roadless areas may limit access opportunities for some individuals, but construction and/or tree-cutting may also adversely impact the availability of some species.

Climate Change/Global Warming

The assessment of effects of greenhouse gas emissions on climate change is in its formative phase. However, the Intergovernmental Panel on Climate Change recently (2007) concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (human caused) greenhouse gas concentrations." The lack of scientific tools to predict climate change on regional or local scales limits the ability to quantify potential future impacts.

None of the alternatives are expected to cause a measurable change in the amount of carbon dioxide or other greenhouse gas emissions compared to current conditions and trends in the roadless areas under the no-action alternative (Alternative 3/Forest Plan Direction). The potential categories of cumulative effects of climate change on resources in roadless areas are summarized in various specialist sections in the RDEIS (USDA Forest Service, 2010), however, the cumulative effects of climate change on roadless area conditions cannot be quantitatively

described in this programmatic evaluation. With regard to energy resources, it is assumed that if production is not allowed in roadless areas, the same greenhouse impacts will be moved to sites outside roadless areas and contribute the same amount to the atmosphere. In terms of fuels treatments, biomass removed can be burned, used in products, replace fossil fuels, or be left in piles elsewhere on the landscape. Except for prescribed burning, any of these disposal methods would slow release of carbon to the atmosphere.

Climate change may cause warming and drying trends that could eventually increase the magnitude, frequency, or extent of wildfires. Those same climate trends may increase droughts, which result in greater insect and disease outbreaks. These effects would be exacerbated in the large portions of roadless areas that remain untreated. This cumulative effect may be slightly greater under the 2001 rule, followed by Alternatives 2/4 and then Alternative 3 due to forest health treatments that would potentially occur under these alternatives. Increases in drought, wildfire, and insects/disease would affect hydrologic functions, water yield, and water quality in roadless area watersheds.

Cool-season plant species' ranges are predicted to move north and to higher elevations, and extinction of native vegetation may be accelerated; these changes in vegetation may further affect air quality. Climate change can also affect terrestrial and aquatic animal species and habitats (e.g., changes in snowpack, runoff, base stream flow; changes in hibernation and migration patterns; decreases in suitable habitat due to warmer temperatures). Climatic changes can combine with direct effects associated with the alternatives; these cumulative effects cannot be quantitatively described in this programmatic evaluation.

**Agency Costs and Revenues**

This section discusses the potential for relative changes in agency costs, across alternatives, for activities related to fuels treatments and roads. The proposed rule does not prescribe project-level or site-specific activities. As a consequence, agency costs and differences in program costs across alternatives have not been quantified. Much of the discussion focuses on cost per acre or cost effectiveness to provide a more consistent means of comparing alternatives in the absence of quantified changes in agency or program costs.

Treatment projects associated with fuel reductions (that may have secondary effects regarding insect and disease outbreak risk reductions) may involve one or more treatment methods including biomass removal, mechanical mulching, mastication, and prescribed fire (see fire ecology and forest health sections in chapter 3 of the revised DEIS (USDA Forest Service, 2010) for details about treatment methods). Much of the road construction under the proposed rule is expected to be affiliated with biomass removal under service contracts with or without salvage rights, stewardship, or a timber sale where receipts can help offset the cost of treatment and temporary road construction. However, there may be projects where temporary road construction would be needed to gain access for mechanical mulching or mastication. Estimates of the number of miles of temporary road construction in roadless areas under each alternative are provided by the individual forest units (see chapter 3 of the RDEIS).

The Forest Service also incurs costs associated with planning, preparation, and administration of treatment projects. Given the assumption that program budgets will remain relatively flat, it is unlikely that the alternatives will result in a change in these costs. The proportion of funds allocated to projects in roadless areas may increase or decrease as a function of the amount of treatment (e.g., cutting) and road construction projected to occur under each alternative.

Road Maintenance

Annual road maintenance averages $350 to $6,500 per mile depending on the road maintenance level and other factors (based on the Forest Service Region 2 cost guide and forest planning cost estimates). Road maintenance costs have been exceeding funding levels for at least the past couple of decades[18]. Thus, there is a backlog of road maintenance needs on NFS land, and the Agency has increasingly emphasized the decommissioning of unnecessary roads. The total number of forest system road miles has been decreasing over the last 10 years as miles of roads decommissioned exceeds new road construction, particularly when considering removal of unauthorized roads. For every mile of new road constructed over the past 10 years on NFS lands in Colorado, more than 10 miles of authorized or unauthorized roads on NFS lands have been decommissioned. It is expected that the trend in closing and decommissioning more road miles than are constructed would continue under all alternatives, recognizing that it may become more difficult to identify roads for decommissioning over time. There will be a net reduction in road density in roadless areas as the Forest Service continues to decommission unauthorized roads or authorized roads that are no longer needed.

Fuel Treatments

If it is not feasible to selectively locate treatments, then a significantly larger percentage of the landscape may have to be treated to achieve a given degree of alteration in landscape fire behavior. Effectiveness and efficiency of fuel treatments depend in part on locations of access roads and natural fuelbreaks. In most roadless areas, the limited amount of roads, fuelbreaks, and fuel-treated areas makes them more difficult to treat and more vulnerable to high-severity fires.

To effectively reduce wildfire threats in a WUI, it is usually necessary to strategically place treatments at a range of distances from homes or other values at risk. Treatments up to several miles away from the value at risk can reduce the fire threat if located where the treatment can affect the way fire spreads and behaves.

Under the 2001 rule, fuel treatments would likely be more expensive and less efficient to implement in IRAs because of the lack of established roads and inability to reconstruct or construct roads. Treatments would generally occur near existing roads, which limits the ability to more strategically locate treatment areas on the landscape to improve effectiveness. Prohibiting roading in the IRAs would reduce opportunities to cut trees to reduce hazardous fuels in IRAs.

[18] Up until 1990, the timber sale program provided for substantial amounts of pre-sale and post-sale road maintenance, partially mitigating low road maintenance budgets. Increasing recreational use of roads contributes to maintenance responsibilities.

Under the proposed rule, tree-cutting and temporary road construction is permitted for treating hazardous fuels in WUI areas within Community Protection Zones (CPZs) extending one half mile from at-risk-communities (ARCs), and conditionally permitted in areas that extend an additional mile from ARCs (see "Fire Ecology and Fuels" section of this report for details about conditions). Roads are often necessary to make treatments economically feasible. Compared to the 2001 rule, the proposed rule would therefore provide increased flexibility to achieve fuel reductions in critical areas, with some potential for secondary benefits associated with increased protection against or insect and disease outbreaks[19]. Increased road miles would increase the Agency's ability to strategically locate fuel treatment areas on the landscape to improve effectiveness and possibly reduce the total amount of the landscape that requires treatment.

Under the proposed rule, treating 5,900 acres per year in CRA and/or IRA areas would yield an increasing trend of conducting hazardous fuel treatments in roadless areas, compared with the 4,400 acres of CRAs treated annually on average from 2001 to 2009. If the Agency treats 5,900 acres rather than 4,400 acres annually in designated roadless areas, there would likely be fewer acres treated for fuels outside the roadless areas, assuming the allocation of funds for fuel reductions on NFS lands remains flat. If fuel reduction funds were to increase, this alternative provides the opportunity to yield an improvement in reducing wildfire hazard at a landscape scale. Alternative 4 is structured similar to Alternative 2, thereby offering similar strategic and efficiency advantages regarding treatments. However, due to increased acreage assigned to upper tier status, projected treatment levels are reduced under Alternative 4. Assuming 64,000 acres of treatments occur on NFS lands within Colorado each year, approximately 9 percent of treatments could occur in roadless areas under Alternative 2, decreasing to about 3 percent under Alternatives 1 and 4.

Under the forest plans alternative (Alternative 3), if the total NFS budget for hazardous fuel treatment remains flat, there would be a shift to treating more acres in roadless areas and fewer acres outside roadless areas compared to the past 9-year trend. Given that 13,100 acres of hazardous fuels treatments are projected for roadless areas under Alternative 3, approximately 20 percent of annual fuel treatments (13,100 out of 64,000 acres) on NFS lands in Colorado could occur in roadless areas if the Agency continues to conduct treatments on approximately 64,000 acres per year. If funding for fuel reduction projects increases, this alternative would provide the greatest opportunity to reduce wildfire threats to values at-risk. The types of effects of building more roads for fuel treatments would generally be the same as described for the proposed rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs. Under Alternative 3, some permanent roads may be constructed in the IRAs for fuel reduction and forest health purposes. Maintaining more permanent roads in the IRAs would enhance the effectiveness and value of roads for fuels and wildfire management purposes over the long-term. The increased flexibility to build both permanent and temporary roads in IRAs would improve the Agency's ability to conduct additional fuel reduction treatments and maintain lower wildfire hazards in WUIs in the long term, compared to the other alternatives.

Invasive Plant Management and Control

[19] Tree-cutting and road construction are not permitted solely for protection against insect and disease outbreaks under the proposed rule, unlike the proposed rule.

As noted in the invasive plants section of this document, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would remain low under the proposed rule and Alternative 4, and relatively low under the forest plans alternative as well. The overall need to address occurrence of invasive plants on NFS land, in aggregate, may also remain somewhat constant across alternatives given the assumption of flat budgets and corresponding constraints on the capacity for increasing the annual extent of treatment activity and roading.

Although roads can be a contributing factor to invasive plant occurrence, roads are often an asset to managing and controlling invasive plant populations. For example, the traditional cost of chemical or mechanical treatment in Colorado's forests on an acre of invasive plants is approximately $50 to $75 where there is a reasonable amount of road access. Comparatively, remote infestations cost five to eight times that amount when hiking, horses, or other means of transport need to be used.

**Distributional Effects**

Economic impact analysis requires resource outputs by alternative to estimate associated jobs and income. As discussed in respective sections in the RDEIS (USDA Forest Service, 2010), resource specialists have found that recreation use – both developed and dispersed, water yield, and livestock management will not vary significantly by alternative. Assuming no change to these resource areas, no change in economic impacts has been estimated across the alternatives, and no analysis was completed.

Commercial timber products (outputs) coming from roadless areas may vary by alternative as a function of treatment acreage (see "Road Construction and Tree-Cutting Projections" section), but the forest program levels are expected to remain constant. Program budget levels were assumed to remain constant across alternatives for all resources. The implication of  is that timber program output levels across all National Forests lands in Colorado would also remain constant under all alternatives, varying only by location of tree-cutting (i.e., the proportion of cutting activity occurring within versus outside of roadless areas will vary). While biological implications for roadless areas are dependent upon the location of forest products removed, economic impact implications are unchanged. Resource specialists could not distinguish differences between alternatives for program level volumes and mix of products removed, so additional economic impact analysis was not completed.

The only resources found to have sufficient measurable and quantitative differences between alternatives are energy mineral extraction and fuels management. Production levels of natural gas and coal vary by alternative. For natural gas, exploration/drilling differences could be estimated as well. In the case of fuels management, the potential for changing community exposure to losses by wildfire is also estimated by alternative.

For details about information discussed in the economic sections below, as well as references and citations, see the revised economic specialist report (USDA Forest Service, 2010b).

**Economic Impacts**

Economic Profile

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 beautiful scenery, Colorado enjoys a strong tourism industry. It also benefits from sizable cable and satellite, defense, technology, and mining industries (including energy). 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.

As noted in the methodology: distributional effects section, to provide a statewide context for the analysis, all Colorado counties were organized into four model areas. A brief description of those areas is provided below.

Table 19 offers 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. Some roadless areas are in these thirteen counties (see appendix J). The rural roadless model area, with 30 counties, follows in economic importance. All but one county in this area contains roadless areas. The energy roadless area, with only 5 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 statewide totals. No roadless areas are in this model area.

**Table 19. Comparison of the energy roadless model area with other roadless model areas (2006)**

| Model Area | Output | | Employment | | Labor income | |
|---|---|---|---|---|---|---|
| | ($ millions) | Percent | (jobs) | Percent | ($ millions) | Percent |
| Energy Roadless | 20,041.8 | 5% | 148,457 | 5% | 6,100.5 | 4% |
| Rural Roadless **Table 19. Comparison of the Energy Roadless model area with other roadless model areas (2006)** | 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. & Colorado State Demography Office.**

Table 20 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 United States. For the same reason, income in the energy roadless area trails the front range metro area.

**Table 20. Comparison of the mineral industry in roadless model areas (2006)**

| Model area | Output | | Employment | | Labor income | |
|---|---|---|---|---|---|---|
| | ($ 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. & Colorado State Demography Office.**

The energy roadless model area includes a variety of communities, ranging from small towns – such as Somerset – to the economic center of western Colorado – Grand Junction. In prior years, this area was primarily defined by retirees, tourism, and agriculture. The area has developed into the center of energy development in western Colorado. Table 21 provides a picture of economic indicators by industrial sector. The totals are strongly influenced by Grand Junction, a regional provider of goods and services.

**Table 21 Output, employment, and labor income in the energy roadless model area (2006)**

| Industry | Output ($ million) | Employment (jobs) | 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. & Colorado State Demography Office.**

In a recent study of the Colorado oil and gas industry (McDonald et al., 2007), this sector was estimated to provide over 2 percent of statewide employment and 3 percent of earnings. 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. Natural gas development in the energy roadless area has brought new employees to the region. Some settle in the area as residents while others re-locate temporarily. The influx of workers can put strain on housing stocks, goods, and services in many communities in these counties. These strains are not expected to dissipate quickly.

All coal mines are up the North Forest Valley of the Gunnison River near the towns of Paonia and Somerset. Most coal from Colorado is shipped by rail to the South and Midwest where it is used in electricity generation. The balance remains in Colorado where a third is used for industrial purposes and two-thirds is used for electricity generation, along the front range. In 2008, coal from North Fork Valley mines accounted for 42 percent of all coal production in Colorado and 1.2 percent in the United States[20]. These operations are among the largest underground coal mines in the county. Like other coal in Colorado, coal from this area is highly valuable because of its high energy and low sulfur content. This coal is classified as "supercompliant" for electric generation because of these characteristics. Typically, it is mixed with coal from other parts of the country to meet air quality standards at electricity generation plants.

### Values at Risk from Wildfire

Early in the last century, immigrants from the East and West coasts were drawn to the mountain west by the lure of wealth from natural assets such as gold, silver, timber, and forage. Communities sprung up – some lasting beyond initial wave of resource extraction and utilization. Today many of those communities still find their dependency and identity linked to mountain landscapes and benefit from visitors who come to admire the landscapes for their beauty and their recreation opportunities (McDonald et al., 2007; Center for Business and Economic Forecasting, Inc., 2001; Dean Runyan Associates, Inc., 2006).

Some visitors come for brief periods, creating the Colorado tourism industry. Small-town appeal, big-town amenities, and scenic landscapes have transformed some parts of western Colorado into clusters of national and international destinations such as Vail, Telluride, and more rural communities, such as Lake City and Ouray. In recent decades, the in-migration of full-time residents and proliferation of second homes with seasonal residents have reached significant proportions in a number of towns both seasonally or year-round. The economy of these towns has become dependent upon their presence and activities (Lloyd Levy Consulting, 2004).

Table 22 offers a picture of the economy for rural counties not part of the energy minerals areas discussed above. This table shows a strong presence of the "accommodation and food services" and "arts, entertainment, and recreation" sectors, common in tourism-based economies. There is

[20] Sources: Colorado Coal Fact sheets (2006-2007), Energy Information Agency (2008-2009) , and Colorado Mining Association (2009) as cited in the revised economic specialist report (USDA Forest Service, 2010b).

also a strong "finance, insurance, and real estate" sector – another hallmark of tourism and second home based areas.

**Table 22. Output, employment, and labor income in the rural roadless model area (2006)**

| Industry | Output ($ millions) | Employment (jobs) | Labor income ($ millions) |
|---|---|---|---|
| Agriculture | 1,068.0 | 11,426 | 185.1 |
| Mining | 4,383.4 | 3,371 | 331.7 |
| Utilities | 549.7 | 1,369 | 125.0 |
| Construction | 4,316.1 | 32,926 | 1692.1 |
| Manufacturing | 1,269.3 | 4,858 | 215.9 |
| Transportation & Warehousing | 754.6 | 4,890 | 224.4 |
| Trade | 2,575.6 | 33,355 | 1017.9 |
| Finance, insurance, & real estate | 4,259.5 | 22,903 | 895.9 |
| Professional services | 1,786.8 | 15,790 | 817.5 |
| Administrative & waste services | 808.6 | 10,907 | 361.5 |
| Educational, health, & social services | 1,602.4 | 21,095 | 807.1 |
| Arts, entertainment, & recreation | 1,384.6 | 16,231 | 505.7 |
| Accommodation & food services | 2,578.0 | 38,531 | 902.1 |
| Other services | 1,644.3 | 20,125 | 571.6 |
| Government | 3,570.9 | 41,503 | 2003.9 |
| Totals | 32,551.7 | 279,280 | 10657.4 |

**Source: Minnesota IMPLAN Group, Inc. & Colorado State Demography Office.**

High-country communities in Colorado are rich in amenities and have always attracted new residents. In recent decades, 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. Many mountain communities are becoming particularly susceptible to natural disturbances, such as mountain pine beetle infestations, drought, and wildfire.

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 examples of infrastructure at risk of wildfire loss. Should these assets be lost, property tax revenues, employment, income, health care, emergency services, and the general welfare of communities may be affected.

Homes provide a good indicator of more comprehensive community values at risk of wildfire. Table 23 displays the 2009 county assessor valuation of non-agricultural, single residence homes

in Colorado counties that overlap IRAs or CRAs (Colorado Department of Local Affairs, Division of Property Taxation. 2010). The table also displays an estimate of home values within 500 meters (about 0.3 mile) of public forest land in each county (U.S. Department of Agriculture [USDA], Forest Service. 2010), and puts these values in context by comparing the estimated home value with total valuation in the county. The infrastructure value of homes in this setting averages 2.8% of total valuation across all counties with either RIAs or CRAs, but exceeds 10% in Eagle, San Miguel, Summit, and Teller Counties. Higher ratios may reflect greater economic and financial vulnerability to losses by wildfire. Table 23 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.

**Table 23. 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 [USDA], Forest Service. 2010.

**Table 23 (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.

Economic Impacts: Oil, Gas, and Coal Production

All economic impacts are shown in Table 24. Results are expressed on an average annual basis over the 15-year analysis period. Only those impacts associated with roadless analysis area are included. Job and income impacts are estimated using the annual output of oil, gas, and coal as well as the average number of wells developed per year. Projected oil, gas, and coal production are equal for alternatives 2 and 4. As noted in the methodology section, the IMPLAN multipliers used to estimate job and income impacts are derived from a specific set of cross-sectional data regarding employment, output, and expenditures from a single point in time (i.e., year). There is uncertainty associated with predicted impacts from the use of multipliers, but the uncertainty is expected to have a consistent effect on projected impacts across alternatives. As a consequence, greater attention should be focused on the relative differences in impacts across alternatives, and not the absolute values or precision of the predicted impacts; projected impacts are approximations.The data used to develope IMPLAN multipliers are compliant with the Data Quality Act (Section 515 of Public Law 106-554). For the reasons cited in the "Methodology" section, the economic impacts for oil, gas, and coal are modeled using only Delta, Garfield, Mesa, Montrose, and Rio Blanco Counties to represent changes in oil and gas production.

Output Impacts are estimated based on the following development and production levels: 41.5 wells/yr, 27 billion cubic feet gas/year (bcfg/year), and 4.9 million tons/year coal for Alternative 1 (2001 Rule); 41.5 wells/yr, 27 bcfg/year, and 12.6 million tons/year coal for Alternative 2 (the Proposed Action); and 47.3 wells/yr, 31 bcfg/year, and 12.6 million tons/year coal for Alternative 3 (No Action). Annual gas production are therefore equal for Alternatives 1 and 2/4, and annual coal production is equal for Alternatives 2/4 and 3. Oil production is included in the impact analysis but is relatively inconsequential or negligible (production ranges from 1,750 (Alternatives 1 and 2/4) to 4,200 (Alternative 3) barrels per year) in comparison to contributions by coal and gas production. Natural gas is the primary energy product in this area (i.e., GMUG and White River National Forest areas within the Piceance Basin) with oil being a secondary or ancillary product. Annual oil and gas production amounts are estimated only for the GMUG and White River National Forest portions of the analysis area as these are the only two forests in which production varies across alternatives within the roadless analysis area. Additional information about the estimation of gas and coal production is presented below (see "Minerals and Energy" section for details about production projections).

Oil and gas production across the three forests with roadless areas where leases currently exist, and/or where it has been determined that development is likely to occur under future leases under Alternative 3, is presented in the "Minerals and Energy" section in this document. Based on those projections, it is evident that production does not vary across alternatives for the San Juan National Forest. As a consequence, oil and gas production is added for the two remaining forests (i.e., GMUG and White River NFs) and divided by 30 years (i.e., average life of a well). Annual gas production is estimated to be approximately 27 bcfg/yr for Alternatives 1 and 2/4 (i.e., 667 bcfg from White River plus 152 bcfg from GMUG divided by 30 years) and slightly greater for Alternative 3 at approximately 31 bcfg/yr (i.e., 753 bcfg from White River plus 174 bcfg from GMUG divided by 30 years). Annual oil production is similarly estimated to be 1,750 (Alternatives 1 and 2/4) and 4,200 (Alternative 3) barrels per year. The value of gas and oil production is estimated by multiplying production by 2006 prices ($6.13/Mcf or $6.13 million/bcfg and $60.23/bo) provided by the Colorado Oil and Gas Conservation Commission

Price Indices for 2006, as cited in the revised Economic Specialist report (USDA Forest Service, 2010b). Prices from 2006 are consistent with the economic impact model used to create job and income multipliers which is based on 2006 data, as noted in the "Methodology, Data, and Assumptions: Distributional Effects" section. The total number of wells developed are presented in the "Minerals and Energy" section for the GMUG and White River NFs for each alternative; total well numbers are divided by 15 years based on the assumption that all wells will be developed within 15 years (even though the average life of a well is 30 years).

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. There are no reserves in roadless areas adjacent to the Bowie mine. It is assumed that current coal production levels for each mine will continue in the future until these reserves are exhausted.

The accessible coal reserves that vary by alternative and are discussed in the Energy Minerals section of the RDEIS (USDA Forest Service, 2010) are gross totals of potentially recoverable reserves within roadless areas, estimated to range from 157 million tons under Alternative 1 (2001 Rule), to 514 million tons under Alternatives 2/4, to 724 million tons under Alternative 3 (No Action, Forest plan direction). Gross reserves are estimated at a coarse scale without benefit of specific exploration data, and are based on estimations made by the USGS, as noted in the Energy Minerals section of the RDEIS. The estimated gross reserves are used to estimate average annual production across the three mines currently operating with leases on GMUG National Forest land[21] over the next 15 years for each alternative using the following steps:

- Assume that the current remaining reserves on roadless and non-roadless areas available to the three mines under the 2001 Rule are equal to the 2004 recoverable reserves for the three mines estimated by the State of Colorado[22] (i.e., 180.9 million tons), adjusted for the documented production that occurred from 2004 to 2009 for the three mines[23]. The adjusted available reserves remaining for the three mines, as of the end of 2009, are estimated to be 88.8 million tons[24].
- Estimate additional reserves made available in roadless areas under the proposed action and the forest plans alternatives by subtracting the gross recoverable reserves from roadless areas under the 2001 Rule from gross reserves available under the other alternatives (e.g., 514 - 157 = 357 million tons of additional reserves are available from roadless areas under the proposed action or Alternatives 2/4),

[21] Production is summed across the three mines (i.e., Bowie No 2+3, Elk Creek, and West Elk mines) to capture aggregate production for the North Fork coal area, even though changes in recoverable reserves from roadless areas within the GMUG National Forest are projected to occur for only two of the mines (Elk Creek and West Elk).
[22] Colorado Coal Directory, 2005.
[23] Sources: Colorado Mineral and Energy Industry Activities, 2007; Energy Information Agency, Annual Coal Report for 2007 and 2008, EIA Coal Supply & Demand 2008 Review; State of Colorado DNR/DMRS 2009 Monthly Report; as cited in the revised Economic Specialist Report (USDA Forest Service, 2010b).
[24] This calculation assumes that the 110 million tons of recoverable reserves in roadless area estimated for the 2001 Rule in the Energy Minerals section of the RDEIS are included within the 180.9 million tons of reserves estimated by the State of Colorado

- Estimate additional years of production for the three mines under each alternative, based on the additional reserves and assuming that future production rates are equivalent to the average annual production rates from 2004 to 2009.
- Calculate the average annual production rates, aggregated across the three mines, for a 15 year period between 2011 (rule implementation) and 2025, for each alternative. Average annual production is estimated to be 4.9 million tons per year for Alternative 1 and 12.6 million tons per year for Alternatives 2/4 and 3.

Average annual coal production is estimated to be 4.9 million tons per year under the 2001 Rule and 12.6 million tons per year under Alternatives 2/4 and 3; these production rates are multiplied by $27.44/ton (2006$)[25] to estimate output value which is used to estimate economic impacts (see Table 24). The estimated production life of the three mines is estimated to range from 8 years (up to 2018) for the 2001 Rule, to 47 years (up to 2057) under the proposed action (and Alternative 4), to 69 years (up to 2079) under the forest plans[26] (see Table 23a).

**Table 23a. Estimated Mine Life Based on Existing Plus Adjacent Coal Reserves in Roadless Areas by Alternative.**

| County | Mine Name | Approximate Year Recoverable Reserves Depleted | | |
|---|---|---|---|---|
| | | Alternative 1 | Alternative 2/4 | Alternative 3 |
| Delta | Bowie No. 2&3 | 2013 | 2013 | 2013 |
| Gunnison | Elk Creek | 2012 | 2034 | 2048 |
| Gunnison | West Elk | 2018 | 2057 | 2079 |

Source: Colorado Coal Directory, 2005. Colorado Mineral and Energy Industry Activities, 2006 and 2008.

As noted above, the coal reserves available to the Bowie mine are unaffected by the roadless alternatives. Under Alternative 3 (No Action), the Elk Creek and West Elk mines are projected to continue operations for another 38 years and 69 years (beyond 2010) respectively (see Table 23a). Under Alternatives 2 (the Proposed Action) and 4, these two mines are projected to continue operations for another 24 and 47 years respectively – still an extended period of time but less than would occur under Alternative 3. Under Alternative 1, restrictions on road construction would result in operations continuing for only two and eight years for Elk Creek and West Elk respectively.

Tables 24 shows the direct, indirect, and induced effects for output (production value), employment, and labor income by alternative for the five counties (Delta, Garfield, Mesa, Montrose, and Rio Blanco) in the "energy model" area. Direct effects are realized by the extraction and drilling 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

[25] Price of coal from Colorado Geological Survey, Colorado Mineral and Energy Industry Activities, 2006 (pgs 17-18). Prices from 2006 are consistent with the economic impact model used to create the job and income multipliers based on 2006 data, as noted in the economic section in Chapter 3 of the RDEIS.

[26] These estimated production lives are somewhat longer than those estimated in the Energy Minerals section of the RDEIS due to the use of slightly lower and more refined production rates compared to a more general production rate of 15 million tons per year adopted in the Energy Minerals section.

income paid by the companies directly and indirectly affected by extraction and well drilling activities.

Alternative 3 – the No Action alternative – has the largest total effects on output, employment, and labor income contributions associated with oil, gas, and coal related activities. Alternatives 2/4 has the next largest effects. Compared with Alternative 3, average output would be lower by about 6 percent annually and average employment and income would be lower by about 4 percent. Alternative 1 has the smallest effects. Compared with Alternative 3, average output would be lower by about 38 percent annually, average employment by about 44 percent, and average labor income by 47 percent annually over the 15 year analysis period.

Coal would provide about seventy percent of the labor income under Alternatives 2/4 and 3, and 50 percent under Alternative 1. Coal would also provide about two-thirds of the employment and slightly more than half of the production value under Alternatives 2/4 and 3.

Economic impacts displayed in Table 24 are substantially larger than those presented in the initial draft EIS (DEIS) completed for the first proposed Colorado roadless rule. Impacts attributable to oil and gas are very similar to those estimated in the DEIS for Alternatives 2 and 3. However, impacts under Alternative 1 are nearly three times larger. In the DEIS, the 2001 roadless rule was in effect and severely limited the leasing of roadless acres. In the RDEIS, the 2001 roadless rule is no longer in effect and substantial leasing of these lands has already occurred. Limitations on road activity to develop the lands for energy production would not occur until a Colorado rule is in effect. Leases awarded prior to the decision can be developed, resulting in much higher projections of drilling and production under Alternative 1.

The largest change 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 24. Average annual economic impacts by alternative for energy mineral activity in the energy roadless model area, 2010-2024 (2006 dollars) (1)**

| | Value of Production ($ millions) | | | Employment (jobs) | | | Labor Income ($ millions) | | |
|---|---|---|---|---|---|---|---|---|---|
| Activity/Effects | Alt 1 | Alt 2 | Alt 3 | Alt 1 | Alt 2 | Alt 3 | Alt 1 | Alt 2 | 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 | 189.7 | 51 | 51 | 57 | 9.0 | 9.0 | 10.2 |
| Indirect | 87.4 | 87.4 | 99.0 | 172 | 172 | 195 | 11.2 | 11.2 | 12.7 |
| Induced | 14.6 | 14.6 | 16.5 | 138 | 138 | 156 | 4.4 | 4.4 | 4.9 |
| Totals | 269.4 | 269.4 | 305.2 | 360 | 360 | 408 | 24.6 | 24.6 | 27.8 |
| **Coal Production** | | | | | | | | | |
| Direct | 134.2 | 347.1 | 347.1 | 285 | 738 | 738 | 34.8 | 90.1 | 90.1 |
| Indirect | 36.4 | 94.1 | 94.1 | 127 | 328 | 328 | 7.4 | 19.0 | 19.0 |
| Induced | 39.1 | 101.0 | 101.0 | 296 | 765 | 765 | 9.3 | 24.1 | 24.1 |
| Totals | 209.6 | 542.2 | 542.2 | 708 | 1,831 | 1,831 | 51.5 | 133.2 | 133.2 |
| **Total Energy Minerals** | | | | | | | | | |
| Direct | 404.8 | 617.7 | 654.3 | 488 | 941 | 969 | 56.6 | 111.8 | 114.8 |
| Indirect | 162.8 | 220.5 | 237.5 | 494 | 695 | 745 | 26.7 | 38.4 | 41.0 |
| Induced | 68.4 | 130.4 | 134.4 | 574 | 1,044 | 1,082 | 18.1 | 32.9 | 34.1 |
| Totals | 636.0 | 968.5 | 1,026.3 | 1,557 | 2,679 | 2,796 | 101.4 | 183.2 | 190.0 |

(1) Results for Alternative 4 are equivalent to Alternative 2. Results apply to the five counties (Delta, Garfield, Mesa, Montrose, and Rio Blanco) included in the "Energy area" IMPLAN model developed for this analysis.

## Local Governments

### Mineral Lease Payments

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 where employees of mining companies reside.

State and local taxes are also levied on the extraction of Federal minerals. County assessors determine the taxable value of both production and equipment then apply local mill levies to calculate property taxes due. Property tax revenues by county originating only from energy mineral activity could not be obtained for this report.

The State of Colorado imposes a severance tax that applies to energy minerals, as well as other mineral production. These revenues are distributed among state funds and local jurisdictions in a way similar to Federal mineral lease payments.

*Analysis of Alternatives*

Federal mineral lease payments, property taxes, and severance taxes have been estimated using information provided by the Colorado Department of Local Affairs, Division of Property Taxation and the Colorado Department of Revenue (as cited in the revised economic specialist report (USDA Forest Service, 2010b)). Payments are estimated for Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin counties (all of which can be considered small entities with the exception of Mesa) due to the presence of roadless areas where the likelihood of energy minerals activity is projected to change across alternatives[27]. 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.

According to Tables 25-27, Alternatives 2/4 and 3 have the largest state and local government revenue effects, totaling $49.7 and $47.3 million, respectively. Total revenues under Alternative 1 are $28.4 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. Details regarding production by roadless area can be found in prior oil and gas and in the coal sections in this document.

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 ($1.8 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 2/4. The Horsefly Canyon Roadless Area is entirely contained within Montrose County, has oil and gas potential, allows roads, but is only available under Alternatives 2/4. The Montrose County share of total production in Alternatives 2/4 is estimated to yield about $111,000 in property taxes per year.

Because of state distribution formulas for severance taxes and Federal mineral lease payments, Colorado counties outside of the energy minerals model area would share approximately $2.0 million under Alternatives 2 and 3, and approximately $1.3 million under the Alternative 1.

[27] The list of counties included in the energy impacts model differs from the list of counties that are projected to experience changes in mineral lease payments due to the fact that the location of employees associated with energy sector jobs does not coincide exactly with the physical location of mineral activity in roadless areas responsible for determining lease payments.

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.

**Table 25. Alternative 1 (2001 Rule) – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2010-2024 (thousands of 2007 dollars per year)**

| 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 | $100,888 | $0 | $0 | $0 | $0 | $145,513 |
| | | | | | | | | |
| Property tax receipts (production only) | $413 | $644 | $2,471 | $1,353 | $0 | $521 | $0 | $5,401 |
| Severance tax receipts | | | | | | | | $4,198 |
| | | | | | | | | |
| Federal Mineral Lease Payments | | | | | | | | |
| Retained by U.S. | | | | | | | | $18,843 |
| Paid to Colorado | | | | | | | | $18,843 |
| | | | | | | | | |
| State Distribution of Severance Tax & Federal Royalties* | | | | | | | | |
| Public School Fund | | | | | | | | $9,422 |
| Other State Funds | | | | | | | | $10,635 |
| To Local Governments | $266 | $552 | $5 | $1,050 | $32 | $0 | $1,080 | $2,985 |
| | | | | | | | | |
| Total of Payments and Taxes Received | $678 | $1,196 | $2,477 | $2,403 | $32 | $521 | $1,080 | $28,443 |

**Table 26. Alternatives 2 (Proposed Action) and 4 (Proposed Action with additional upper tier) – 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 | $11,462 | $26,161 | $59,293 | $32,700 | $3,158 | $23,206 | $0 | $155,980 |
| Coal Production Value | $44,625 | $0 | $331,698 | $0 | $0 | $0 | $0 | $376,323 |
| | | | | | | | | |
| Property tax receipts (production only) | $606 | $686 | $3,698 | $1,297 | $111 | $517 | $0 | $6,915 |
| Severance tax receipts | | | | | | | | $7,147 |
| | | | | | | | | |
| Federal Mineral Lease Payments | | | | | | | | |
| Retained by U.S. | | | | | | | | $33,269 |
| Paid to Colorado | | | | | | | | $33,269 |
| | | | | | | | | |
| State Distribution of Severance Tax & Federal Royalties | | | | | | | | |
| Public School Fund | | | | | | | | $16,634 |
| Other State Funds | | | | | | | | $18,550 |
| To Local Governments | $557 | $916 | $11 | $1,760 | $61 | $0 | $1,926 | $5,231 |
| | | | | | | | | |
| Total of Payments and Taxes Received | $1,163 | $1,601 | $3,708 | $3,058 | $171 | $517 | $1,926 | $47,330 |

**Table 27. Alternative 3 (Forest Plans) – 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 | $33,320 | $17,390 | $77,569 | $31,952 | $0 | $16,479 | $0 | $176,710 |
| Coal Production Value | $44,625 | $0 | $331,698 | $0 | $0 | $0 | $0 | $376,323 |
| | | | | | | | | |
| Property tax receipts (production only) | $1,356 | $456 | $4,248 | $1,268 | $0 | $367 | $0 | $7,695 |
| Severance tax receipts | | | | | | | | $7,457 |
| | | | | | | | | |
| Federal Mineral Lease Payments | | | | | | | | |
| Retained by U.S. | | | | | | | | $34,565 |
| Paid to Colorado | | | | | | | | $34,565 |
| | | | | | | | | |
| State Distribution of Severance Tax & Federal Royalties | | | | | | | | |
| Public School Fund | | | | | | | | $17,282 |
| Other State Funds | | | | | | | | $19,301 |
| To Local Governments | $568 | $958 | $11 | $1,840 | $63 | $0 | $1,999 | $5,439 |
| | | | | | | | | |
| Total of Payments and Taxes Received | $1,924 | $1,414 | $4,259 | $3,108 | $63 | $367 | $1,999 | $49,717 |

**Excludes activity on substantially altered areas.**

### Other Revenue Sharing

Historically, decisions on the management of NFS lands have affected forest revenues and subsequent payments to states and counties – often referred to as "25% payments" in reference to the share of receipts paid back to state and local governments. 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 NFS 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 energy mineral development activities in roadless areas. Only fees associated with Forest Service permits for oil, gas, and coal exploration and development would affect 25 percent payments to San Miguel County. Federal mineral lease royalties are collected by the Department of Interior and not subject to "25% fund" payments. Changes in the payment to the county are not expected to be sizeable under any alternative.

Counties with Federal lands also receive "Payments in Lieu of Taxes," or PILT. These payments are administered 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.

### Fuels Treatments

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.

A Community Protection Zone (CPZ) has been defined around all at-risk communities near inventoried or proposed roadless areas[28]. The CPZ extends a minimum of 0.5 miles and up to 1.5 miles beyond at-risk communities. The CPZ that intersects an IRA or CRA is the focus of this analysis. A more detailed description of this analysis area can be found in "Fire and Fuels Ecology" section.

[28] For the first proposed Colorado Roadless Rule (2008), 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.

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 28 shows the CPZ land area, by county, that overlaps with roadless areas (i.e., CRAs and/or IRAs) where likelihood of treatments are projected to be low to high. 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 – that depends on project funding, overall fuel treatment priorities both in and outside of roadless areas, and other factors. However, Table 28 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 24 counties. Across these counties, the greatest acreages of potential treatment occur under Alternatives 2 and 3. The counties with the greatest CPZ overlap with roadless areas where there is high potential for treatment include La Plata, Park, and Larimer counties. Those with moderate overlap with areas of high potential include Archuleta, Chaffee, Custer, and Douglas. By referencing Table 23 above, these counties have a minimum of 0.4% to 8.8% of their total valuation in homes located in the wildland urban interface.

Under Alternative 1, 16 counties have potential for fuel treatments in the CPZ. The counties with the greatest overlap with areas of high potential treatment include La Plata, Larimer, Archuleta, and Douglas. Under Alternative 4, 22 counties have potential for treatments in the CPZ. The counties with the greatest overlap with areas of high potential treatment include La Plata, Park, and Douglas.

Table 29 provides a comparison of potential treatment acres between each alternative and Alternative 3 (No Action alternative). This table shows more clearly that there are few differences between Alternative 2 and 3 with only two counties showing a decrease and three counties showing an increase in potential under Alternative 2. It also shows clearly a reduction in overlap with areas of low to high potential treatment acres under Alternatives 1 and 4. Thirteen counties would have a lower potential of treatment under Alternative 1, while Eighteen counties would have a lower potential of treatment under Alternative 4. Based on Table 23, Eagle and Summit Counties have a sizeable tax dependence on properties in the urban interface and would also have some of the largest reduction in overlap with roadless areas with potential treatment under Alternative 1. Clear Creek County is the only one to have an increase in overlap under Alternative 1. Boulder, Clear Creek, Dolores, Grand, and Montezuma Counties could have an increase in overlap under Alternative 4, mostly with lower potential for treatment. Based on Table 23, Clear Creek and Grand Counties have a modest, but not insignificant tax dependence on properties in the urban interface.

Tables 30 and 31 provide another context for understanding potential treatment implications. These tables display the share of CPZ acres within National Forest System land that intersect with roadless areas where potential exists for treatment. A high percentage means that potential treatments in IRAs and CRAs could play an important role in overall reduction of community

vulnerabilities due to wildfire. A low percentage implies that treatments in IRAs or CRAs may not be as critical for this purpose – though exceptions to this rule may exist. Fuel treatments under Alternatives 2 and 3 in IRAs or CRAs may be especially important for La Plata, Custer, Huerfano, Pueble, and Fremont Counties. Acres with a high likelihood of treatment range from about 16% to 38% of all NFS acres in the CPZ. Of these counties, Custer has the highest relative tax dependence (4.2%) on homes in the wildland urban interface. For most other counties, high potential acres are a relatively small share of all NFS acres in the CPZ. Under Alternative 1, only La Plata County shows a high share of all NFS acres for high potential acres. Under Alternative 4, high potential treatment acres are a small share of all NFS acres in the CPZ for all counties.

Table 31 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, are lower 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 may have a reduced role on NFS lands in the context of fuel treatments and protecting values at risk associated with at-risk-communities.

**Table 28. Potential Fuel Treatment Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities, by County (1)**

| 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 | - | - |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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** |

**Table 28(cont). Potential Fuel Treatment Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities, by County (1)**

| County | Alternative 4 | | | |
|---|---|---|---|---|
| | 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 |
| Archuleta | 300 | 2,400 | 300 | 2,400 |
| Boulder | 1,400 | 4,500 | - | 3,900 |
| Chaffee | 400 | 5,700 | 400 | 1,600 |
| Clear Creek | 4,800 | 18,200 | - | - |
| Custer | 2,100 | 6,500 | - | 200 |
| Dolores | 1,300 | 1,900 | - | - |
| Douglas | 2,500 | 11,800 | 2,500 | 11,800 |
| Eagle | 3,500 | - | - | - |
| El Paso | - | 900 | - | 900 |
| Fremont | 1,100 | 3,600 | - | - |
| Garfield | - | - | - | - |
| Grand | 2,300 | 20,600 | 500 | 3,900 |
| Gunnison | 100 | 1,200 | 100 | 1,200 |
| Huerfano | 136 | 2,560 | 136 | 2,560 |
| Jefferson | 500 | 4,400 | 500 | 4,400 |
| La Plata | 8,300 | 20,700 | 8,300 | 20,700 |
| Lake | 300 | 300 | 300 | 300 |
| Larimer | 8,100 | 26,200 | 3,400 | 8,800 |
| Mineral | - | - | - | - |
| Montezuma | 5,700 | 22,800 | - | - |
| Park | 8,200 | 25,600 | 4,200 | 10,000 |

| | | | | |
|---|---|---|---|---|
| Pitkin | 901 | 17,618 | - | - |
| Pueblo | - | 300 | - | 300 |
| Summit | 1,100 | 3,100 | - | - |
| **Total** | **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 29. Potential Fuel Treatment Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities Compared with Alternative 3, Totals by County (1)**

| 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 | - | - |
| 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 |

| 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* | | | | | | | | | | | |
| 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 30 - Share of Total NFS Lands in the Community Protection Zone where Potential Exists for Fuel Treatment by County (1)**

| 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% |

| 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 |
| 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% | - | - |
| **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 31 - 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% |
| 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% |

| 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 |
| **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)

Other Community Impacts

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 areas jurisdictions 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.

**References**


2007 Annual Report—advanced tables. Colorado Department of Local Affairs, Division of Property Taxation. Denver, CO. 2007.

2007 Annual Report. Colorado Department of Revenue.

(http://www.revenue.state.co.us/TaxStats). Denver, CO. January 2008.

Brown, G. and P. Reed. 2000. Validation of a forest values typology for use in national forest planning. Forest Science. 46(2):240-247.

Center for Business and Economic Forecasting, Inc. 2001. Tourism Jobs Gain Ground in Colorado. Prepared for the Colorado Department of Local Affairs. Denver, CO. 2001.

Dean Runyan Associates, Inc. The Economic Impact of Travel on Colorado: 1996-2005. Prepared for the State of Colorado, Colorado Tourism Office, Office of Economic Development and International Trade. Denver, CO. June 2006.

Dyer, Desty. Personal communication regarding coal mining. USDI-Bureau of Land Management, Montrose Field Office. Montrose, CO. May 21, 2008.

General Accounting Office. 1999. Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildland Fire Threats. April, 1999 (GAO/RCED-99-65). (http://www.gao.gov).

Lloyd Levy Consulting. Job Generation in the Colorado Mountain Resort Economy. Prepared for the Northwest Colorado Council of Governments. Silverthorne, CO. 2004.

McDonald, Lisa A., Holly Wise Bender, Eric Hurley, Sheri Donnelly, and David Taylor. Oil and Gas Economic Impact Analysis. Prepared by Booz Allen Hamilton for the Colorado Energy Research Institute. Golden, CO. June 2007.

Minnesota IMPLAN Group 2003. IMPLAN Professional Version 2.0 (regional economic impact modeling software).

USDA Forest Service, 2010. Revised Draft Environmental Impact Statement (RDEIS): Proposed Colorado Roadless Rule. Region 2, USDA Forest Service, Denver CO.

USDA Forest Service, 2010a. Opportunities for Small Entities: Proposed Roadless Area Conservation Rule for Colorado. Region 2, USDA Forest Service, Denver CO.

USDA Forest Service, 2010b. Social and Economics Specialist Report: Proposed Roadless Area Conservation Rule for Colorado. Region 2, USDA Forest Service, Denver CO.USDA Forest Service, 2008. Draft Environmental Impact Statement (DEIS): Proposed Roadless Area Conservation Rule for Colorado. Region 2, USDA Forest Service, Denver CO.

USDA Forest Service, 2008a. Roadless Area Conservation: National Forest System Lands in Colorado: Proposed Rule Regulatory Impact Analysis and Cost Benefit Analysis. Region 2, USDA Forest Service, Denver CO.

USDA Forest Service, 2005. Profile 2005: Softwood Sawmills in the United States and Canada. Research Paper: FPL-RP-630. USDA Forest Service, Forest Products Laboratory, Madison WI.

USDA Forest Service, 2005a. Cumulative Set Aside Program Analysis Spreadsheets, by Forest Unit. USDA Forest Service Region 2, Denver CO

USDA Forest Service. 2004a. FEAST (Forest Economic Analysis Spreadsheet Tool) Software 2004 Model Outputs and Response Coefficients.

USDA Forest Service and US Department of the Interior. 2001. Managing the Impacts of Wildland fires on Communities and the Environment – The National Fire Plan. (http://www.forestsandrangelands.gov/index.shtml)