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

Regulatory Impact Analysis
And
Cost-Benefit Analysis

USDA Forest Service

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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 were revised and a second round of public comments was solicited. Additional modifications to the revised proposed rule have been incorporated into the final rule based on public comment.

This report summarizes the regulatory impact analysis for the final Colorado Roadless Rule as directed by Executive Order 12866 issued September 30, 1993. Executive Orders 13563 and 12866 direct agencies to assess costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. These executive orders require that agencies conduct a regulatory analysis for economically significant regulatory actions. Economically 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 $760 million under the final rule, compared to $694 under baseline conditions, implying the annual monetized impacts of the final rule are estimated to be an increase of $65 million per year for total oil, gas, and coal output. Even though economic effects are estimated to be less than $100 million per year (and in fact constitute a positive monetized effect of $65 million per year), this rule has been designated a significant regulatory action although not economically significant, under section 3(f) of Executive Order 12866. Accordingly, the rule has been reviewed by the Office of Management and Budget.

The final rule is programmatic in nature and intended to guide future development of proposed actions in roadless areas. The final 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 around communities to allow access to coal reserves in the North Fork coal mining areas, and to allow access to future water conveyances. 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 final 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 final rule can be found in the revised final environmental impact statement (FEIS) for the final rule, as well as 'specialist' reports developed to support the effects summarized in the FEIS. 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 FEIS for details about these resource areas. The following changes have occurred under the final rule since the release of the proposed rule and the RDEIS in 2011 (these changes also apply to Alternative 4 except where noted):

- The amount of upper tier acres was increased from 562,200 acres in the RDEIS to 1,219,200 acres (number of upper tier acres under Alternative 4 is the same under the RDEIS and the FEIS).
- The North Fork coal mining area was changed from 19,600 acres in the RDEIS to 19,100 acres.
- An exception to allow for temporary road construction in upper tier was added to account for public health and safety.
- The ability to make administrative corrections to upper tier boundaries was added to account for clerical errors, mapping errors or changes in mapping technologies.
- A provision requiring future oil and gas leases in upper tier to have a no surface occupancy (NSO) stipulation has been added.
- The definition of a pre-existing water court decree was changed to address initial applications filed before the promulgation of the rule.

Methods and Assumptions

This report summarizes the benefits, costs, and distributional effects of the final Colorado Roadless Rule (final rule) and Alternative 4 (a modified version of the rule with additional upper tier acreage) in comparison to baseline conditions represented by the 2001 Roadless Rule (2001 rule). The assumption regarding baseline conditions is consistent with the 10th US Circuit Court of Appeals mandate (2012) lifting a prior US District Court injunction of the 2001 rule, thereby re-installing the 2001 rule, as of the date of publication of this report. The 2001 rule alternative assumes all provisions of the 2001 rule are in place and that the 2001 inventory is utilized. Any leases issued since promulgation of the 2001 Rule would be valid. A third alternative, referred to as provisions of the Forest Plans (or simply 'forest plans'), would establish a state-specific roadless rule for Colorado that would exempt inventoried roadless areas on NFS lands in Colorado from the 2001 Roadless Rule. Though the 2001 rule represents baseline conditions, the

final rule (and Alternative 4) are compared to both the 2001 rule, as well as the forest plans alternative, to fully understand the impacts of this action. It should be noted that the Final Environmental Impact Statement (FEIS) for this action refers to these alternatives as follows: Alternative 1 - the 2001 rule (No Action); Alternative 2 - the final rule (Colorado Roadless Rule); Alternative 3 – forest plans; and Alternative 4 – the modified rule (Colorado Roadless Rule with Public Proposed Upper Tier Acres).

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 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) are removed from roadless areas for all alternatives. In addition, the Colorado roadless areas (CRAs) under the final 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 are approximately 4.24 million acres, while Colorado roadless areas (CRAs) under the final 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.

Because the final 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. The analyses of resource-specific effects upon which benefits are based are presented and summarized in resource-specific sections in Chapter 3 of the FEIS and not reproduced in this report.

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 final 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 final 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 distinguishes between the projection of reasonably foreseeable *activities* (i.e., tree cutting, road construction and reconstruction actions) and changes in potential *opportunities* resulting from those activities. Potential opportunities for generating goods and services (e.g., recreation, fuel reductions, minerals) are affected by the extent to which activities (i.e., tree cutting, road construction and reconstruction) are permitted in roadless areas under each alternative to facilitate provision of goods and services. Projections of tree cutting and road construction activities are provided by individual National Forests within Colorado and 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 used to help characterize reasonably foreseeable flows of goods (e.g., coal, oil and gas production) and services (e.g., reduction of risks from wildfire in the wildland urban interface) as well as resource utilization for each alternative and baseline conditions over a 15 year time period. Projected activity levels are also used as indicators of potential effects to and subsequent changes in benefits derived from roadless characteristics. Details about the derivation of activity projections are described in the FEIS, as well as the resource specialist reports supporting the FEIS, 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, and Pitkin). The counties where relevant jobs are located do not necessarily coincide with counties where deposits are physically located, implying that different sets of counties are modeled for different types of impact analysis endpoints. Fiscal impacts to other Colorado counties are shown collectively. Distributional effects to the forest products industry are presented qualitatively. The distributional effects associated with reducing wildfire hazard are characterized by estimating the changes in the extent to which community protection zone (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, livestock grazing, recreation) due to evidence suggesting that the extent or magnitude of changes in output or services are not sufficient to cause significant changes in distributional effects (see resource-specific sections in this report as well as FEIS for details).

The analysis area adopted for the FEIS and 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 the 2001 rule amount to 4,243,600 acres while Colorado roadless areas (CRAs) are estimated to cover 4,186,000 acres under the final rule and Alternative 4. The amount of CRA acreage assigned to upper tier status is 1,219,200 acres under the final rule and 2,614,200 acres under Alternative 4. Tree cutting, sale or removal as well as road construction or reconstruction are prohibited in upper tier areas (exceptions for these activities in upper tier areas include: permissions for tree cutting when incidental to and needed for management activity or

appropriate for personal or administrative use; permissions for road construction when needed pursuant to reserved or outstanding rights or as provided by statute or treaty).

Local Resource Challenges

Local resource challenges include reducing the hazard to communities, property, and resources from 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).

Road construction and tree-cutting are projected to occur for specific purposes, and effects are therefore also described for specific purposes. Sometimes road construction or tree-cutting intended for one purpose will support other or ancillary purposes. For example, tree-cutting for fuel reduction treatments may also serve to improve forest health, however, tree-cutting spedifically for the purpose of forest health may not reduce hazardous fuels.

Projected levels of treatment involving tree cutting across treatments for all purposes (i.e., hazardous fuels reduction, ecosystem maintenance and restoration, habitat improvements) within the analysis area as a whole, are greatest under forest plans (17,380 acres per year; 260,700 acres over 15 years) followed by the final rule (7,320 acres per year; 109,800 acres over 15 years), and Alternative 4 (3,140 acres per year; 47,100 acres over 15 years), with the lowest amount of tree cutting projected for conditions under the 2001 rule (2,670 acres per year; 40,050 acres over 15 years).

Reductions in the amount of timber available for commodity production on NFS lands, as represented by ‘allowable sale quantity’ (ASQ) estimates, may occur under the final rule and Alternative 4. However, current and reasonably foreseeable volumes of timber actually sold are well below the ASQ and expected to remain so under the final rule and Alternative 4. Timber supplies outside of roadless areas are therefore available to substitute for decreases in timber availability within roadless areas. Timber output is therefore expected to vary only by location (i.e., proportion of tree cutting occurring inside versus outside of roadless areas) under the final rule and Alternative 4, forest plans, as well as baseline conditions (i.e., 2001 rule).

Forest health describes the forest condition associated with age, composition, structure, function, vigor, insects and disease, and resilience to disturbances. Forest health conditions in roadless areas are variable, with some areas considered healthier than others. A combination of tree cutting, removal, and prescribed burning are used to reduce the occurrence or spread of damaging insects and diseases, provide desirable forest conditions to reduce fire hazard, and address other forest health concerns (i.e., forest health improvements may occur as a result of tree-cutting for a variety of purposes). Forest health treatments and other forest management projects within roadless areas are limited to some degree due to the nature and location of roadless areas under all alternatives. Most or large portions of roadless areas will remain unmanaged (i.e., with no treatments) under the final rule, Alternative 4, forest plans, as well as baseline conditions. Roadless areas that remain unmanaged would likely continue to depart from desired conditions. The decline in forest health would result in some landscapes being less resilient to large-scale insect and disease outbreaks.

Under the 2001 rule baseline conditions, almost all of the forest vegetation in roadless areas would remain unmanaged (i.e., few treatments for fuel management, restoration, and other forest health or vegetation management purposes) over the next 15 years. The 2001 rule is generally the most restrictive on tree cutting (2,670 acres/yr projected across treatments for all purposes in the analysis area) and road construction for forest vegetation management and provides the fewest options to improve forest health.

The final rule provides greater opportunities to improve forest health (i.e., 7,320 acres/yr of tree cutting projected across treatments for all purposes in the analysis area) to meet desired vegetation conditions compared to the 2001 rule. Although the final rule is unlikely to substantially improve forest health and hazardous fuel conditions overall, the increased flexibility compared to the 2001 rule, would increase the likelihood of achieving management objectives in critical areas, especially in the community protection zones. The final rule would also reduce the likelihood of achieving the Forest Plan desired conditions outside of community protection zones.

Under the forest plans, tree cutting activity is projected on 17,380 acres per year in across treatments for all purposes in the analysis area. Forest plans provide more flexibility than the final rule, the 2001 rule, or Alternative 4 to address concerns that may arise (including response to climate change) and the highest likelihood of achieving Forest Plan objectives.

The effects of Alternative 4 are expected to be similar to the final rule regarding opportunities to improve forest health. However, Alternative 4 has fewer opportunities to improve forest health (tree cutting projected on 3,140 acres/yr across treatments for all purposes in the analysis area) to meet desired vegetation conditions compared to the final rule because of restrictions in upper tier areas. Alternative 4 provides more opportunities to improve forest health in community protection zones than would occur under the 2001 rule. The increased flexibility compared to the 2001 rule would increase the likelihood of achieving management objectives in the community protection zones. Alternative 4 would be the most restrictive on tree cutting outside of community protection zones and therefore would reduce the likelihood of achieving the Forest Plan desired conditions outside of the community protection zones compared to forest plans as well as the final rule.

Other potential changes to forest or rangeland vegetation in the roadless areas include short-term, localized changes in vegetation composition, structure, and function as a result of increases in roads and tree cutting activities. The potential for longer term and more widespread improvements in forest and rangeland health would be more pronounced under forest plans with decreasing potential for improvements under the final rule, Alternative 4, and the 2001 rule respectively.

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 treatments in roadless areas, and least likelihood of reducing wildfire hazards to at-risk communities in and adjacent to roadless areas. Approximately one percent of annual fuel treatments on NFS lands in Colorado could occur in the analysis area under the 2001 rule. Tree-cutting for fuel treatments on a total of 13,350 acres (<1 percent) of the 4.24 million acres in IRAs over a 15 year period (890

acres per year of of fuel treatments) in the analysis area under the 2001 rule 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 final rule and forest plans provide flexibility to prioritize where hazardous fuel and forest health treatments would occur in roadless areas, resulting in greater potential ability to reduce the high-severity wildfire threats to communities and municipal watersheds that lie near the roadless areas. For the final rule, hazardous fuel reduction treatments, including tree cutting, are permitted to occur in CRAs within Community Protection Zones (CPZs) where 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 final rule. Tree-cutting for fuel treatments on 82,650 acres over 15 years (5,510 acres per year of fuel treatments) offers more opportunity for improving fuels and fire management effectiveness and could result in significantly more fuels and fire hazard reduction under the final rule compared to the 2001 rule. The final rule would result in reduced hazard for at-risk communities and other values in proximity to the CRAs.

Forest plans offer 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 13,350 acres per year of tree-cutting for fuel reductions projected to occur in the analysis area under forest plans could represent 21 percent of the total NFS acres treated annually in Colorado. Fuel treatments on 200,250 of the 4.25 million acres over 15 years in areas currently inventoried as roadless (IRAs) could result in reducing the fuel hazard on a significant portion of the total in IRA acreage. Options for fuel treatments under Alternative 4 are similar to the 2001 rule where tree cutting for fuel treatments is projected for 2,000 acres per year (30,000 acres over 15 years) 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 approximately half of CPZs within roadless areas. In contrast, none of the CRAs within 0.5 or 1.5 miles CPZs are in upper tier acres under the final rule.

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 whose lease terms allow for road construction. Twenty-one (21) IRAs containing 156,393 leased acres are on the GMUG, White River, San Juan, Manti-LaSal, Routt, and Pike-San Isabel (PSI) National Forests. Roads would be allowed in 132,783 acres of the total area leased, and roads would be prohibited in 23,610 acres. Of the 21 IRA's with existing leased acreage, only fourteen IRAs located on the Grand Mesa-Uncompahgre-Gunnison (GMUG), San Juan, and White River NF's are expected to have oil and gas roads and development activity over the 15-year analysis timeframe.

Under the final rule, as well as Alternative 4, road construction would be allowed on oil and gas leases that allow surface occupancy and were issued before the final rule becomes effective. There are 27 proposed CRAs containing 157,760 leased acres on the GMUG, White River, San Juan, Manti-LaSal, Routt, and Pike-San Isabel (PSI) National Forests. Roads would be allowed in 134,003 acres of the total area leased, and roads would be prohibited in 23,757 acres. Of the 27 CRAs with existing leased acreage, only sixteen IRAs located on the GMUG, San Juan, and White River NF's are expected to experience oil and gas development activity in the foreseeable future. Under forest plans, road construction would be allowed on existing and future oil and gas leases where roads are allowed under lease terms and stipulations. Fourteen (14) IRAs on the

GMUG, San Juan, and White River NF's 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.

The total number of oil and gas wells and recoverable reserves (i.e., 732 wells; 1,276 billion cubic feet of gas (bcfg)) are projected to be the same for the final rule, the 2001 rule and Alternative 4 for the analysis area in the foreseeable future. In comparison, total wells and accessible reserves are estimated to be slightly higher under forest plans (819 wells; 1,384 bcfg) for the foreseeable future. Accessible gas reserves therefore decrease by 108 bcfg (8%) under the final rule compared to forest plans.

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 accessible coal reserves (157 million tons of coal) for the North Fork coal mining area. Approximately 7,100 acres out of 8,600 acres are leased (5,900 leased acres are within IRAs), and 1,500 acres are unleased. A total of 2,700 acres out of 8,600 acres are outside of IRAs under the 2001 rule.

For the final rule (as well as Alternative 4), foreseeable production opportunities are estimated to be 19,125 acres of accessible reserves (504 million tons of coal) of which 7,100 acres are leased (4,000 leased acres are within CRAs) and 12,025 acres are unleased. A total of 15,025 out of 19,125 acres are outside of CRAs under the final rule (and Alternative 4). Accessible coal reserves are estimated to be 347 million tons greater than the 2001 rule (with 157 million tons) and 211 million tons less than forest plans (with 715 million tons).

Under forest plans, foreseeable production opportunities are estimated to be 715 million tons of reserves on 36,400 acres of accessible coal reserves, of which 7,100 are leased (5,900 leased acres within IRA boundaries) and 29,300 acres are unleased. A total of 32,400 out of 36,400 acres are located outside of IRA boundaries under forest plans.

Projected road construction associated with coal production is estimated to be: 16 miles (7 within IRAs) under the 2001 rule; 52 miles (50 within CRAs) under the final rule and Alternative 4; and 73 miles (64 within IRAs) under forest plans.

Forest plans 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 final rule, Alternative 4, and the 2001 rule because of prohibitions on road construction for this purpose. However, 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. Road construction or reconstruction is allowed in roadless areas under the final rule, Alternative 4, and the 2001 rule where needed to address road safety hazards and imminent threats of flood, fire, and other catastrophic events that may threaten loss of life or property. This exception applies to upper tier acres as well under the final rule and Alternative 4. The lower number of road miles projected to occur in roadless areas under the 2001 rule may be more limiting regarding responsiveness to emergency health and safety situations. Under the final rule and Alternative 4, and to a greater extent under forest plans,

increases in road miles projected may facilitate responses to emergency health and safety situations compared to the 2001 rule (acknowledging that many roads are expected to be temporary).

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 the 2001 rule, future authorizations (i.e., after the effective date of this rule) would generally prohibit roads but allow linear construction zones (LCZs), including for oil and gas pipelines from lease areas outside of IRAs. Approximately 4.7 miles of LCZs per year are projected under the 2001 rule (all of which are in IRAs) for these types of special use authorizations. Opportunities for future authorizations related to these types of uses are similar for the final rule and Alternative 4; however allowances for LCZs are more limiting, and specific to particular special use areas, as noted in the final rule language. The final rule and Alternative 4 also prohibit LCZ and road construction for many types of future special use authorizations other than oil and gas pipelines, electrical/telecommunication lines, and water conveyances. Similar to the 2001 rule, 4.7 miles of LCZs per year are projected under the final rule and Alternative 4 (of which 3.3 miles are in CRAs). Road and LCZ construction would generally be allowed for a variety of future special use authorizations under forest plans, except where prohibited under management plans. Approximately 5.1 miles of LCZs per year are projected for the analysis area under forest plans, 0.4 miles more than the final rule and Alternative 4.

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 final 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 that would not be allowed under the 2001 rule. Under forest plans the potential to construct roads and cut trees in IRAs in ski areas would be the same as the final rule, recognizing that forest plans can be amended to expand ski area allocations into what would be IRAs or CRAs under the 2001 rule or the final rule respectively. 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 final rule is not expected to have a significant impact on other types of developed recreation opportunities compared to forest plans or baseline conditions.

The final 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 Area 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 existing or projected to occur on 88 - 89% of IRA acres (i.e., approximately 11% of IRAs are substantially altered). 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 final rule, minimal direct effects to roadless area characteristics are expected because there is little activity (approximately 90,000 acres of tree cutting projected over 15 years) projected to occur on 98% of CRA acres, compared to 88% to 89% of IRAs under the 2001 rule. The final rule has the lowest risk of adverse effect to roadless area characteristics from LCZ construction as this activity is generally more restricted compared to the 2001 rule as well as forest plans, and regulatory protection of roadless area characteristics on an additional 409,500 acres within CRA boundaries is provided under the final rule but excluded from IRAs under the 2001 rule. The direct effects of Alternative 4 (final rule with additional public proposed upper tier acres) on roadless characteristics are similar to the final rule, recognizing that little activity is projected to occur on 99% of CRAs.

In general, the final rule, Alternative 4, and the 2001 rule pose less direct risk to roadless area characteristics (i.e., potential for adverse effects resulting directly from tree-cutting or road construction activity) than forest plans, 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 under forest plans. Approximately 10% of the analysis area is currently substantially altered; an additional five percent is projected to have activities in the next 15 years, implying that 85% will retain roadless area characteristics under forest plans. No regulatory protection of roadless area characteristics other than that described in forest plans and the Forest Service Manual (FSM) is provided under the forest plans alternative.

Some of the adverse effects of increasing levels of tree cutting and road construction on roadless characteristics under Alternative 4, the final rule, and forest plans respectively may be offset by the longer-term beneficial effects of the vegetation treatments facilitated by the projected activities compared to the 2001 rule. 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 2001 rule would retain the most IRA acreage at high to very high scenic integrity levels where it exists. Most of the substantially altered IRA acreage would continue to reflect moderate to low scenic integrity levels, inconsistent with general roadless area characteristics and values. The final rule would retain greater percentages of areas classified as roadless at high to very high scenic integrity compared to the 2001 rule due in large part to the removal of substantially altered IRA acreage from CRAs. The final 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 under the final rule could result in a higher potential for portions of roadless areas to shift to a moderate to low scenic integrity levels than the 2001 rule (but lower potential than forest plans). Substantially altered landscapes would not be included in the CRAs and would therefore not detract from scenic integrity in designated roadless areas under the final rule compared to the 2001 rule. 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 forest plans. More opportunities for tree cutting associated with treatments under the final rule may contribute to high scenic quality in the long-run compared to the 2001 rule (but less than forest plans conditions). Forest plans would retain fewer acres in the IRAs at the current high to very high scenic integrity levels, compared to the final rule or Alternative 4. 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 the final rule but with slightly reduced risk to scenic integrity 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 under all alternatives, as well as baseline conditions. Potential effects would be moderated under all alternatives and baseline conditions through project-level compliance with scenic integrity and visual quality objectives specified in land management plans.

There are a total of 36 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 87,000 acres of roadless areas have been recommended for wilderness in land management plans. The final rule (and Alternative 4), as well as the 2001 rule will not have a direct effect on designated wilderness, because wilderness 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 unless a site-specific amendment is completed. Projected activities under the final rule, Alternative 4, and the 2001 rule all have a similarly low likelihood of affecting wilderness characteristics because activities are not expected to occur adjacent to wilderness area boundaries. The final rule, Alternative 4, and the 2001 rule pose lower risk of adverse effects on wilderness experience compared to forest plans. The risk of detracting from wilderness characteristics in adjacent wilderness areas would be higher under forest plans. Unlike the 2001 rule, projected activities in the North Fork Coal Mining area under the final rule, Alternative 4, and forest plans could potentially affect the solitude and wilderness experience opportunities in the adjacent West Elk wilderness. Forest plans could also potentially create the greatest reduction in the number of roadless acres that would be capable of supporting new wilderness recommendations. Inclusion of 1,219,200 and

2,614,200 CRA acres in upper tiers under the final rule and Alternative 4 respectively may help establish a uniform management approach for recommended wilderness that would not be possible under the 2001 rule or forest plans, 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. Neither the final rule, nor Alternative 4 would directly impact the congressionally designated trail. Neither alternative 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 alternatives 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 final rule or Alternative 4 on the characteristics and values of adjacent designated areas compared to the 2001 rule. Road construction and tree cutting are not projected to occur on Research Natural Areas (RNAs) or Special Interest Areas (SIAs) under the alternatives or baseline conditions. Some forest 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 only slightly among the alternatives based on different levels of projected roading, tree removal, and energy resource development activities. The final rule would have more risk of adverse impacts compared to the 2001 rule but less risk compared to forest plans. Forest plans 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 under the final rule may be higher compared to forest plans and lower relative to the 2001 rule 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 impacts in roadless areas from projected activities under the final rule and Alternative 4 compared to forest plans and baseline conditions would be negligible. The 2001 rule would have the least risk of adverse effects on water quality, quantity, or stream flow, while the final rule and Alternative 4 would have a slightly higher risk respectively. Risks posed to water supplies by the final rule would be lower than forest plans, however, actual impacts on water quality anticipated from any of the alternatives or baseline conditions 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. Levels of projected fuel treatment activity increase under Alternative 4, the final rule, and forest plans respectively. Increasing fuel treatment activity may reduce risks to water quality and municipal water supplies from high severity wildfires, though decreases in risk may be slight.

There is no major difference in the projected effects on air quality among the alternatives compared to baseline conditions. One minor difference is related to potential smoke-related impacts from wildfires, which would have greater potential to occur in roadless areas under the 2001 rule, less likely under the final rule and Alternative 4, and least likely to occur under forest plans.

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.

Three T&E and 41 sensitive plant species are known or likely to occur in roadless areas in Colorado. The effects of the final rule, Alternative 4, forest plans, and baseline conditions on T&E plant species are not expected to differ substantially, because no additional roading, tree cutting, energy development, or LCZ activities under any of the alternative conditions are projected to occur in the portions of roadless areas that support T&E plants. For sensitive plants, the potential risk of direct adverse impacts from road construction, tree cutting, LCZs, and oil, gas or coal development depends on the extent to which these activities take place within the specific areas where sensitive plant species occur. The relative difference in risk is tied to the likelihood of projected activities across alternatives. Authorized activities are designed and conducted to avoid habitat containing sensitive plant species when practical, or to at least avoid a loss of population viability, however, some level of risk of accidental damage to sensitive plants or their habitats during project implementation (or other unintended consequences from management activities) may occur. Increasing degrees of risk from invasive plants may occur under Alternative 4, the final rule, and forest plans respectively 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. Over time, weeds could spread from infested activity areas into sensitive plant habitat, even if the activities are conducted at some distance from these habitats (e.g., via wind). Some of the potential indirect impacts from invasive plants would be avoided or mitigated by implementation of the Forest Service's weed management and prevention programs. None of the alternatives or baseline conditions 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. However, the level of projected activities under any of the alternatives is not likely to be sufficient to measurably reduce risks within sensitive plant habitat.

One T&E fish species, three sensitive sucker species, several management indicator fish (trout) 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, Alternative 4 and the 2001 rule are similar in offering the greatest level of protection of threatened or endangered species (TES) and MIS aquatic species and would generally have the least potential for adverse effects on aquatic species and habitat in roadless areas compared to the more intensively managed lands outside roadless areas. The final rule provides less protection and greater potential for adverse impacts compared to Alternative 4 and the 2001 rule due to reduced "upper tier" protection and greater amounts of projected tree cutting (though effects are expected to be limited). Greater potential for adverse effects and least protection of TES and MIS aquatic species in roadless areas occurs under forest plans, compared to the final rule and Alternative 4.

Activities projected under the final rule, Alternative 4, forest plans, and baseline conditions 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 final rule, Alternative 4, and the 2001 rule may provide greater protection for cutthroat trout compared to forest plans. While potential for adverse effects may be similar for the final rule and Alternative 4, a portion of upper tier acres under Alternative 4 are within many watersheds occupied by TES fish, implying potential improvements in protection under Alternative 4, relative to the final rule. However, benefits from protection may be offset in part by prohibitions of tree cutting for habitat improvements under The final rule and Alternative 4. Increasing amounts of fuel reduction and forest health treatments under the final rule and forest plans respectively could have long-term beneficial effects on aquatic habitat and species compared to the 2001 rule.

The greatest concern for potential impacts to aquatic species and habitat could occur 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 forest plans, slightly less under the final 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, 39 sensitive species, and 36 MIS are known or likely to occur in roadless areas in Colorado. Under the final rule, Alternative 4, and the 2001 rule, roughly 4.2 million acres would be managed to maintain roadless characteristics, which would benefit a wide range of wildlife species. The 2001 rule would afford terrestrial species and habitats the most protection because it is most restrictive with respect to road construction or reconstruction in the roadless areas that could be detrimental to T&E, sensitive, MIS, migratory bird species, and big game. On the other hand, about 11% of the IRA acreage actually contains existing roads and developments (referred to as "substantially altered" areas under the 2001 rule) under the 2001 rule. The updated inventory of Colorado Roadless Areas under and the final rule and Alternative 4 will better meet the intent of roadless area conservation and will provide a higher quality portfolio of wildlife habitat within roadless areas compared to the 2001 rule.

There is no prohibition on construction and maintenance of linear construction zones (LCZs) under the 2001 rule and forest plans, implying that baseline conditions and forest plans are less protective of terrestrial wildlife in this respect than the final rule or Alternative 4. The final rule

offers more exceptions and exemptions allowing road construction, tree cutting, and oil and gas and coal development in roadless areas (and removes roadless protections from areas adjoining certain ski areas) compared to the 2001 rule and Alternative 4. These allowances under the final rule could have adverse effects on terrestrial wildlife, however, the generally low projected levels and intensity of development under the final rule would be expected to have only minor, short term negative impacts. The increased opportunity for tree cutting allowed under the final rule could improve terrestrial habitats, and reduce the potential for uncharacteristically severe stand-replacing wildfire that could adversely impact terrestrial species and habitats, especially when combined with prescribed fire compared to the 2001 rule.

Forest plans would have the highest potential for adverse impacts to terrestrial species and habitats because the majority of roadless area acres are located in plan management areas where plans place fewer restrictions on road construction (including development of permanent roads, tree cutting, and oil and gas and coal development) relative to the 2001 rule.

Under Alternative 4, the risk to terrestrial species and habitat from projected activities is reduced, compared to forest plans and the final rule. The increased upper tier acres under Alternative 4 would reduce the risks of adverse effects compared to the final rule. However, there is reduced opportunity for tree cutting to improve habitat and reduce adverse effects from severe wildfire under Alternative 4, compared to forest plans and the final rule.

Site-specific design criteria and mitigation measures are expected to minimize the risk of adverse effects on terrestrial wildlife under all alternatives as well as baseline conditions. Detrimental effects from an expected increase in invasive plants, animals, and pathogens would be of greater risk under the final rule compared to the 2001 rule but of lower risk compared to forest plans.

In general, under the final rule, Alternative 4, forest plans and the baseline conditions, activities may affect but are not likely to adversely affect federally-listed species or designated critical habitats, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. Given the large acreage afforded roadless protection under the alternative conditions, any changes in population trends for MIS would likely be an increase above current Forest Plan projections. Any potential adverse effects to terrestrial species are expected to be either avoided or minimized through site-specific analysis and project design under the final rule and Alternative 4, forest plans, as well as baseline conditions.

The value of roadless areas in conserving terrestrial and aquatic wildlife as well as the diversity of plant and animal communities in general, 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 protecting large contiguous blocks of secure habitat and biological strongholds as well as providing habitat connectivity. These types of benefits would be similar for the final rule, Alternative 4, and the 2001 rule but would be realized to a lesser degree under forest plans. Forest plans would likely pose a higher risk of negatively affecting fish and wildlife populations, habitats, and plant and animal diversity because of fewer activity restrictions. 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. Increasing opportunities for tree cutting under

Alternative 4, the final rule, and forest plans to address hazardous fuels and ecosystem restoration may have beneficial effects on plant and animal diversity through protection of species that inhabit forest ecosystems with high-frequency, low intensity fire regimes compared to the 2001 rule. Prescribed burning will continue to be the primary tool used for habitat enhancement under all conditions.

Potential damages from invasive plants differ across alternatives and baseline conditions 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, as a function of projected road construction and oil and gas development, would remain relatively low under the final rule and Alternative 4, with the greatest relative risk under forest plans. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would still be relatively low under forest plans.

The 2001 rule would retain a high proportion of IRA acres in a primitive or semi-primitive setting. 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. Newly identified roadless areas not protected under the 2001 rule could shift to less primitive settings in the event of road construction or tree cutting. The final rule would retain a high proportion of the CRA acres in a primitive or semi-primitive setting, although there would be more CRA acres with roads and energy activities. The higher levels of human activity and development under the final rule compared to the 2001 rule could 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, compared to less consistency within substantially altered IRAs under the 2001 rule. The inclusion of unroaded areas in CRAs under the final rule (and Alternative 4) 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 final 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 forest plans 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 compared to the final rule and Alternative 4. However, under forest plans, as well as the final rule, Alternative 4, and the 2001 rule), new roads or tree cutting activities would be projected to occur on only a small percentage of the existing roadless area acreage. 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 roadless areas under forest plans. Alternative 4 is likely to retain a greater proportion of CRA acreage in primitive/semi-primitive settings compared to the final rule given slight reductions in construction and tree cutting activity under Alternative 4 and larger percentages of CRAs in upper tier, compared to the final rule. In general, dispersed recreation opportunities are not expected to change substantially under any of the alternatives or baseline

conditions, but feelings of remoteness and solitude may change for periods of time in areas where activity occurs.

The effects on developed recreation opportunities in roadless areas do not substantially differ between the alternatives and baseline conditions. None of the roadless areas in Colorado contain developed recreation sites, except for portions of developed ski areas. Aside from trail construction (motorized and non-motorized), developed recreation sites would generally not be constructed within roadless areas under the final rule, Alternative 4, or the 2001 rule. Under forest plans there would be additional opportunities for future development of recreational sites or facilities within the analysis area in accordance with forest plan direction. However, projected road construction for recreation purposes under forest plans is negligible to minimal.

Any future potential emission inventories for GHGs associated with projected activities under the final rule and Alternative 4, forest plans as well as baseline conditions, are too speculative for estimation. Future activities or actions will undergo additional NEPA analysis. From a qualitative perspective, potential releases of greenhouse gas emissions may be highest for forest plans and lowest for the 2001 rule. The final rule would likely release more emissions from tree cutting, coal mining, and prescribed fire than the 2001 rule, but less than forest plans. The North Fork Coal Mining Area is the same for the final rule and alternative 4, so emissions from coal are not expected to differ between these two alternatives. Wildfire emissions would likely be less under Alternative 4 compared to the 2001 rule, but more than the final rule and forest plans.

Adaptation to climate change may involve both active and passive management strategies. The 2001 rule and Alternative 4 align closely to the passive management strategy, offering more restrictive management on all, or a majority of the roadless inventory. Forest plans afford more management options for both active and passive climate change adaptation than the final rule and Alternative 4. The final rule is a hybrid alternative, offering strict passive management strategies for the upper tier, as well as some active management options in non-upper tier CRAs.

The final 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 final 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 final 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 compared to baseline conditions.

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 final 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. Compared to forest plans, the final rule would provide decreased flexibility. 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 final rule.

Under the final rule, tree-cutting across all treatment purposes is projected to be 5,970 acres per year within CRAs (not the entire analysis area). Over the past several decades, an average of 4,400 acres per year of treatments is estimated to have occurred within CRAs. Assuming budgets remain flat, these values imply that more treatments will shift to areas within CRAs under the final rule compared to previous years. Correspondingly, fewer treatments would occur outside of CRAs under the final rule, again, assuming budgets remain flat.

Under forest plans, there would be the potential to shift even more treatment acreage across all purposes (up to 17,380 acres per year in the analysis area) into roadless areas and fewer acres outside of roadless areas compared to the final rule. The effects of building more roads for fuel treatments would generally be the same under forest plans as described for the final 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 the final rule, thereby offering similar strategic and efficiency advantages regarding treatment flexibility. However, due to increased acreage assigned to upper tier status, projected treatment levels in roadless areas 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 under the final rule, Alternative 4, forest plans, as well as baseline conditions, acknowledginging 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 under the alternatives and baseline conditions.

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 for economic sectors with measurable and

quantifiable differences between alternatives are the oil, gas, and coal industry sectors. 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 final rule and forest plans are estimated to result in increases of average annual production, employment, and labor income contributed by energy sectors over the next 15 years compared to the 2001 rule. Total value of annual output from the oil, gas, and coal sectors is estimated to be slightly lower, but still similar for the final rule compared to forest plans ($760 and $793 million per year respectively) and higher than the 2001 rule ($694 million). Total employment contributed under the 2001 rule are estimated to be 2,100 jobs, increasing to 2,300 under the final rule (and Alternative 4) and to 2,400 under forest plans. Respective annual labor income is estimated to be $147 million, $164 million, and $169 million (2009 dollars) under the 2001 rule, the final rule, and forest plans. Results for Alternative 4 are equivalent to the results for the final rule. The total annual output, employment, and labor income associated with the entire mining sector (i.e., all mining activity in all land ownerships) in the five-county energy model area is estimated to be approximately $5.2 billion, 7,800 jobs, and $656 million for 2009.

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 $28.8 million per year total payments and taxes received by the State and counties under the 2001 rule, payments are estimated to be approximately 8% higher for the final rule ($31.2 million per year). Compared to $32.6 million per year under forest plans, payments are approximately 4% lower under the final rule. Again, results for Alternative 4 are equivalent to the final 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.

Economic impacts displayed in Table E.3 are generally smaller than those presented in the previous Regulatory Impact Analysis completed for the revised proposed Colorado Roadless Rule. For the final rule, forest plans, and Alternative 4 production estimates are reduced by 30 percent, employment by 20 percent, and labor income by 15 percent. Updates to the coal scenario, as opposed to oil and gas, are largely responsible for a different pattern of net changes in overall mineral impacts under the 2001 rule. The 2001 rule shows a net production reduction of 10 percent, employment increase by 5 percent, and labor income increase by 15 percent.

Impacts to the forest products industry are expected to be minimal. Timber sales and harvest levels for Colorado national forests as a whole are projected to be similar during the 15-year analysis period across the alternatives.

The distribution of projected fuel treatments and corresponding reduction in wildfire hazard to at-risk-communities near roadless areas varies by alternative and baseline conditions. 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 are measured based on projected likelihood of tree cutting to occur for the

purpose of fuel treatments in roadless areas that overlap with community protection zones (CPZs). Potential opportunities for fuel treatments are estimated to increase for 13 counties under the final rule compared to the 2001 rule (and decreases for one county). In contrast, there is little projected change in potential fuel treatments under the final rule compared to forest plans (decrease in two counties and increase in two counties), suggesting that potential opportunities to address wildfire hazards to at-risk communities are similar under the final rule and forest plans. When comparing Alternative 4 with the 2001 rule, fuel treatment opportunities are estimated to increase for 13 counties, but decrease for another 6 counties. Fuel treatment opportunities are estimated to decrease for 16 counties and increase for two counties under Alternative 4 compared to forest plans. 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 (4)

	Baseline Condition - 2001 Roadless Rule (Alternative 1 in the FEIS)	Final Rule (Alternative 2 in the FEIS)	Forest Plans (Alternative 3 in the FEIS)	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres (2) (Alternative 4 in the FEIS)
Roadless Area Acreage (3)	Inventoried Roadless Areas (IRAs) = 4,243,600 acres (4.24 million acres)	Colorado Roadless Areas(CRAs) = 4,186,000 acres (4.19 million acres) Upper Tier CRA acres: 1,219,200	None	Colorado Roadless Areas (CRAs) = 4,186,000 acres (4.19 million acres) Upper Tier CRA acres: 2,614,200
Total Existing Authorized Road Miles in Roadless Areas (1)	1,235 miles in IRAs	0 miles in CRAs	1,235 miles	0 miles in CRAs
Road Construction and Reconstruction Projected in the Analysis Area	13.8 miles/year (11 miles in IRAs)	19.7 miles/year (16 in CRAs) * 5.9 miles/year more than 2001 rule * 6.1 miles/yr less than forest plans	25.8 miles/year	17.9 miles/year (14 in CRAs) * 4.1 miles/year more than 2001 rule * 7.9 miles/year less than forest plans
Tree cutting Projected in the Analysis Area	2,670 acres/year (1,520 in IRAs)	7,320 acres/year (5,970 acres in CRAs) * 4,650 acres/year more than 2001 rule * 10,060 acres/year less than forest plans	17,380 acres/year	3,140 acres/year (1,790 acres in CRAs) * 470 acres/year more than 2001 rule * 14,240 acres/year less than forest plans

(1) Approximately 117 miles of roads are projected to be decommissioned in IRAs and 0 miles decommissioned in CRAs.
(2) Alternative 4 is the same as the final rule with the exception that more roadless areas are assigned to the upper tier restrictions.
(3) The total analysis area is approximately 4.65 million acres and is the same across all four alternatives.
(4) Naming conventions for Alternatives 1 through 4 clarify how alternative conditions correspond to descriptions of Alternatives in the Final Environmental Impact Statement (FEIS) for the Colorado Roadless Rule.

Table E.2 - Comparison of the Final Rule and Alternatives with Baseline Conditions

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
Local Challenges and Resources: Roadless Area Management				
Fire and Fuels (Hazardous Fuel Reductions)	Tree cutting for fuel treatments projected for 890 acres per year in the analysis area to reduce hazardous fuels (30 of which are within IRAs); this amounts to 1% of average annual fuel treatments on all NFS lands in CO. Least flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems.	Tree cutting for fuel treatments projected for 5,510 acres per year in the analysis area to reduce fuels (4,900 of which are within CRAs). This amounts to 9% of annual fuel treatments on all NFS lands in CO and is 4,620 acres more than the 2001 rule and 7,869 acres less than forest plans. More flexibility than the 2001 rule (and Alternative 4) to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems. Less flexability than forest plans. None of the CRAs within either the 0.5 or 1.5 mile CPZs are in the upper tier acres.	Tree cutting for fuel treatments projected for 13,350 acres per year in the analysis area to reduce fuels; this amounts to 21% of annual fuel treatments on all NFS lands in CO. Greatest flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems. Options available for fuel reduction include prescribed fire, mechanical treatment, and road construction as needed to facilitate treatment.	Tree cutting for fuel treatments projected for 2,000 acres per year in the analysis area to reduce fuels (1,390 of which are within CRAs). This amounts to 3% of annual fuel treatments on all NFS lands in CO and is 110 acres more than the 2001 rule and 11,350 less than forest plans. Within the CRAs that are non-upper tier acres, the flexibility to conduct hazardous fuel reduction and reduce fire risk to communities and municipal water supply systems is identical to the final rule. Greater amount of upper tier acres with tree cutting prohibited results in least number of acres for tree cutting for fuels reduction. Unable to conduct hazardous fuels reduction on 48% of 0.5 mile CPZ and

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
				52% of 1.5 mile CPZ due to upper tier acre prohibitions.
Forest Health including reduced risk from Insect and Disease Outbreaks and climate induced stressors	Forest health treatments are limited to some degree in due to the characteristics and locations of roadless areas, as well as economic viability of treatments, under all alternatives. Most or large portions of roadless areas will remain unmanaged (i.e., with no treatments) under the alternatives and baseline conditions. Roadless areas that remain unmanaged will likely continue to depart from desired conditions. Declines in forest health would result in some landscapes being less resilient to large-scale insect and disease outbreaks.			
	Fewest opportunities to improve forest health. Tree cutting for all treatment purposes is projected for 2,670 acres per year.	Greater opportunity to improve forest health compared to the 2001 rule and Alternative 4 but lower than forest plans. Tree cutting for all treatment purposes projected for 7,320 acres per year (4,650 acres more than the 2001 rule and 10,060 acres less than forest plans). Increased likelihood of achieving management objectives in CPZs but reduced likelihood in areas outside of CPZs.	Greatest opportunity and flexibility to improve forest health. Tree cutting for all treatment purposes projected for 17,380 acres per year. Higher likelihood of achieving management objectives.	Similar effects compared to the final rule but slight decrease in opportunities to improve forest health due to restrictions on tree cutting in upper tier roadless areas. Tree cutting for all treatment purposes projected for 3,140 acres per year (470 acres more than the 2001 rule and 14,240 less than forest plans). Lower likelihood of achieving management objectives in areas outside of CPZs.
Timber	Reduction in allowable sale quantity (ASQ) estimates, may occur. However, foreseeable timber production (volume of timber sold) is well below the ASQ and is expected to remain so under the alternatives and baseline conditions**.** Therefore, timber supplies outside of roadless areas are available to substitute for decreases in timber availability within roadless. Timber output is expected to vary only by location (i.e., proportion of cutting occurring within versus outside of roadless areas). Tree cutting (sale or removal) in the roadless analysis area is projected to occur in association with treatments on 2,670, 7,320, 17,380, and 3,140 acres per year respectively under the 2001 rule, the final rule, forest			

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
	plans, and Alternative 4 respectively. Average annual treatment acreage on all NFS land is not expected to be affected substantially by the alternatives.			
Oil and Gas	Projections are for approximately 732 oil and gas wells drilled in the combined IRA/CRA analysis area with access to 1,276 bcfg [wells produce for 30 yrs] (same for the final rule and Alternative 4). Projected development activities within IRAs over 15 years: 143 miles of road, 705 wells 146 well pads.	Projections are for approximately 732 oil and gas wells drilled in the analysis area with access to 1,276 bcfg over a 15-year period [wells produce for 30 yrs] (same for the 2001 rule and Alternative 4). 87 fewer wells and a decrease of 108 bcfg in accessible reserves compared to forest plans. Projected development activities within CRAs over 15 years : 146 miles of road 715 wells 162 well pads	Projections are for approximately 819 oil and gas wells in the analysis area with access to 1,384 bcfg over a 15-year period [wells produce for 30 yrs], providing slightly more opportunity compares to the other alternatives. Projected development activities within IRAs over 15 years: 159 miles of road 787 wells 160 well pads	Same as the final rule,
Coal (North Fork mining area)	Projections are for 16 miles of new roads in the analysis area, of which 7 are in IRAs. Foreseeable production opportunities would be limited to 8,600 acres of accessible coal reserves (157 million tons). Approximately	Projections are for 52 miles of new roads in the analysis area, of which 50 are in CRAs. Reduces restrictions on access to potential coal resources in CRAs compared to the 2001 rule, but is more restrictive than forest plans (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. Least restrictive on access to potential coal resources in IRAs compared to the other two alternatives. Foreseeable production opportunities are estimated to be 715	Same as the final rule.

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
	7,100 acres out of 8,600 acres are leased (5,900 leased acres are within IRAs), and 1,500 acres are unleased. A total of 2,700 acres out of 8,600 acres are outside of IRAs.	Foreseeable production opportunities are estimated to be 19,125 acres of accessible reserves (504 million tons) of which 7,100 acres are leased (4,000 leased acres are within CRAs) and 12,025 acres are unleased. A total of 15,025 out of 19,125 acres are outside of CRAs Accessible reserves are 347 million tons greater than the 2001 rule and 211 million tons less than forest plans.	million tons of reserves on 36,400 acres of accessible reserves, of which 7,100 are leased (5,900 leased acres within IRAs) and 29,300 acres are unleased. A total of 32,400 out of 36,400 acres are outside of IRAs.	
Geothermal	Opportunities for geothermal development in roadless areas would not occur under the final rule, Alternative 4, or the 2001 rule due to new road prohibitions. Opportunities for some geothermal development in roadless areas may occur under forest plans as most land management plans allow new roads in roadless areas for this purpose. However, there are no current leases on NFS lands in Colorado.			
Public Safety	The final rule, Alternative 4, forest plans, as well as baseline condistions 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 final rule, and would be expected to be temporary under the 2001 rule and forest plans.			
	Road construction or reconstruction is allowed in IRAs where needed to: address road safety hazards	Road construction permissions are similar to the 2001 rule and forest plans within both standard tier and upper tier acres.	Same as the 2001 rule, per agency regulations and policy directives.	Same as the final rule within both standard and upper tier acres.

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
	and imminent threats of flood, fire, and other catastrophic events that may threaten loss of life or property.			
Special Uses: Non-recreational (pipelines, electrical or telecommunication lines, water conveyances)	Special use authorizations issued prior to the effective date of rulemaking would be unaffected under the alternatives and baseline conditions.			
	Future special use authorizations in IRAs would generally prohibit road construction, but there would be no prohibition on the use of LCZs. 4.7 miles of LCZs per year projected (all in IRAs).	Future special use authorizations in CRAs would generally prohibit road construction. Use of LCZs in non-upper tier for existing and future authorizations for oil/gas pipelines, electrical power lines, telecommunication lines and water conveyance structures could only occur under certain conditions outlined in the final rule compared to no prohibitions or conditions that need to be met under the 2001 Roadless Rule and forest plans. LCZs in upper tier would only be allowed for existing authorizations for oil/gas pipelines, electrical power lines,	Future special use authorizations would generally allow for road construction, except where prohibited under forest plans. There would be no prohibition on the construction of LCZs, for future electrical power lines or telecommunication lines, water conveyance structures or oil and gas pipelines. 5.1 miles of LCZs per year projected.	More restrictions than the final rule, due to the greater proportion of upper tier acres. 4.7 miles of LCZs projected per year (3.3 miles in CRAs), similar to the 2001 rule and 0.4 miles less than forest plans.

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
		telecommunication lines and existing or future water conveyance structures 4.7 miles of LCZs per year projected (3.3 miles in CRAs), similar to the 2001 rule.		
Developed Ski Areas	Least opportunities for ski area development and expansion. 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 than the 2001 rule. Opportunities similar to forest plans except expansion of ski areas into roadless areas through plan amendments not permitted under the final rule. 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 that would not be allowed under the 2001 rule.	Same as the final rule, recognizing that Forest plans can be amended or revised to expand ski area allocations beyond the current allocation.	Same as the final rule.
Other Developed Recreation	Effects on developed recreation opportunities are not projected to differ substantially across alternatives compared to baseline conditions.			
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.			
Saleable and Locatable Minerals	Impacts and differences in impacts to or from these resources are found to be minimal or insignificant across alternatives.			

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
	There are no effects to the statutory right of reasonable access to prospect, explore and develop locatable minerals under any alternative or baseline conditions. There will be no roads for saleable mineral development except under forest plans if road construction is allowed, although need is expected to be minimal.			
Roadless Area Characteristics and Values				
Scenic Quality	Projected activity levels (e.g., tree cutting) occur on relatively small percentages of total roadless area under the alternatives compared to baseline conditions.			
	Maintains the most IRA acreage at high to very high scenic integrity levels where it exists. However, many substantially altered IRAs would continue to exhibit low scenic integrity.	Greater percentages of roadless areas would retain high to very high scenic integrity compared to the 2001 rule due to removal of substantially altered areas under the final rule. 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. Lower risk to scenic integrity compared to forest plans. New unroaded areas would add to areas protected for high scenic integrity compared to the 2001 rule.	Highest risk to scenic integrity, as more unroaded acres may shift to a moderate to low scenic integrity as a result of projected road and tree cutting activities. Greater opportunities for treatments may contribute more to high quality scenic levels in the long-term.	Similar to the final rule within CRAs that are not upper tier. Greater assurances about preserving high quality scenic levels in upper tier acres, compared to the final rule.

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
		More opportunities for treatments to contribute to scenic quality in long-run compared to the 2001 rule (but less than forest plans).		
Wilderness and Other Congressionally Designated Areas	No major difference among the alternatives and baseline conditions 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. Effects on areas recommended as wilderness would not differ across alternatives and baseline conditions as land management plans generally prohibit road construction and tree cutting and removal activities in those areas.			
	Indirect effects on wilderness area characteristics or experience from activities in adjacent roadless areas are expected to be low and similar to the 2001 rule because projected activities are not expected to occur adjacent to wilderness area boundaries. Unlike the 2001 rule, the final rule provides opportunities to establish uniform management approaches for recommended wilderness through placement of roadless areas in upper tier.		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.	Effects similar to the final rule and the 2001 rule. 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. The 2001 rule and Alternative 4 would have the least risk of adverse effects, and the final rule would have a slightly higher risk than the 2001 rule but lower than forest plans. 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 under the final rule may be higher compared to forest plans and lower relative to the 2001 rule as a result of projected levels of fuel treatments.			
Water Quality, Quantity, and Stream Flow	Projected activities under the alternatives and baseline conditions are unlikely to contribute to water quality impairment (i.e., exceeding water quality standards) due to adverse effects being mitigated through the use of site-specific Watershed Conservation Practices, Best Management Practices, and other mitigation measures and regulatory (Clean Water Act) permit requirements, as well as compliance with wetland regulations (E.O. 11990 and Section 404(b)(1) guidelines. Water quantity effects expected to be minimal as the area of tree cutting on any one watershed affected is likely to be small.			
	Lowest risk of direct	Slightly greater risk of direct	Higher risk of direct adverse	Similar to the final rule

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
	adverse effects from tree cutting and road construction. Slightly greater potential for adverse effects from severe fire to water supplies.	adverse effects from tree cutting and road construction compared to the 2001 rule, but lower compared to forest plans. Fewer restrictions on fuel treatments and slightly lower potential for adverse effects to water supplies from fire compared to the 2001 rule, but slightly higher potential compared to forest plans.	effects from tree cutting and road construction. Least restrictions on fuel treatments and slightly lowest potential for adverse effects from severe fire.	though slightly lower direct risk due to more upper tier acres. More restrictions on fuel treatments and slightly greater risk to water supplies from severe fire, compared to the final rule and forest plans.
Air Resources	Differences in effects on air quality do not substantially differ between the alternatives and baseline conditions. 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. Potential for smoke related impacts under the final rule would be only slightly lower than the 2001 rule and slightly greater than forest plans.			
Threatened Endangered or Sensitive Plants	No direct 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 or baseline conditions are expected to result in the loss of viability, nor cause a trend toward Federal listing of sensitive species.			
	Least risk of adverse impacts to sensitive plants, including threats from invasives.	More potential risk of adverse impacts to sensitive plants, including threats from invasives, compared to the 2001 rule but less risk than forest plans.	Greatest risk of adverse impacts to sensitive plants, including threats from invasives.	More risk of adverse impacts to sensitive plants compared to the 2001 rule, including threats from invasives,; but less risk than the final rule or forest plans.
Aquatic Species and Habitat	No measurable declines are expected on threatened and endangered (T&E)species, sensitive species, and MIS population			

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
(also includes Threatened Endangered or Sensitive)	trends; downstream T&E species; or wetlands and riparian areas under the alternatives or baseline conditions due to the assumption that mitigation measures and best management practices would help avoid or minimize impacts from the projected activities.			
	Greatest level of protection and least risk of adverse impacts. Provides most protection of cutthroat trout (similar to Alternative 4)	Some limited potential for reduced protection and increased risk of adverse impacts compared to the 2001 rule and Alternative 4 (but less risk than forest plans). Provides greater protection for cutthroat trout compared to forest plans.	Least amount of protection and greatest potential for adverse impacts.	Greatest level of protection and least risk for adverse impacts. Provides most protection of cutthroat trout (similar to the final rule).
		Increasing amounts of fuel reduction and forest health treatments under the final rule and forest plans could have long-term beneficial effects on aquatic habitat and species, compared to the 2001 rule.		
Terrestrial Species and Habitat (also includes Threatened Endangered or Sensitive)	For the final rule, Alternative 4, forest plans, and baseline conditions, site-specific design criteria and mitigation measures are expected to avoid or minimize adverse effects from projected tree cutting and road construction; projected activities are not likely to adversely affect federally listed species or designated critical habitat, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. Given the large acreage afforded roadless protection under the final rule, Alternative 4, and the 2001 rule, any changes in population trends for MIS would likely be an increase above current Forest Plan projections.			
	Least risk to terrestrial species and habitat from projected tree cutting and road construction.	Increased risk to terrestrial species and habitat from projected tree cutting and road construction compared to the 2001 rule and Alternative 4 (though effects are expected to be minimal and short-	Greatest risk to terrestrial species and habitat from projected tree cutting and road construction. Greatest opportunity for tree cutting (in combination with prescribed fire) to improve habitat and	Reduced risk to terrestrial species and habitat from projected activities, compared to forest plans and the final rule. Reduced opportunity for tree cutting to improve habitat and reduce

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
		lived). More opportunities for tree cutting (when combined with prescribed fire) to improve habitat and reduce potential for adverse effects from severe wildfire compared to the 2001 rule, but fewer opportunities compared to forest plans. Updated inventory of roadless areas provides higher quality portfolio of wildlife habitat within roadless areas compared to the 2001 rule.	reduce adverse effects from severe wildfire.	adverse effects from severe wildfire compared to forest plans and the final rule. Updated inventory of roadless areas provides higher quality portfolio of wildlife habitat within roadless areas compared to the 2001 rule.
Diversity of Plant and Animal Communities	The value of roadless areas in conserving plant and animial diversity 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 secure habitat, biological strongholds, and habitat connectivity would be greatest for the 2001 rule and lowest under forest plans. Increasing opportunities for treatments under Alternative 4, the final rule, and forest plans respectively to address hazardous fuels and ecosystem restoration may have beneficial effects on long-term diversity compared to the 2001 rule.			
Invasive Plants	Site-specific design criteria and mitigation measures are expected to minimize risk. The magnitude and extent of spread of invasives in roadless areas would be relatively small under the alternatives and baseline conditions.			
	Lowest risk of spread due to low projections of road construction or tree cutting.	Intermediate risk of spread, higher than the 2001 rule and Alternative 4, but less than forest plans, due to greater projections of road	Substantially greater risk of spread due to the greatest projections for road construction, tree cutting, fuels management, and	Slightly higher risk of spread than the 2001 rule but less than the final rule and forest plans due to lower projections of road construction and

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
		construction or tree cutting.	future oil, gas, and coal activities compared to other alternatives.	tree cutting.
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 under the alternatives and baseline conditions. Dispersed recreation opportunities (including hunting and fishing) are therefore not expected to change under the final rule and Alternative 4, but feelings of remoteness and solitude may change for periods of time in areas where activity occurs compared to the 2001 rule.			
	Likely to retain a high proportion of IRA acreage in a primitive or semi-primitive setting. The substantially altered areas and developed ski areas in IRAs may continue to appear inconsistent with semi-primitive characteristics expected in roadless areas. The newly identified roadless acres (409,500 acres) where road construction and tree cutting, are projected to occur but are not within the IRAs could shift to less primitive settings.	Likely to retain a high proportion of CRA acreage in a primitive or semi-primitive setting; although some CRA acres would shift toward roaded natural settings in areas where the most roads, tree cutting, and energy operations are projected in CRAs. By not including substantially altered areas and developed ski areas in CRAs and adding newly identified roadless areas to CRAs, the CRAs would appear more consistent with semi-primitive characteristics expected in roadless areas, compared to less consistency within IRAs under the 2001 rule.	Greatest risk of shifts from primitive/semi-primitive settings to roaded natural settings in areas where the most tree cutting, roads, or energy operations are projected to occur. .	Likely to retain greatest greater proportion of CRA acreage in primitive/semi-primitive setting compared to the final rule given slight reductions in construction and tree cutting activity and larger percent of CRAs in upper tier. 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 compared to less consistency within IRAs under the 2001 rule.

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
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. Neither the final rule, Alternative 4, forest plans,, nor baseline conditions are expected to have negligible adverse effects on recreational special uses, including outfitter and guide opportunities, based on the projected magnitude and distribution of reasonably foreseeable activities. 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 and Heritage Resources	Site-specific inventories, design criteria, and mitigation measures are expected to minimize risk. Under the final rule, Alternative 4, forest plans, and baseline conditions, there may be small, localized impacts from a number of ongoing activities. The magnitude of human activities in roadless areas would continue to be much lower than on other NFS lands			
	Least risk of damage to cultural and heritage resources due to lowest projected amounts of tree cutting and road construction.	Intermediate risk of damage to cultural and heritage resources because of higher projected tree cutting and road construction, compared to the 2001 rule, but lower risk than forest plans.	Highest risk of damage to cultural and heritage resources because of highest projected amounts of tree cutting and road construction.	Same as the final rule.
Geological and Paleontological Resources	None of the projected activities in roadless areas that vary across alternatives and baseline conditions would be likely to adversely affect geological or paleontological resources, which would be avoided or otherwise protected from potential adverse impacts. Management of these resources does not require road construction or tree cutting and would be the same under the alternatives and baseline conditions.			
Climate Change	Future emission of GHGs associated with projected activities under the alternatives and baseline conditions are too speculative for estimation. Potential releases of greenhouse gases due to the net effect of energy development and changes in wildfire conditions might be highest for forest plans and lowest for the 2001 rule, with the final rule being less than forest plans but more than the 2001 rule. Strategy options for adapting to climate change are more restrictive under the 2001 rule and Alternative 4, more flexible under the final rule, and most flexible under forest plans.			
Agency Costs				
Vegetation and Fuel Treatments	Treatments are likely to be less efficient and more costly in IRAs.	Decreased flexibility to achieve management objectives in critical insect and disease areas compared to forest plans (but	Capacity to shift the greatest amount of treatment acreage into roadless areas; increased efficiency, cost effectiveness and	Management flexibility is similar to the final rule, but projected treatment amounts are lower due to constraints imposed by more upper tier

Issue or Affected Resource	Baseline Condition - 2001 Roadless Rule	Final Rule	Forest Plans	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres
		increased flexibility compared to the 2001 rule). Decreased ability to strategically and cost effectively locate treatments and improve efficiency as compared to forest plans but increased treatment cost effectiveness compared to the 2001 rule.	timeliness of wildfire suppression response as well as fuel reductions in CPZs compared to the final rule and Alternative 4.	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 and baseline conditions. Although new roads can contribute to the spread of invasive plants, roads can also be an asset in helping to cost effectively control invasive populations.			

Table E3 – Summary of distributional effects and economic impacts of the final rule, Alternative 4, and forest plans compared to baseline conditions.

	Baseline Condition - 2001 Roadless Rule (Alternative 1 in the FEIS)	Final Rule (Alternative 2 in the FEIS)	Forest Plans (Alternative 3 in the FEIS)	Alternative 4 Proposed Rule with Public Identified Upper Tier Acres (2) (Alternative 4 in the FEIS)
Leasable Minerals: Coal, Oil and Gas – Output Value, Jobs and Income (2009$) Contributed (1)	$694 million/yr Output 2,100 Jobs supported $147 million per year Labor Income	$760 million/yr Output * $33 million/yr less than forest plans * $65 million/yr greater than the 2001 rule. 2,300 Jobs supported * 100 fewer jobs than forest plans * 200 more jobs than the 2001 rule. $164 million/year Labor Income * $5 million/yr less than forest plans * $17 million/yr more than the 2001 rule	$793 million/yr Output 2,400 Jobs supported $169 million per year Labor Income	Same as the final rule.
Revenue Sharing: Mineral Lease Payments and Tax Revenues per year (2009$) (2)	State Total: $28.8 million Energy-Affected Counties: $5.9 million All other CO Counties: $2.9 million	State Total: $31.2 million * $1.4 million less than forest plans * $2.4 million more than the 2001 rule Energy-Affected Counties: $6.2 million * $0.4 million less than forest plans * $0.3 more than the 2001 rule All other CO Counties: $3.2 million * $0.1 million less than forest plans * $0.3 more than the 2001 rule	State Total: $32.6 million Energy-Affected Counties: $6.6 million All other CO Counties: $3.3 million	Same as the final rule
Values at risk: Number of Counties Where Potential for Fuel Treatments in CPZs may Increase or Decrease Compared to forest plans and Baseline Conditions (3)	In comparison to Alt 3: Decrease: 13 counties Increase: 0 county	In comparison to forest plans: Decrease: 2 counties Increase: 2 counties In comparison to the 2001 rule: Decrease: 1 county Increase: 13 counties	In comparison to the 2001 rule: Decrease: 0 counties Increase: 13 counties	In comparison to forest plans: Decrease: 16 counties Increase: 2 counties In comparison to the 2001 rule: Decrease: 6 counties Increase: 13 counties

(1) Jobs and income contributed annually (2009 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, 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. 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). In response to the rule and DEIS, the Department, State, and Forest Service repeatedly heard public comment requesting changes to the proposed exceptions for road construction and tree cutting. Based on the public comments, the State asked the USDA to postpone further rulemaking efforts until the State considered revision of its petition.

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

rule and RDEIS were published in April 15, 2011 and public comments were accepted on the proposal until July 14, 2011; about 56,000 comments were received.

A primary reason for the original Colorado petition was to address uncertainty associated with roadless area management in Colorado due to the ongoing litigation of the 2001 Roadless Rule. As of the date of this report, that uncertainty has been removed by 10th US Circuit Court of Appeals mandate (2012) lifting a prior US District Court injunction of the 2001 rule, thereby re-installing the 2001 rule. Through the process of analyzing and adjusting the Colorado Rule, an approach to managing Colorado Roadless Areas emerged that addresses specific State concerns while still conserving roadless area values. As a consequence, the Colorado Roadless Rule is being finalized to realize those benefits, as outlined in this report.

This report summarizes the regulatory impact analysis for the final Colorado Roadless Rule as directed by Executive Order (E.O.) 12866 issued September 30, 1993. Executive Orders 13563 and 12866 direct agencies to assess costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. These executive orders require that agencies conduct a regulatory analysis for economically significant regulatory actions. Economically 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 $760 million under the final rule, compared to $694 under baseline conditions (i.e., the 2001 Roadless Rule), implying the annual monetized impacts of the final rule are estimated to be an increase of $65 million per year for total oil, gas, and coal output. Even though economic effects are estimated to be less than $100 million per year (and in fact constitute a positive monetized effect of $65 million per year), this rule has been designated a significant regulatory action although not economically significant, under section 3(f) of Executive Order 12866. Accordingly, the rule has been reviewed by the Office of Management and Budget.

The final rule is programmatic in nature and intended to guide future development of proposed actions in roadless areas. The final 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 around communities to allow access to coal reserves in the North Fork coal mining areas, and to allow access to future water conveyances. 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 final 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.

This document summarizes information about the benefits, costs, and distributional effects of the final rule. Details about the environmental effects of the final rule can be found in the revised final environmental impact statement (FEIS) for the final rule (USDA Forest Service, 2011), as well as 'specialist' reports developed to support the effects summarized in the FEIS. 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 FEIS for details about these resource areas.

Changes to the Colorado Roadless Rule between the Revised Draft EIS and the Final EIS

The following changes have been made to the Colorado Roadless Rule between the RDEIS and the FEIS:

- The amount of upper tier acres was increased from 562,200 acres in the RDEIS to 1,219,200 acres. Generally areas within 0.5 to1.5 miles of a community at risk (described as a community protection zone or CPZ) were dropped from upper tier designation to ensure communities could conduct hazardous fuel reduction projects for community protection. In addition, areas were added to upper tier to help offset the exceptions for Colorado-specific issues and concerns.
- The North Fork coal mining area was changed from 19,600 acres in the RDEIS to 19,100 acres. Two small areas totaling about 500 acres were dropped because they were incorrectly mapped and contain no recoverable coal.
- An exception to allow for temporary road construction in upper tier was added to account for public health and safety in cases of imminent threat of flood, fire, or other potential catastrophic event that without intervention, would cause the loss of life or property. This could include a situation in which a dam within upper tier that, without intervention could fail, may be allowed access with a temporary road for reconstruction activities.
- In the proposed rule from the RDEIS, administrative corrections and modifications could only be made to the CRA boundary and not the upper tier boundary. The ability to make administrative corrections to upper tier boundaries was added to account for clerical errors, mapping errors or changes in mapping technologies.
- A provision requiring future oil and gas leases in upper tier to have a no surface occupancy (NSO) stipulation has been added. This provision was added to further restrict activities within upper tier that have the potential to adversely impact roadless area characteristics.
- The definition of a pre-existing water court decree was changed to address initial applications filed before the promulgation of the rule. This change was made in recognition that many water rights may take multiple years to adjudicate.

For details about prior changes to the rule, see the RDEIS (USDA Forest Service, 2010).

Purpose and Need

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 characteristics within roadless areas in Colorado. In its petition to the Secretary of Agriculture, the State of Colorado indicated 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 conservation and management of roadless area characteristics.
2. As recognized in the 2001 Roadless Rule, timber 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 characteristics and there is a need to generally prohibit these activities in roadless areas. Since the 2001 Roadless Rule was promulgated, some have argued that linear construction zones also need to be restricted.
3. In addition to the concerns articulated in the 2001 Roadless Rule, there is a need to accommodate state-specific situations and concerns in Colorado's roadless areas. These include the following:
    a. reducing the risk of wildfire to communities and municipal water supply systems;
    b. facilitating exploration and development of coal resources in the North Fork coal mining area;
    c. permitting construction and maintenance of water conveyance structures;
    d. permitting access to current and future electrical power lines;
    e. accommodating existing permitted or allocated ski areas; and
    f. Ensure that Colorado roadless areas are accurately mapped.

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, and unique social/cultural/historical characteristics, areas prized for collection of non-timber forest products, or exceptional hunting and fishing opportunities).

Final Rule and Alternatives

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. The four alternatives analyzed in detail are:

- **Baseline condition – 2001 rule: The 2001 Roadless Area Conservation Rule (2001 Roadless Rule; also referred to as Alternative 1 in the FEIS)**[1]. All provisions of the 2001 Rule are in place, and the 2001 inventory is utilized. Any leases issued since promulgation of the 2001 Rule would be valid. This baseline condition would establish general prohibitions on tree cutting, sale and removal and road construction/reconstruction within IRAs, while permitting some of those activities under certain exceptions. This baseline condition does not include any prohibitions on LCZs and does not include an upper tier category.
- **The Final rule: Final Colorado Roadless Rule (Final Rule; also referred to as Alternative 2 in the FEIS)**. The final rule is based on the revised petition submitted by the State of Colorado to the Secretary of Agriculture. The Colorado Roadless Rule establishes general prohibitions on tree cutting, sale, or removal; road construction and reconstruction; and linear construction zones (LCZs), within CRAs, while permitting those activities under certain exceptions to address needs specific to Colorado.
- **Forest Plans or Forest Plan Direction (also referred to as Alternative 3 in the FEIS).** This alternative would establish a state-specific roadless rule for Colorado that would exempt inventoried roadless areas on NFS lands in Colorado from the 2001 Roadless Rule.
- **Alternative 4: Colorado Roadless Rule with Public Proposed Upper Tier (referred to as Alternative 4 in the FEIS).**

  Alternative 4 reflects the same substantive management direction as examined in the final rule, but would apply the more protective upper tier restrictions to a higher percentage of CRA lands. Alternative 4 has the same general prohibitions and exception as the final rule on tree cutting, sale or removal; road construction and reconstruction; and linear construction zones within CRAs. As with the final rule, substantially altered acres have been removed from the CRA mapped areas. Some, but not all of the final rule upper tier acres are upper tier acres in Alternative 4. Under this alternative, some lands covered by

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

existing oil and gas leases that do not expressly prohibit roads are included as CRA upper tier acres. The upper tier acres included in Alternative 4 also contain areas adjacent to communities at risk to wildfire.

Though the 2001 rule represents baseline conditions, the final rule (and Alternative 4) are compared to both the 2001 rule, as well as the forest plans alternative to fully understand the impacts of this action. Table 1a describes more detail about the attributes exclusive to each alternative.

Table 1a – Comparison of Alternatives (Requirements)

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
Overview and Where Alternative Applies			
Roadless area management direction	The management of roadless areas on NFS lands in Colorado is governed by prohibitions and exceptions comparable to 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 proposed 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, excluding 185,000 acres of wilderness and other congressionally designated acres, as well as correcting mapping errors to remove areas identified as wilderness or private land from the inventory.	4.19 million acres of CRAs, excluding 185,000 acres of wilderness and other congressionally designated acres, and modified by correcting map errors and updating NFS land boundaries. Removing 8,300 acres of allocated ski areas and 459,100 substantially altered areas Adding 409,500 acres of unroaded lands meeting roadless area criteria. Designating 1,219,200 acres as upper tier in Alternative 2. Designating 2,614,200 as upper tier in Alternative 4	4.24 million acres of IRAs are managed according to forest plan direction.
Changes to roadless area boundaries	No process provided for the Forest Service to make future changes to IRA boundaries.	Provides a process for the Forest Service to make changes to CRA boundaries. Changes are subject to public review and comment.	Roadless inventories completed during forest plan revision process, subject to public review and comment, and other NFMA and NEPA regulations.
Comparison of Tree cutting, Sale, or Removal by Alternative			
General tree cutting, sale, and removal provisions	Tree cutting, sale, or removal, is generally prohibited in roadless areas, with some exceptions (see below). In some IRAs forest plans add more restrictions related to conducting this activity, to protect other resource	Similar to the general prohibition in Alternative 1, although more exceptions exist under this alternative (see below). An additional limitation is that the Responsible Official must determine the activity is consistent with the forest plan.	In some IRAs tree cutting is prohibited or limited to protect resource values. Forest plans in Colorado generally allow tree cutting for non-timber purposes on any NFS lands,

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
	values, and the activity must be consistent with the forest plan. Tree cutting for all exceptions is expected to be infrequent.	In some CRAs, forest plans add more restrictions related to conducting this activity to protect other resource values, and the activity must be consistent with the forest plan.	subject to specific resource management direction. Forest plans identify lands suitable for timber harvest for timber production purposes.
Tree cutting, sale, or removal for incidental, personal, administrative uses	This activity is allowed in IRAs where it is incidental to other management activities (e.g., road or trail construction or maintenance, minerals operations, and other authorized uses). For personal or administrative uses, as provided for in 36 CFR 223 (e.g., firewood, Christmas trees).	This activity is allowed in CRAs, including upper tier acres where it is incidental to other management activities (e.g., road or trail construction or maintenance, minerals operations, and other authorized uses). For personal or administrative uses, as provided for in 36 CFR 223 (e.g., firewood, Christmas trees).	This activity is allowed in inventoried roadless areas (IRAs): Where incidental to other management activities (e.g., road or trail construction or maintenance, minerals operations, and other authorized uses). For personal or administrative uses, as provided for in 36 CFR 223 (e.g., firewood, Christmas trees).
Tree cutting, sale, or removal in substantially altered areas	This activity is not rule-limited in substantially altered areas that are the result of classified road construction and subsequent timber harvesting 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 proposed rule is to reduce the risk of wildfire effects but could have other purposes. Generally small-diameter trees and would maintain or improve one or more roadless area characteristics. This exception can also include treatments for prevention or suppression of insect and diseases in order to maintain or restore ecosystem characteristics.	Not allowed within CRA upper tier acres Language simplified and updated to take into account climate change: “to maintain or restore characteristics of ecosystem composition, structure and processes”. These are infrequent and one or more of the roadless area characteristics would be maintained or improved over the long-term. This exception can also include treatments for prevention or suppression of insect and diseases in order to maintain or restore ecosystem characteristics. Not limited to generally small diameter trees.	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: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
Tree cutting, sale, or removal for habitat improvement	This activity is allowed in IRAs to improve habitat for threatened, endangered, proposed, or sensitive species, and to maintain or improve roadless area characteristics. Limited to generally small-diameter trees and would maintain or improve one or more roadless area characteristics	Not allowed within CRA upper tier acres. This activity is allowed in CRAs to improve habitat for threatened, endangered, proposed, or Agency designated sensitive species in coordination with the Colorado Department of Natural Resources including the Colorado Division of Parks and Wildlife. Not limited to generally small diameter trees. One or more of the roadless area characteristics would be maintained or improved over the long-term	Forest plans generally allow tree cutting in IRAs to improve habitat for all species including threatened, endangered, proposed, Regionally designated sensitive species or other species.
Tree cutting, sale, or removal to reduce wildland fire hazard	This activity is allowed in IRAs, to maintain or restore ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildland fire effects, within the range of variability expected to occur under natural disturbance regimes of the current climatic period, and would maintain or improve roadless area characteristics. Limited to generally small-diameter trees and prohibits associated road construction/reconstruction.	This activity is not allowed on upper tier acres within CRAs. On acres within CRAs that are not upper tier, this activity is allowed where the Regional Forester determines it is needed to reduce wildland fire hazard to an at-risk community or municipal water supply system within the first 0.5 mile of the CPZ. The CPZ can extend beyond the first 0.5 mile up to an additional 1 mile, if the land exhibits one of the following characteristics: a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; has a geographic feature that aids in creating an effective fire break, such as a road or a ridge top; or is in condition class 3 as defined by Healthy Forests Restoration Act (Pub. L. 108–148). Where the CPZ extends up to an additional mile, the activity is allowed if within the area of a CWPP. If no CWPP exists, no projects using this exception	Forest plans allow tree cutting in most IRAs for purposes described in Alternatives 1 or 2, with exceptions in some specific management areas. Not limited to generally small-diameter trees, and does not preclude associated road construction/ reconstruction, except as precluded by specific forest plan direction. Forest plan direction provides the basis for activities allowed within roadless areas.

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
		would be proposed in this next one-mile. On acres within CRAs outside of the CPZ, this activity is allowed where the Regional Forester has determined there is a significant risk that a wildland fire disturbance event could affect a municipal water supply system or the maintenance of the system. A significant risk exists where the history of fire occurrence and fire hazard indicate a serious likelihood that a wildland fire disturbance event would have adverse effects to a municipal water supply system. Such projects would focus on small diameter trees to create strategic fuel breaks that modify fire behavior while large trees would be retained to the extent practical, as appropriate to the forest type. One or more of the roadless area characteristics would be maintained or improved over the long-term. Projects outside of the CPZ are expected to be infrequent.	
Tree cutting, sale or removal within newly designated roadless areas	These acres are not within the IRA inventory. No regulatory limitation on tree cutting, sale or removal.	These acres are within the CRA inventory. Tree cutting, sale or removal is subject to the prohibitions in the proposed rule.	These acres are not within the IRA inventory These acres remain subject to forest plan direction.
Comparison of Road Construction and Reconstruction by Alternative			
General road construction provisions	Generally prohibits road construction or reconstruction in IRAs. Exceptions do not distinguish between forest roads and temporary roads. Rule language does not include additional requirements for environmental analysis or NEPA	Generally prohibits road construction or reconstruction in CRAs, distinguishing between forest roads and temporary roads. Includes additional environmental analysis and determination requirements for road construction	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

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
	documentation. Does not include specific provisions about decommissioning and closing roads. Does not include provisions about closing roads to public motorized use.	determining that motorized access without road construction is not feasible; within a native cutthroat trout catchment or identified recovery watershed, road construction would not diminish conditions in the water influence zone and in occupied native cutthroat habitat over the long-term; road construction is consistent with the applicable forest plan; when proposing to build a forest road, a temporary road would not provide reasonable access. Includes specific provisions about decommissioning and closing roads. Roads are closed to public motorized use.	construction. Does not include additional environmental analysis requirements for road construction. Includes some specific direction about road decommissioning. Some plans include some direction about road closures to public use for protection of resource values in specific areas.
Road construction in ski areas	Road construction or reconstruction is limited to within ski area permit boundaries established before [the effective date of this proposed rule] (~6,600 acres). The 8,300 acres of permitted and allocated to ski areas within IRAs remain within IRAs.	Ski areas acres in permitted ski areas or forest-plan allocated ski areas are removed from CRAs (8,300 acres). They are subject to forest plan direction.	Road construction allowed in these management areas.
Roads construction in substantially altered lands (~459,100 acres)	Road construction or reconstruction on substantially altered lands in IRAs is prohibited. Substantially altered acres remain in the IRAs.	These acres are excluded from CRAs. No rule-related limitations on road construction or reconstruction on the substantially altered lands; remain subject to forest plan direction.	Generally road construction is allowed in these management areas.
Road construction in newly identified roadless acres (~409,500 acres)	These acres are not within the IRAs. No rule-related limitations on road construction or reconstruction on the newly identified roadless acres; remain subject to forest plan direction.	These acres are within the CRAs. Road construction or reconstruction on newly identified roadless acres is subject to provisions within the proposed rule.	These areas are not within the IRAs. Road construction direction varies based on management designations within these areas.

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
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). .	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) within CRAs and upper tier acres.	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)
Road construction for public health & safety and resource protections	Road construction or reconstruction is allowed in IRAs where needed to: Prevent irreparable resource damage. Address road safety hazards. Protect public safety from imminent threat of flood, fire, and other catastrophic events that may threaten loss of life or property.	Same as Alternative 1 within both standard tier and upper tier. Additionally, only temporary roads may be constructed or reconstructed as needed for public health and safety in cases of imminent threat of flood, fire, and catastrophic events that, without intervention, might cause loss of life or property.	Road construction or reconstruction is allowed in IRAs where needed to prevent irreparable resource damage. Address road safety hazards. Protect public safety from imminent threat of flood, fire, and other catastrophic events that may threaten loss of life or property, per agency regulations and policy directives.
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 before the effective date of the Colorado Rule) where lease stipulations and other regulations allow. Forest or temporary roads could be constructed. Road construction is prohibited on leases within IRAs issued after (the effective date of the Colorado Rule)	Road construction or reconstruction in CRAs related to oil and gas exploration and development is limited to roads needed, pursuant to rights granted under an existing lease (issued before the effective date of the Colorado Rule) where lease stipulations and other regulations allow. Roads are temporary roads. Road construction is prohibited on leases within CRAs issued after (the effective date of the Colorado Rule) 8 conditions are to be considered for inclusion in approved Surface Use Plans of Operation. Alternative 2 has portions of 6 existing oil and gas leases within the upper tier acres. Alternative 4 upper tier acres include many existing current oil and gas	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 in IRAs 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: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
		leases where road construction could occur if allowed by lease terms and considering 8 conditions for inclusion in approved Surface Use Plans of Operation. Future oil and gas leases within upper tier acres will have a No Surface Occupancy provision.	
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 before the effective date of the Colorado Rule). This includes 5,900 acres currently leased within IRAs. No rule-related language on location of buried infrastructure needed for capture, collection, and use of coal mine methane. No regulatory prohibition on the use of roads constructed or reconstructed for purpose of collecting and transporting coal mine methane	Road construction or reconstruction in CRAs is allowed for coal exploration and development in existing lease areas, and in future lease areas within the North Fork coal mining area (19,100 acres). This includes 4,000 acres currently leased in the North Fork coal mining area. Roads constructed or reconstructed for coal exploration or coal related surface activities may also be used for the purpose of collecting and transporting coal mine methane in the North Fork coal mining area when authorized under a gas lease. Roads are temporary roads. Buried infrastructure needed for capture, collection, and use of coal mine methane would be located within road rights-of-way No CRA upper tier acres in either alternative are located in the North Fork coal mining area.	Current forest plan direction does not limit road construction in areas where coal resources exist. Forest plans include management direction for areas where coal resources exist to protect sensitive surface resources. Current forest plan direction does not limit location of buried infrastructure.
Road construction for water conveyance facilities	Road construction or reconstruction related to water conveyances is limited in IRAs to areas under an existing permit (issued before effective date of Colorado Rule). Road construction or reconstruction is	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 (filed before effective date of	Road construction/reconstruction activities in IRAs would be governed by forest plan direction. Forest plan direction includes areas where road construction is prohibited, limited, discouraged, or unrestricted.

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
	not allowed for future water conveyance structures.	Colorado Rule). Water conveyances are defined as facilities associated with the transmission, storage, impoundment, and diversion of water on and across NFS lands. Not allowed within CRA upper tier acres.	
Road construction for reducing wildland fire hazards	Construction or reconstruction of a road is not allowed in IRAs to reduce wildland fire hazard to at-risk communities.	Construction or reconstruction of a temporary road is allowed with Regional Forester determination to facilitate tree cutting, sale or removal within the first one-0.5 mile of the CPZ to reduce the wildfire hazard to an at-risk community or municipal water supply. Not allowed within CRA upper tier acres.	Road construction/reconstruction activities would be governed by forest plan direction, which varies by management area.
Road construction to facilitate maintenance and restoration of ecosystem characteristics.	Construction or reconstruction of a road is not allowed in IRAs for maintenance and restoration of ecosystem characteristics.	Construction or reconstruction of a temporary road is allowed with Regional Forester determination to facilitate tree cutting, sale or removal within the first one-0.5 mile of the CPZ to maintain or restore ecosystem characteristics. Not allowed within CRA upper tier acres.	Road construction/reconstruction activities would be governed by forest plan direction, which varies by management area.
Comparison of Linear Construction Zones by Alternative			
General LCZ provisions	Does not include any prohibition on LCZs Does not include additional environmental analysis requirements for LCZs. Does not include specific provisions about decommissioning and closing LCZs.	Generally prohibits LCZs in CRAs. Includes additional environmental analysis and determination requirements for LCZs determining that: motorized access without LCZs is not technically feasible; within a native cutthroat trout catchment or identified recovery watershed, an LCZ would not diminish conditions in the	Some Forest plans provide direction to follow to protect resource values when proposing the use of an LCZ. Does not include additional environmental analysis requirements for LCZs. Does not include specific provisions about decommissioning and closing

Descriptor	Alternative 1: 2001 Roadless Rule	Alternative 2: Proposed Action Colorado Roadless Rule Alternative 4: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
		water influence zone and in occupied native cutthroat habitat over the long-term; an LCZ is consistent with the applicable forest plan; and use of watershed conservation practices. Includes specific provisions about decommissioning and closing LCZs. Standard and upper tier provisions are the same.	LCZs.
LCZs for water conveyance structures	No rule-related prohibition on LCZs.	The Regional Forester determines an LCZ is needed related to an authorized water conveyance structure operated pursuant to a pre-existing water court decree (filed before effective date of Colorado Rule). Water conveyances are defined as facilities associated with the transmission, storage, impoundment, and diversion of water on and across NFS lands.	Generally forest plan direction does not limit the use of LCZs.
LCZs for electrical power lines and telecommunication lines	No rule-related prohibition on LCZs or location of electrical power lines or telecommunication lines.	Construction of an LCZ within non-upper tier, 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. Not allowed within CRA upper tier acres.	Generally forest plan direction does not limit the use of LCZs or the location of electrical power lines or telecommunication lines.
Use of an LCZs for construction or reconstruction of an oil and gas	There is no rule-related language prohibiting the use of an LCZ for this	Where the Regional Forester determines a LCZ is needed within	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: CO Roadless Rule w/ Public Proposed Upper Tier	Alternative 3: Provisions of Forest Plans
pipeline	purpose.	non-upper tier to allow for the construction or reconstruction of a pipeline associated with an oil and gas lease that allows surface use within a CRA or the construction or reconstruction of a pipeline needed to connect to infrastructure within a CRA from outside a CRA where such a connection would cause substantially less environmental damage than alternative routes. Not allowed within CRA upper tier acres.	
Other Requirements for Management of Roadless Areas in Colorado			
Oil and gas pipelines where the source(s) and destination(s) of the oil and natural gas is not within the roadless area	No prohibition on oil or gas pipelines through IRAs from sources outside IRAs.	The construction of pipelines for the purposes of transporting oil or natural gas through non-upper tier where the source(s) and destination(s) of the pipeline are located exclusively outside of a CRA shall not be authorized.	Forest plans generally allow oil or gas pipelines through IRAs from sources outside IRAs

Description of Roadless Area Boundaries

The 2001 rule, final rule, and Alternative 4 each provide for a state-specific roadless rule; however, the provisions of each alternative apply to different roadless inventories. The 2001 rule and forest plans use the inventory of the 2001 Roadless Rule IRAs. For the final rule and Alternative 4, the Forest Service re-examined the inventory from the 2001 Roadless Rule and considered other National Forest System lands for inclusion. From this, the Forest Service identified portions of the 2001 Roadless Rule inventory that had roadless characteristics that were substantially altered, including areas with road construction and other ground-disturbing activities. In addition, the Forest Service identified areas outside the 2001 Roadless Rule inventory that met the criteria for roadless character. Together, the exclusion of the substantially altered lands and inclusion of additional roadless areas became the Colorado roadless areas (CRAs) inventory for the final rule and Alternative 4.

Table 1b displays the comparisons between the IRA inventory in the 2001 rule and forest plans and the CRA inventory in the final rule and Alternative 4. Overall, the CRAs have a net loss of 58,000 acres in roadless from the IRA acres.

Table 1b. Net change in roadless acreage by forest—from inventoried roadless area acres to Colorado roadless area acres

Forest	2001 Rule Total IRA Acres [1]	Corrected CO IRA Acres[2] (2001 Rule and Forest Plans)	Substantially Altered Acres Removed from CRAs	Roadless acres added to CRAs	Total CRA Acres Final Rule and Alternative 4)	Net Change
Arapaho-Roosevelt	391,000 (1997)	352,500	10,800	5,400	347,100	(5,400)
GMUG	1,127,000 (1979)	1,058,300	281,500	124,200	901,100	(157,200)
Manti La Sal	11,000 (1979)	11,000	3,800	500	7,700	(3,300)
Pike San Isabel	688,000 (1979)	667,300	62,900	170,300	774,700	107,400
Rio Grande	530,000 (1996)	529,000	14,200	3,800	518,600	(10,400)
Routt	442,000 (1998)	442,300	10,400	1,700	433,600	(8,800)
San Juan	604,000 (1979)	543,600	76,500	98,900	566,100	22,500
White River	640,000 (2002)	639,500	7,400	4,700	636,700	(2,800)
Total, State of Colorado	***4,433,000***	***4,243,600***	***467,400***	***409,500***	***4,185,600***	***(58,000)***

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 National 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. Examples of specific mapping errors in the 2001 Rule inventory are: 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.

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 predicts it willhave a “flat” or declining budget. 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. 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 9, 2012, the Agency published 36 CFR 219 National Forest System Land Management Planning Final rule in the **Federal Register**. The Forest Service will begin implementing the final rule 30 days following the publication date.

The emphasis of the final rule on public participation, 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 rules would place constraints on individual roadless areas in individual land management plans. In the case of the Colorado Roadless Rule, the 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 roadless areas.

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 located within Colorado Roadless Areas (CRAs) 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.[2] 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"[3]

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.[4] These plans are developed following *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy (2001).*

Except for the effects discussed in the body of the EIS on the implementation of the Act, the final rule and the alternative conditions 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 streamlined 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.

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[2] 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.
[3] See Sections 102(e) and (f) of HFRA
[4] The definition of Wildland-Urban Interface (WUI) is found at Section 101 (16) of the Healthy Forest Restoration Act of 2003

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 the final Colorado Roadless Rule (final rule); a modified version of the final rule with additional upper tier acres (referred to as Alternative 4); the forest plans alternative, and baseline conditions represented by the 2001 Roadless Rule (2001 rule). See section "Description of Alternatives" for details about requirements under each alternative. The assumption regarding baseline conditions is consistent with the 10th US Circuit Court of Appeals mandate (2012) lifting a prior US District Court injunction of the 2001 rule, thereby re-installing the 2001 rule, as of the date of publication of this report. The term roadless areas, as used throughout this chapter, generally refer to both the IRAs and CRAs. The Final Environmental Impact Analysis (FEIS) (USDA Forest Service, 2011) uses the following alternative descriptions: Alternative 1 = 2001 rule; Alternative 2 = final rule; Alternative 3 = forest plans; Alternative 4 = modified final rule (i.e., Alternative 4).

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 FEIS (USDA Forest Service, 2011)).

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 final 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 final rule.

The assessment of benefits and costs distinguishes between the *creation of potential opportunities* and the *projection of reasonably foreseeable activities*. Potential opportunities for generating goods and services (e.g., recreation, fuel reductions, minerals) are affected by the extent to which activities (i.e., tree cutting, road construction and reconstruction) are permitted in roadless areas under each alternative to facilitate provision of goods and services. Projections of tree cutting and road construction 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 used to help characterize 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 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 FEIS for the proposed action (USDA Forest Service 2011), as well as the resource specialist reports supporting the FEIS, 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 final 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 final 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 FEIS, 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[5], 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 2011b). 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 (MIG, Inc., 2011) 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 2009 IMPLAN data. IMPLAN data has been supplemented using employment and mineral sector data from many Colorado sources to provide a more representative model. Details regarding model specifications may be obtained from the administrative record. 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.

[5] 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

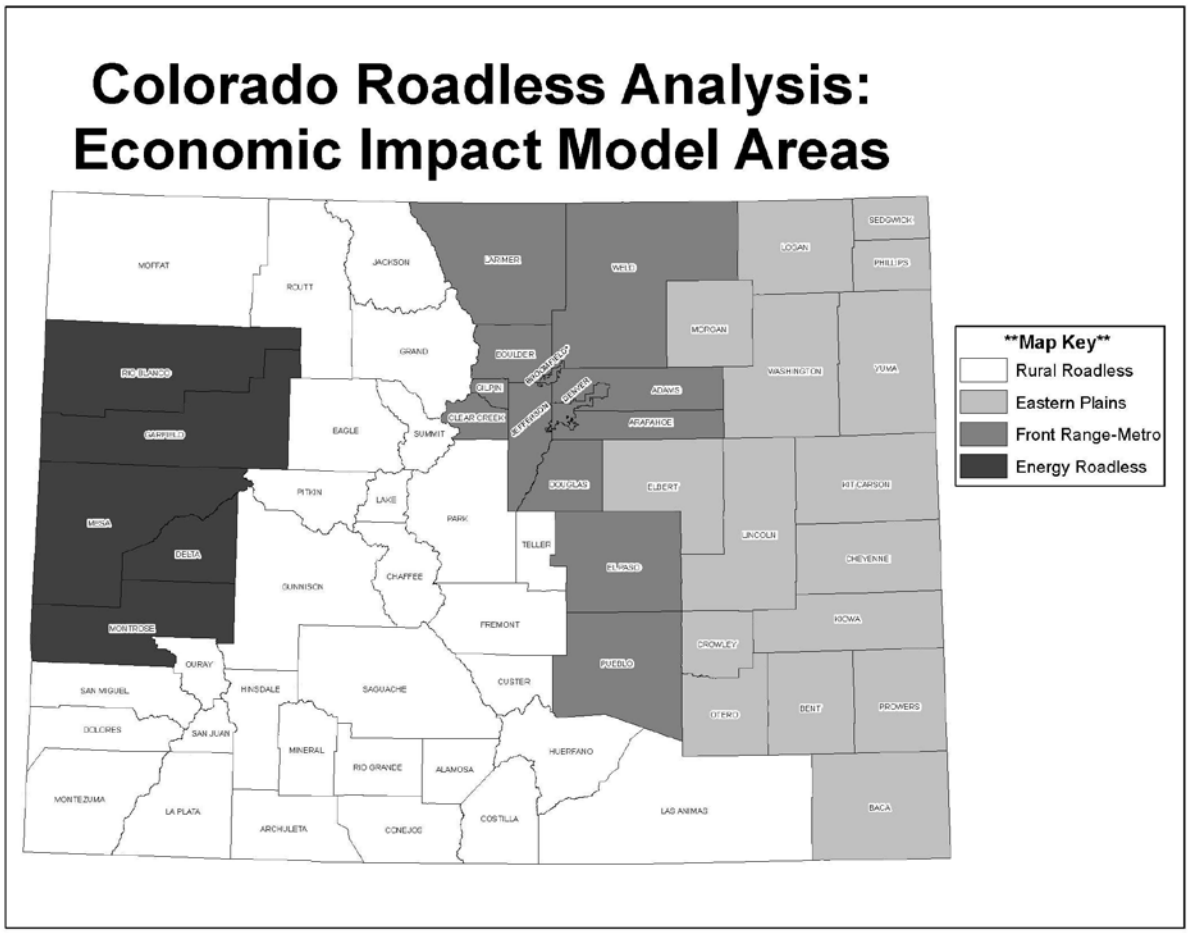

Figure 1. Colorado Roadless Analysis: Economic Impact Model Areas

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[6]. 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, Montrose, 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 live in Delta, Montrose, and Mesa Counties. All 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 FEIS (USDA Forest Service, 2011). The model[7] 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).

[6] 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 FEIS (USDA Forest Service, 2011)).

[7] 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

In August 2008, the Wyoming District Court set aside and enjoined the 2001 Roadless Rule. Accordingly, the February 2011 RIA for the revised proposal for the Colorado Roadless rule assumed baseline conditions to be those resulting from application of forest plan direction (i.e., 'forest plans') as the likely scenario in the event that no state-specific rule were adopted. On October 21, 2011 the U.S. Tenth Circuit Court of Appeals reversed the Wyoming District Court's decision to set aside the 2001 Roadless Rule and remanded the case back to the District Court to vacate the permanent injunction, implying that the 2001 rule would represent baseline conditions. As of the writing of this report, the injunction has been lifted by the 10th US Circuit Court of Appeals, thereby re-installing the 2001 rule. As a consequence, this report adopts the 2001 rule to represent baseline conditions. Though the 2001 rule represents baseline conditions, the final rule (and Alternative 4) are compared to both the 2001 rule, as well as the forest plans alternative, to fully understand the impacts of this action.

Time Frame and Geographic Scope

Environmental effects analysis for the different resource and service areas completed for the FEIS for the final 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 adopts a 15 year time period of analysis. The management direction for roadless areas applies to CRAs under the final rule and Alternative 4 and IRAs under the 2001 rule and forest plans. Forest plan direction applies to all areas not categorized as roadless under all alternatives. The geographic scope of direct impacts from the final 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 sub-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 FEIS for the final rule (USDA Forest Service 2011) as well as separate resource *Specialist Reports* (e.g., Minerals, Social and Economics, Recreation) completed to support and cited in the FEIS. As such, this report makes frequent reference to the FEIS 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 FEIS 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, oil, and 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 and 2009.
- Colorado Department of Natural Resources: 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 and road construction that would likely occur in CRAs and substantially altered areas under each alternative for the final rule; no changes were made to this information for the final rule and FEIS. Projections for activity levels consider flat budget trends. Each resource area section in the FEIS provides further descriptions of the information used to project activity levels (USDA Forest Service 2011).

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 designated as 'roadless' 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 or the 2001 rule 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 or the 2001 rule baseline conditions 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**
Baseline condition – the 2001 Roadless Rule	IRAs – Forest Plan & 2001 Rule	IRAs – Forest Plan & 2001 Rule	Forest Plan
The final rule – Colorado Roadless Rule	CRAs – Forest Plan & CO Rule	Forest Plan	CRAs – Forest Plan & CO Rule
Forest Plans	Forest Plan	Forest Plan	Forest Plan
Alternative 4 - Colorado Roadless Rule with More Public	CRAs – Forest Plan & CO Rule	Forest Plan	CRAs- Forest Plan & CO Rule

Proposed Upper Tier			

The 2001 rule 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.

The final rule 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 plans and the Colorado Roadless Rule. The 467,100 acres that includes permitted or forest plans allocated ski area acres and those that have been substantially altered would be managed according to the respective forest plans. This alternative designates 1,219,200 acres as CRA upper tier acres.

Forest plans 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 plans and the Colorado Roadless Rule. The 467,100 acres that includes permitted or forest plans 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 forest plans followed by the final rule, Alternative 4 and the 2001 rule 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 in Tables 4 and 5.

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						
	The 2001 Rule		The final rule		Forest Plans	Alternative 4	
	IRA roadless Acres	Non-IRA acres in the Analysis Area	CRA roadless Acres	Non-CRA acres in the Analysis Area	All acres, Forest Plan	CRA roadless Acres	Non-CRA acres in the Analysis Area
	- annual average miles -						
Oil and gas	9.5	0.9	9.7[a]	0.7	11.9	9.7[a]	0.7
Coal mining	0.5	0.6	3.3[a]	0.1	4.9	3.3[a]	0.1
All Other Purposes[b]	1.4	0.9	3.9	2	9	2.1	2
Totals	***11.4***	***2.4***	***16.9***	***2.8***	***25.8***	***15.1***	***2.8***

Data source: *Collected from management unit staff within Forest Service Region 2, August 2011.*

a) *Can only be temporary roads under the final rule and Alternative 4 and would be restored after use.*

b) Hazardous fuels reduction treatments; ecosystem maintenance/restoration; recreation special uses; water conveyances; utility special uses; hard rock minerals; other roads (health, safety, Federal Highway, CERCLA)

Table 5 displays a summary of the total average annual miles of road projected to be constructed or reconstructed for all activities under each alternative. Table 5 also displays the type of road (temporary or forest) that is projected to be constructed or reconstructed.

Table 5 - Average Annual Road Construction and Reconstruction Miles Projected by Alternative

Type of projected road construction or reconstruction	Average annual road construction and reconstruction						
	The 2001 rule		Alternative 2		Forest Plans	Alternative 4	
	IRA Roadless Acres	Non-IRA acres in the Analysis Area	CRA Roadless Acres	Non-CRA acres in the Analysis Area	All acres, Forest Plan	CRA Roadless Acres	Non-CRA acres in the Analysis Area
	---------- miles ----------						
Temporary	11.2	2.4	16.6	2.3	24.1	14.9	2.7
Forest[1]	0.2	0	0.3	0.1	1.7	0.2	0.1
Total Construction[2] (nearest mile)	***11.4***	***2.4***	***16.9***	***2.8***	***25.8***	***15.1***	***2.8***

Data source: *Forest Service Region 2, August, 2011.*

1) Totals might not add due to rounding.

2) These represent the highest level of road development, in some cases temporary roads might 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. All projections for tree cutting, sale or removal are annual averages over the next 15 years, but can be expected to vary from year to year. For each alternative, projections are provided separately for areas mapped as roadless (i.e., IRAs for the 2001 rule; CRAs for Alternatives 2 and 4) and areas not managed as roadless (i.e., 'Non-IRA acres' for the 2001 rule; 'Non-CRA acres' for Alternatives 2 and 4). Total tree-cutting projections for the analysis area as a whole (i.e., sum of areas managed as roadless and non-IRA or non-CRA) are also provided for each alternative. Table 6 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. Forest health is not stated as a separate line item in Table 6 because treatments across all purposes are expected to affect forest health. The greatest number of acres where tree cutting, sale or removal is projected to occur is under forest plans followed by the final rule, Alternative 4 and the 2001 rule 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 the FEIS (USDA Forest Service, 2011).

Table 6. 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 for the Analysis Area[1]						
	The 2001 rule		Alternative 2		Forest Plans	Alternative 4	
	IRA Roadless Acres	Non-IRA acres	CRA Roadless Acres	Non-CRA acres	All acres, Forest Plan	CRA Roadless Acres	Non-CRA acres
	- - - - - - - - - - - - - - average annual acres –10 acres - - - - - - - - - - - -						
Hazardous fuels reduction treatments	30	860	4,900	610	13,350	1,390	610
Analysis Area	*890*		*5,510*		*13,350*	*2,000*	
Restore and maintain ecosystem	1,410	250	930	700	3,690	370	700
Analysis Area	*1,660*		*1,630*		*3,690*	*1,070*	
TEPS habitat improvement	50	0	60	0	80	10	0
Analysis Area	*50*		*60*		*80*	*10*	
Other[2]	20	40	90	40	260	30	40
Analysis Area	*60*		*130*		*260*	*70*	
Total tree cutting, sale or removal	**1,520**	**1,150**	**5,970**	**1,350**	**17,380**	**1,790**	**1,350**
Total for the Analysis Area	***2,670***		***7,320***		***17,380***	***3,150***	

Data source: Forest Service Region 2, August, 2011

1) Totals may not add due to rounding

2) 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 for market values to be 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. 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 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, non-commodity, 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 FEIS.

Likewise, management designation for roadless areas in Colorado is controversial. One of the central questions that frame the debate is commodity and non-commodity 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 non-motorized 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 7) and can be used to display the differences between alternatives, recognizing that value categories do not define specific individuals or groups.

Table 7. 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

Value/Interest Category	Defined for Colorado roadless area analysis
	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 8 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 8. Summary of social value and interest preference for alternatives by interest category.

Value/Interest Category	The 2001 rule	The final rule	Forest Plans	Alternative 4
Conservation			Preferred	
Industry Access			Preferred	
Preservation	Preferred			Preferred
Recreational use: motorized		Preferred		
Recreational use: non motorized	Preferred			
Roaded access			Preferred	
Tourism	Nature/eco based, preferred		Motorized-adventure based and ski industry, preferred	
Wilderness	Preferred			Preferred
Wildland urban interface		Preferred	Preferred	

As noted in the section regarding "Purpose and Need," the final 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 final 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

The following sections are brief summaries of benefits in the context of potential changes in opportunities resulting from projected levels of tree cutting and road construction or reconstruction activities. Details about resource or program-specific effects are provided in Chapter 3 of the FEIS (USDA Forest Service, 2011) and not reproduced in this report. For a discussion of effects related to employment, income, and payments/royalties paid to federal, state, and local governments, see the "Distributional Effects" section in this document.

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. 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 unaffected by the final rule. Program budget levels were assumed to remain constant across alternatives for all resources. The implication of this 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. The proportion of cutting activity occurring within versus outside of roadless areas will vary across alternatives, but overall economic impacts are unchanged.

The potential sustainable supply of timber from NFS lands within Colorado (i.e., Allowable Sale Quantity (ASQ)) is currently 145.4 million board feet (MMBF) annually (as averaged over a decade). Potential reductions in long-term sustainable supply of timber volume are estimated to range from 20% under the final rule and Alternative 4 to 23% under the 2001 rule (see Vegetation Management section within the FEIS for details). Sustainable supplies of timber are therefore estimated to be 116 MMBF under the final rule (and Alternative 4) and 112 MMBF under the 2001 rule, both of which are well above actual timber volumes sold from 2000-2009 (i.e., 69.2 MMBF). These results imply that timber supplies outside of roadless areas are available to substitute for decreases in timber availability within roadless areas under all alternatives considered.

Overall, the volume differences across alternatives are not anticipated to result in significant impacts to the wood products and forest service sectors[8].

Minerals and Energy

[8] 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).

Mineral and energy resources from roadless areas can be of substantial value, and road access for exploration and development can have affect future development opportunities for mineral resources. On a national scale, mineral and energy contributions from roadless areas 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.

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 occur 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 FEIS).

Under the 2001 rule, 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. The newly identified roadless acres that are not within the IRAs under the 2001 rule, but included within CRAs under the final rule and make up the remainder of the analysis area, follow forest plan and oil and gas leasing availability direction.

Under the final rule, 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 the 2001 rule 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 the final rule follow forest plan and oil and gas leasing availability direction. A provision requiring future oil and gas leases in upper tier areas to have a no-surface occupancy stipulation has been added to the final rule.

Under forest plans, 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 the 2001 rule and the final rule 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. 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.

The effect under alternative 4 would be the same as the final rule, with the exception that more CRAs are assigned to upper tier. 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, similar to the final rule.

Projected Activities and Opportunities for Oil and Gas

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 whose lease terms allow for road construction. Twenty-one (21) IRAs containing 156,393 leased acres are on the GMUG, White River, San Juan, Manti-LaSal, Routt, and Pike-San Isabel (PSI) National Forests. Roads would be allowed in 132,783 acres of the total area leased, and roads would be prohibited in 23,610 acres. Of the 21 IRA's with existing leased acreage, only fourteen IRA's located on the Grand Mesa-Uncompahgre-Gunnison (GMUG), San Juan, and White River NF's are expected to have oil and gas roads and development activity over the 15-year analysis timeframe.

Under the final rule, as well as Alternative 4, road construction would be allowed on oil and gas leases that allow surface occupancy and were issued before the proposed Colorado Roadless Rule becomes effective. There are 27 proposed CRAs containing 157,760 leased acres on the GMUG, White River, San Juan, Manti-LaSal, Routt, and Pike-San Isabel (PSI) National Forests. Roads would be allowed in 134,003 acres of the total area leased, and roads would be prohibited in 23,757 acres. Of the 27 CRA's with existing leased acreage, only sixteen IRA's located on the GMUG, San Juan, and White River NF's are expected to experience oil and gas development activity in the forseeable future.

Under forest plans, road construction would be allowed on existing and future oil and gas leases where roads are allowed under lease terms and stipulations. Fourteen (14) IRAs on the GMUG, San Juan, and White River NF's 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.

The total number of oil and gas wells and recoverable reserves are projected to be the same for the 2001 rule, the final rule, and Alternative 4 for the combined IRA/CRA analysis area for the foreseeable future (i.e., 732 wells; 1,276 billion cubic feet of gas (bcfg)). In comparison, total wells and accessible reserves are estimated to be slightly higher under forest plans (819 wells; 1,384 bcfg) for the foreseeable future.

Coal

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 only unit for which coal resource development is anticipated is theGMUG NF.

Three underground mines (West Elk, Bowie #2, and Elk Creek) produce coal from private lands and leases on federal lands.

Under the 2001 rule, road construction or reconstruction in IRAs would be limited to areas under lease prior to the effective date of the Colorado Rule. Effects of road prohibitions on development of coal resources under the 2001 rule 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 parts of the GMUG NF in IRAs that overlap with the Somerset and Grand Mesa coalfields.
- 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.

Under the final rule, 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. 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 road prohibitions on development of coal resources under the final rule include the following:

- Lost opportunity for exploration of un-leased federal coal resources on smaller (compared to the 2001 rule) parts 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.

Under forest plans, 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.

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

Projected Activities and Opportunities for Coal

Under the 2001 rule, foreseeable production opportunities would be limited to 8,600 acres of accessible coal reserves (157 million tons of coal) for the North Fork mining area. Approximately 7,100 acres out of 8,600 acres are leased (5,900 leased acres are within IRAs), and 1,500 acres are unleased. A total of 2,700 acres out of 8,600 acres are outside of IRAs under the 2001 rule. For the final rule (as well as Alternative 4), foreseeable production opportunities are estimated to be 19,125 acres of accessible reserves (504 million tons of coal) of which 7,100 acres are leased (4,000 leased acres are within CRAs) and 12,025 acres are unleased. A total of 15,025 out of 19,125 acres are outside of CRAs under the final rule (and 4). Under forest plans, foreseeable production opportunities are estimated to be 715 million tons of reserves on 36,400 acres of accessible coal reserves, of which 7,100 are leased (5,900 leased acres within IRA boundaries) and 29,300 acres are unleased. A total of 32,400 out of 36,400 acres are located outside of IRA boundaries under forest plans.

Projected road construction associated with coal production is estimated to be: 16 miles (7 within IRAs) under the 2001 rule; 52 miles (50 within CRAs) under The final rule and Alternative 4; and 73 miles (64 within IRAs) under forest plans.

Geothermal Energy

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.

Projected Activities and Opportunities for Geothermal Energy

Forest plans 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 final 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.

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 final rule does not constitute a "significant energy action" as defined in E.O. 13211 because

projected changes in oil, gas, and coal production under the final rule are not sufficient to cause exceedence of criteria for significance.

Economic impacts discussed here are generally smaller than those presented in the RIA prepared for the RDEIS. These changes are the result in different economic conditions and updated data sources (see "Methodology" section in this report and the "Social and Economic Specialist Report" (USDA Forest Service, 2011a) for details). When the impacts of drilling, oil and gas extraction, and coal mining are summed, the net change from the RDEIS exhibits two patterns. For the final rule, forest plans, and Alternative 4 total aggregate production values for coal, oil, and gas are reduced by 22 percent, employment by 15 percent, and labor income by 10 percent in the FEIS compared to the RDEIS. Updates to the coal scenario, as discussed above, are largely responsible for a different pattern of net changes under the 2001 rule in the FEIS. Compared with the RDIES, the 2001 rule shows a total production value increase of 9 percent, employment increase by 33 percent, and labor income increase by 45 percent for coal, oil, and gas in aggregate in the FEIS.

Projections of natural gas production are discussed in the FEIS 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 from the combined IRA/CRA analysis area varies across alternatives for only two National Forests (the Grand Mesa, Gunnison, and Uncompahgre (GMUG) and White River National Forests). For the San Juan National Forest, production occurs within roadless areas but does not vary across alternatives for that National Forest. It has also been determined that there is no appreciable difference in projected natural gas production between the 2001 rule and the final rule or Alternative 4. The difference in potential average annual natural gas production between the 2001 rule, final rule or Alternative 4 (35 billion cubic feet (bcf) per year) and forest plan directions for the GMUG and White River National Forests (39 billion cubic feet per year) is a decrease of about 4 bcf/year, or 4 million million cubic feet (mcf)/year, which is well below the E. O. 13211 criterion for adverse effects of 25 million mcf/year.

Projected oil production ranges from approximately 50,000 barrels under the 2001 rule, the final rule, and Alternative 4 to approximately 110,000 barrels under forest plans over a period of 15 to 30 years. The corresponding reduction in oil production per day under the 2001 rule, final rule or forest plans is inconsequential compared to the E. O. 13211 criterion of 10,000 barrels per day.

Natural gas pipeline mileage across roadless areas is projected to be similar for the final rule, Alternative 4, and the 2001 rule, implying that gas distribution costs are also projected to be similar across these alternatives (i.e., distribution costs will not increase under the final rule compared to the 2001 rule).

Natural gas pipeline mileage across roadless areas is projected to be approximately six miles under the forest plans alternative. The final rule would restrict pipeline construction in roadless areas, and these restrictions could result in an increase of about 10 miles of additional total natural gas pipeline compared with forest plans. Analysis of transmission natural gas pipeline operations in the U.S. indicates that labor and material costs average approximately $85,000 per mile per year. Consequently, the increase in the distribution cost of natural gas would be $850,000 per year greater under the 2001 rule, the final rule, and Alternative 4, compared to forest plans. This amount represents less than 0.2 percent of total pipeline industry output in Colorado and less than 0.1 percent of energy sector (oil and gas drilling, production. and

pipelines) output in Colorado (USDA Forest Service, 2011a). This share of the energy sector is well below the E.O. 13211 criterion for adverse effects of one percent.

Average annual coal production is projected to be greater under the final rule (and Alternative 4) compared to the 2001 rule (see section "Economic Impacts"), implying that economic impacts associated with coal are positive under the final rule, compared to the 2001 rule.

Based on *average* annual coal production rates estimated for economic impact analysis purposes, annual aggregate production for all mines operating in the affected area is projected to be the same under the final rule, forest plans, and Alternative 4 until 2060. It is only after 2060 that annual coal production is projected to decrease under the final rule compared to forest plans by an amount of 5.0 million tons per year. This is the combined average production rate for both the Elk Creek and West Elk mines from 2008 to 2010. A decrease of 5 million tons is equivalent to the E. O. 13211 threshold criterion for significant adverse effects. It should be noted that one of the existing mining companies in the North Fork Valley has announced plans to shift its operations to BLM and private lands once currently leased reserves under NFS lands have been recovered. This shift would occur regardless of roadless area alternatives considered.

The reduced accessibility to potentially recoverable coal reserves from roadless areas that are made accessible under the final rule, relative to forest plans, is estimated to be 210 million tons (i.e., 724 - 514 = 210 million ton reduction). In comparison, the recoverable coal reserves[9] reported for the State of Colorado by the US Energy Information Administration is estimated at 314 million tons in 2009,. The reduction of 210 million tons made inaccessible under the final rule is only 2% of the total estimated recoverable reserves[10] for the state of Colorado in 2009 (9,634 million tons) and less than 0.1% of total estimated recoverable reserves for the nation in 2009 (260,551 million tons).

The estimated reductions in the production life of mines in the North Fork Valley under the final rule compared to forest plans may or may not be significant, particularly when considering projected demand for coal from western mines[11] and the Nation as a whole. However, both the final rule and forest plans are projected to sustain similar production rates over an extended period of 48 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. Approximately 53% of all coal produced from Colorado in 2010[12] (25.2 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.

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[9] "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, 2009, 2008) http://www.eia.doe.gov/cneaf/coal/reserves/reserves.html

[10] "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, 2009) http://www.eia.doe.gov/cneaf/coal/reserves/reserves.html

[11] A national increase in coal production to 2035 is fueled primarily by western mines. By 2035, western coal is projected to account for nearly 60 percent of national production Source: US Energy Information Administration (EIA), Annual Energy Outlook, April 2011 (Figure 101 – Coal production by region, 1970-2035).

[12] Colorado Department of Natural Resources, Colorado Geological Survey. 2011. 2010 Colorado Coal Fact Sheet. Denver, CO.

Reduced coal production life under the final rule (as well as Alternative 4), relative to forest plans 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 life under the final rule, relative to forest plans are not projected to occur until 48 years in the future (2060) and estimated reductions after year 48 matches but does not exceed the criterion of 5.0 million tons per year;
- Reduced access to potentially recoverable coal reserves under the final rule relative to forest plans amounts to a relatively small percentage of total estimated recoverable reserves in the State of Colorado (2%) and the nation (<0.1%); and
- Reduced access to potentially recoverable coal reserves and associated overall production under the final rule compared to forest plans are estimated to occur well into the future (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.

Because of reduced accessibility, there is an associated reduction in annual coal production under the 2001 rule, compared to forest plans. Estimated reductions range from 4.3 million tons per year beginning in 2022 and increase to 9.3 million tons per year by 2027. These are greater than the reductions noted for the final rule (and Alternative 4), and production life is anticipated to extend for only 10 to 15 years under the 2001 rule compared to a longer production life under forest plans. The second production reduction under the 2001 rule in 2027 exceeds the criterion of 5 million tons per year for adverse effects, 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 may outweigh the effects of implementing the 2001 rule alternative.

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 FEIS, 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 final rule does not disturb access to privately held mineral rights, or mineral rights held through existing claims or leases, and restrictions on saleable mineral materials are narrow. The final rule does not prohibit future mineral claims or mineral leasing in areas otherwise open for such, however it affects the ability to construct or reconstruct roads on certain affected lands. The rule also provides regulatory mechanism for consideration of requests for modification of restrictions if adjustments are determined to be necessary in the future. Based on the evidence above, criteria for “significance” under EO 13211 are not exceeded for the final rule. The final rule is therefore not considered a significant energy action.

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. Roadless areas provide a diverse array of forest vegetation, ranging from warm, dry pinyon-juniper woodlands to cold, moist sub-alpine forests.
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. 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, old trees and a warmer climate.

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 with 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.

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.
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.

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.

Under the 2001 rule, 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) 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. 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.

Under the final rule, tree cutting to reduce the wildfire hazard to an at-risk community is restricted to within the CPZ (within one-half mile of communities and 1.5 miles under certain conditions). 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. 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. Similar to the 2001 rule, the final 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. Compared to the other three alternatives, forest plans 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.

Alternative 4 has the same exceptions for tree cutting, sale or removal for forest health purposes as the final rule. Like the final rule, these exceptions would not be allowed within the upper tier acres (there are approximately 1.9 million more upper tier acres under Alternative 4 compared to the final rule). Similar to the 2001 rule and the final rule, 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.

Projected Activities and Opportunities for Forest Health

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. Forest health treatments and other forest management projects are limited to some degree due to the nature and location of roadless areas under all alternatives. Most or large portions of roadless areas will remain unmanaged (i.e., with no treatments) under all alternatives. Roadless areas that remain unmanaged would likely continue to depart from desired conditions. The decline in forest health would result in some landscapes being less resilient to large-scale insect and disease outbreaks.

Under the 2001 rule, almost all of the forest vegetation in roadless areas would remain unmanaged (i.e., no treatments for fuel management, restoration, and other forest health or vegetation management purposes) over the next 15 years. This alternative is generally the most restrictive on tree cutting (2,670 acres/yr projected) and road construction for forest vegetation management and least likely to achieve the Forest Plan desired conditions.

The final rule provides greater opportunities to improve forest health (e.g., 7,320 acres/yr of tree cutting projected for treatment purposes) to meet desired vegetation conditions compared to the

2001 rule. Although this alternative is unlikely to substantially improve forest health and hazardous fuel conditions overall, the increased flexibility compared to the 2001 rule, would increase the likelihood of achieving management objectives in critical areas, especially in the community protection zones. The final rule would also reduce the likelihood of achieving the Forest Plan desired conditions outside of community protection zones.

Under forest plans, tree cutting activity is projected on approximately 17,400 acres per year in for treatment purposes. Forest plans provides more flexibility than the 2001 rule, the final rule or Alternative 4 to address concerns that may arise (including response to climate change) and the highest likelihood of achieving Forest Plan objectives.

The effects of Alternative 4 are nearly identical to those in the final rule. However, this alternative has fewer opportunities to improve forest health (tree cutting projected on 3,140 acres/yr) to meet desired vegetation conditions compared to the final rule because of restrictions in upper tier areas. This alternative provides more opportunities to improve forest health in community protection zones than would occur in the 2001 rule. The increased flexibility compared to the 2001 rule would increase the likelihood of achieving management objectives in the community protection zones. This alternative would be the most restrictive on tree cutting outside of community protection zones and therefore would reduce the likelihood of achieving the Forest Plan desired conditions outside of the community protection zones.

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 forest plans and lower under the 2001 rule, the final rule and Alternative 4.

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. 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. 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[13] 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.

[13] 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).

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.

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.

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.

Projected Activities and Opportunities for Fire and Fuels

The 2001 rule provides the lowest probability of conducting hazardous fuel treatments in roadless areas, and least likelihood of reducing wildfire hazards to at-risk communities in and adjacent to roadless areas. Approximately one percent of annual fuel treatments on NFS lands in Colorado could occur in the analysis area under the 2001 rule. Treating 13,350 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 over a 15 year period.

The final rule and forest plans 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 final 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 final rule. Treating 82,650 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 final rule would result in reduced hazard for at-risk communities and other values in proximity to the CRAs. Forest plans offer 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 13,350 acres projected to occur in the analysis area could represent 21 percent of the total NFS acres treated annually in Colorado. Treating 200,250 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 the 2001 rule where tree cutting is projected for 2,000 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 approximately half of CPZs within roadless areas. In contrast, none of the CRAs within 0.5 or 1.5 miles CPZs are in upper tier acres under the final rule.

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 final 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 final rule, and even more so under forest plans, the respectively increasing number of road miles projected to occur in roadless areas may facilitate responses to emergency health and safety situations.

Under the final rule and Alternative 4, exceptions exist for road construction for the purpose of public health and safety.

In addition, as the projected road miles increase under Alternative 4, the final rule, and forest plans 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 FEIS). 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).

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. SUAs evaluated in the FEIS include 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. The aggregate effect of alternatives on all types of SUAs are discussed in this report (see the FEIS for details about different SUA types).

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. For information about changes in opportunities associated with oil and gas pipelines, see the section “Compliance with EO 13211 (Statement of Energy Effects)” in this report.

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.

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.

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.

Projected Activities and Opportunities for Non-recreational Special Uses

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 the 2001 rule, future authorizations (i.e., after the effective date of this rule) would generally prohibit roads but allow linear construction zones (LCZs), including for oil and gas pipelines from lease areas outside of IRAs. Approximately 4.7 miles of LCZs per year are projected under the 2001 rule (all of which are in IRAs) for these types of special use authorizations. Opportunities for future authorizations related to these types of uses are similar for the final rule and Alternative 4, however allowances for LCZs are more limiting – including the requirement that LCZs in non-upper tier for existing and future authorizations for oil/gas pipelines, electrical power lines, telecommunication lines and water conveyance structures could only occur under certain conditions outlined in the final rule. Under the final rule, LCZs in upper tier would only be allowed for existing authorizations for oil/gas pipelines, electrical power lines, telecommunication lines and existing or future water conveyance structures. The final rule and Alternative 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 the 2001 rule, 4.7 miles of LCZs per year are projected under the final rule and Alternative 4 (of which 3.3 miles are in CRAs). Road and LCZ construction would generally be allowed for a variety of future special use authorizations under forest plans, except where prohibited under management plans. Approximately 5.1 miles of LCZs per year are projected for the analysis area under forest plans.

Increases in natural gas pipeline mileage across roadless areas is projected to be six miles for the final rule compared with forest plans. When considered from a total mileage perspective, this increase suggests that the final rule restrictions could result in about 10 miles of additional total natural gas pipeline compared with forest plans.

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.

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.

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.

Projected Activities and Opportunities for Ski Areas

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 final 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 forest plans, the potential to construct roads and cut trees in IRAs in ski areas would be the same as the final rule, recognizing that forest plans can be amended to expand ski area allocations beyond current allocations. 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.

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 final rule, 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.

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. 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. 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

The following sectsion are brief summaries of benefits in the context of potential changes in opportunities resulting from projected levels of tree cutting and road construction or

reconstruction activities. Details about resource or program-specific effects are provided in Chapter 3 of the FEIS (USDA Forest Service, 2011) and not reproduced in this report.

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. 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.

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. 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).

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. Population growth and increasing development on lands adjacent to roadless areas can have a cumulative impact on scenic quality.

Projected Activities and Opportunities for Scenic Quality

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 final 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 forest plans. Tree cutting associated with treatments under the final rule, as well as other alternatives, may have long-term beneficial impacts on scenic quality. Forest plans 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 the final rule 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.

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.

Projected Activities and Opportunities for Wilderness

There are a total of 36 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 87,000 acres of roadless areas have been recommended for wilderness in land management plans. The 2001 rule, the final rule, and Alternative 4 will not have a direct effect on designated wilderness, because wilderness 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 unless a site specific amendment is completed. Projected activities under the 2001 rule, the final rule, and Alternative 4 have a low likelihood of affecting wilderness characteristics because activities are not expected to occur adjacent to wilderness area boundaries. The risk of detracting from wilderness characteristics in adjacent wilderness areas would be higher under forest plans. Projected activities in the North Fork Coal Mining area could potentially affect the solitude and wilderness experience opportunities in the adjacent West Elk wilderness. Alternative 3 (forest plans) could also potentially create the greatest reduction in the number of roadless acres that would be capable of supporting new wilderness recommendations.

The use of an 'upper tier' category for some CRA acreage under the final rule and Alternative 4 may help establish, or contribute to, a more uniform management approach for recommended wilderness, recognizing that upper tier selection is not based on wilderness criteria. The final rule and Alternative 4 designate 1,219,200 and 2,614,200 million CRA acres as upper tier acreage respectively, implying that the opportunities for using upper tier designations to assist with decisions regarding recommended wilderness is somewhat greater under Alternative 4.

Other Congressionally or Administratively Designated Areas and Trails

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.

Soils, Water, and Air

Roads are recognized as a significant human-caused source of soil and water disturbances in forested environments. 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.

Soil

Soil in the potentially affected roadless areas 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.

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.

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 forest plans 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 the 2001 rule and lowest under forest plans 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.

Water

Colorado has approximately 95,500 miles of rivers and streams, 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). Approximately 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.

The streams and lakes in roadless areas in Colorado generally have good to excellent water quality. 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.

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 relative differences in potential water 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, quantity, or stream flow, while the final rule and Alternative 4 would have a slightly higher risk, followed by forest plans 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 Alternative 4, the final rule, and forest plans have the potential to reduce risks to water quality and municipal water supplies from high severity wildfires, though decreases in risk may be slight.

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.

Most of the roadless areas lie adjacent to wilderness areas, many of which are categorized as 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.

Differences in effects on air quality do not substantially differ among alternatives. Based on the projected land management activities that differ among alternatives, 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.

Forest plans 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.

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. 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 forest plans.

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 FEIS (USDA Forest Service 2011).

Botanical Resources

Three threatened plant species are known to occur in CRAs. There are 41 sensitive plant species known or likely to occur in the roadless areas in Colorado. Forest Service sensitive species are those designated by a regional forester for which population viability is a concern. 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. 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 the 2001 rule and Alternative 4 and somewhat higher for the final rule and forest plans.

The overall relative risks to T&E and sensitive plant species are summarized in Table 8a (as presented in Chapter 3 of the FEIS (USDA Forest Service, 2011).

Table 8a. 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 2 =Alt 3 = Alt 4	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".

Projected Impacts Associated with T&E and Sensitive Plants

The alternatives do not substantially differ in their estimated effect on T&E plant species, because no additional roading, tree cutting, energy development, or LCZ activities are projected to occur in the portions of roadless areas that support T&E plants. For sensitive plants, the potential risk of direct adverse impacts from road construction, tree cutting, LCZs, and oil, gas or coal development depends on the extent to which these activities take place within the specific areas where sensitive plant species occur. The relative difference in risk is tied to the likelihood of projected activities across alternatives. Authorized activities are designed and conducted to avoid habitat containing sensitive plant species when practical, or to at least avoid a loss of population viability, however, some level of risk of accidental damage to sensitive plants or their habitats during project implementation (or other unintended consequences from management activities) may occur. Individual sensitive plants may be affected by projected activities, however, none of the alternatives or baseline conditions are expected to result in the loss of viability, nor cause a trend toward Federal listing of sensitive species.

Increasing degrees of risk from invasive plants may occur under the final rule and forest plans and Alternative 4 respectively 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. Over time, weeds could spread from infested activity areas into sensitive plant habitat, even if the activities are conducted at some distance from these habitats (e.g., via wind). Some of the potential indirect impacts from invasive plants would be avoided or mitigated by implementation of the Forest Service's weed management and prevention programs. 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. However, the level of projected activities under any of the alternatives is not likely to be sufficient to measurably reduce risks within sensitive plant habitat.

Aquatic Habitat and Species

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.
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 three sucker species (flannelmouth, bluehead, and mountain suckers) listed as sensitive within roadless areas. 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 introduced sucker species.

There are other T&E fish species 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.

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. 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).

Projected Impacts to Aquatic Species and Habitat

Considering the overall effects of each alternative, regardless of the differences on each forest, the 2001 rule and Alternative 4 are similar in offering the greatest level of protection of threatened or endangered species (TES) and MIS aquatic species and would generally have the least potential for adverse effects on aquatic species and habitat in roadless areas compared to the more intensively managed lands outside roadless areas. The final rule provides less protection and greater potential for adverse future impacts due to reduced "upper tier" protection and greater amounts of projected tree cutting, though effects are expected to be limited. The greatest potential for adverse effects and least protection of TES and MIS aquatic species in roadless areas occurs under forest plans.

Activities projected under the final rule as well as the 2001 rule and Alternative 4 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 2001 rule, the final rule and Alternative 4 provide greater protection for cutthroat trout compared to forest plans. While potential for adverse effects may be similar for the final rule and Alternative 4, a portion of upper tier acres under Alternative 4 are within many watersheds occupied by TES fish, implying potential improvements in protection relative to the final rule. However, benefits from protection may be offset in part by prohibitions of tree cutting for habitat improvements under the final rule and Alternative 4. A potential beneficial effect of the final rule and forest plans could be associated with the increased amount of fuel reduction treatment acres, which could reduce wildfire severity in roadless areas, resulting in beneficial effects on aquatic habitat and species.

The greatest concern for potential impacts to aquatic species and habitat could occur 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 forest plans, slightly less under the final 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.

Terrestrial Wildlife

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.

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) and 39 sensitive terrestrial animal species (birds, mammals, amphibians, and insects) known or likely to occur in the analysis area. There are also 36 terrestrial MIS animal species represented for the NFs in Colorado excluding those selected for national grassland ecosystems. All 36 MIS are likely to occur in at least one roadless area and therefore are relevant to this analysis. Roadless areas provide important habitats for wild ungulates (elk, deer, bighorn sheep, mountain goats), and black bear and mountain lion.

Projected Impacts to Terrestrial Species

For terrestrial wildlife, six T&E species, 39 sensitive species, and 36 MIS are known or likely to occur in roadless areas in Colorado. Under the 2001 rule, the final rule, and Alternative 4, roughly 4.2 million acres would be managed to maintain roadless characteristics, which would benefit a wide range of wildlife species. The 2001 rule would afford terrestrial species and habitats the most protection because it is most restrictive with respect to road construction or reconstruction in the roadless areas that could be detrimental to T&E, sensitive, MIS, migratory bird species, and big game. On the other hand, about 11% of the IRA acreage actually contains existing roads and developments (referred to as “substantially altered” areas), and the updated inventory of Colorado Roadless Areas under The final rule and Alternative 4 better meets the intent of roadless area conservation and will provide a higher quality portfolio of wildlife habitat within roadless areas.

There is no prohibition on construction and maintenance of linear construction zones (LCZs) under the 2001 rule and forest plans, making these alternatives less protective of terrestrial wildlife in this respect than the final rule or Alternative 4. The final rule offers more exceptions and exemptions allowing road construction, tree cutting, and oil and gas and coal development in roadless areas, and removing roadless protections from areas adjoining certain ski areas than the 2001 rule and Alternative 4, which could have adverse effects on terrestrial wildlife, but the generally low projected levels and intensity of development would be expected to have only minor, short term negative impacts. The increased opportunity for tree cutting allowed under the final rule could improve terrestrial habitats, and reduce the potential for uncharacteristically severe stand-replacing wildfire that could adversely impact terrestrial species and habitats, especially when combined with prescribed fire. Forest plans would have the highest potential for

adverse impacts to terrestrial species and habitats because the majority of roadless area acres are in management area allocations that have fewer restrictions on road construction including development of permanent roads, tree cutting, and oil and gas and coal development. The increased upper tier acres under Alternative 4 would reduce the risks of adverse effects compared to the final rule. Site specific design criteria and mitigation measures are expected to minimize the risk of adverse effects on terrestrial wildlife under all alternatives. Detrimental effects from an expected increase in invasive plants, animals, and pathogens would be of greater risk under the final rule and forest plan than the other two alternatives.

In general, for all alternatives, activities may affect but are not likely to adversely affect federally-listed species or designated critical habitats, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. Given the large acreage afforded roadless protection under the 2001 rule, the final rule, and Alternative 4, any changes in population trends for MIS would likely be an increase above current Forest Plan projections. Under all alternatives, any potential adverse effects to terrestrial species are expected to be either avoided or minimized through site-specific analysis and project design.

Diversity of Plant and Animal Communities

Based on current literature (see the terrestrial habitat and species section in chapter 3 of the FEIS (USDA Forest Service, 2011), 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, the final rule, and Alternative 4 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.

Relative increases in projected road construction and tree cutting activities in roadless areas under the final rule and Alternative 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.

Potential Impacts to Plant and Animal Diversity

The value of roadless areas in conserving terrestrial and aquatic wildlife as well as the diversity of plant and animal communites in general, 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 secure habitat and biological strongholds as well as providing habitat connectivity. These types of benefits would be similar for the final rule, Alternative 4, and the 2001 rule but would be realized to a lesser degree under forest plans. Forest plans, because of fewer restrictions, would probably pose a higher risk of negatively affecting fish and wildlife populations, habitats, and plant and animal diversity. 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. Increasing opportunities for tree cutting under Alternative 4, the final rule, and forest plans to address hazardous fuels and ecosystem restoration may have beneficial effects on plant and animal diversity through protection of species that inhabit forest ecosystems with high-frequency, low intensity fire regimes. Prescribed burning will continue to be the primary tool used for habitat enhancement under all alternatives. 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 forest plans.

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.

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. Numerous natural mechanisms also spread invasive plants, including wildlife, wind, and flowing water.

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.

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, as a function of projected road construction and oil and gas development, would remain relatively low under the final rule and Alternative 4, with the greatest relative risk under forest plans. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would still be relatively low under forest plans.

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.

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.

The effects on developed recreation opportunities in roadless areas do not substantially differ among the alternatives being evaluated in this document.

Developed sites may be built adjacent to roadless areas in order to facilitate specific demands for recreation activities within the area. However, aside from trail construction (motorized and non-motorized), developed recreation sites would generally not be constructed within roadless areas under the 2001 rule, the final rule, or Alternative 4. Under these alternatives, developed recreation sites could be developed in the analysis area acreage that is not within the roadless area boundaries for those alternatives, depending on forest plan direction. Under a forest plan there would potentially be additional opportunities for future development of recreational sites or facilities within IRAs in accordance with forest plan direction. Projected road construction for recreation purposes under forest plans is negligible to minimal based on projected road construction for developed recreation of only 0.4 miles per year under forest plans (the least restrictive Alternative regarding road construction); see Chapter 3 of the FEIS (USDA Forest Service, 2011) for details about road construction projections for various purposes.

Roads projected to be constructed in a roadless area for the foreseeable uses identified for each alternative would not be expected to remain open for public vehicle travel (see Analysis Framework). Therefore, there would be no measurable increase in motorized road access for recreation opportunities within roadless areas under any alternative.

Dispersed Recreation

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

The 2001 rule would retain a high proportion of IRA acres in a primitive or semi-primitive setting. 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. Newly identified roadless areas not protected under the 2001 rule could shift to less primitive settings in the event of road construction or tree cutting.

The final rule would retain a high proportion of the CRA acres in a primitive or semi-primitive setting, although there would be more CRA acres with roads and energy activities than under Alternative 1. 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 final 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 forest plans 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. However, under forest plans (as well as the other alternatives), new roads or tree cutting activities would be projected to occur on only a small percentage of the existing roadless area acreage. 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.

Alternative 4 is likely to retain the greatest proportion of CRA acreage in primitive/semi-primitive settings given slight reductions in construction and tree cutting activity under Alternative 4 (compared to the final rule) and larger percentages of CRAs in upper tier. 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.

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 final rule, 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 forest plans, recreation use authorizations could include activities facilitated by new roads in IRAs or CRAs, however, as noted in the “Recreation” section above, minimal road construction is projected for the purposes of recreation under any of the alternatives.

The agency has also prepared an assessment of small entity impacts (“Opportunities for Small Entities (Revised)”) (USDA Forest Service, 2011b) 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 final 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 final rule. 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 FEIS (USDA Forest Service, 2011) 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 the 2001 rule, alternative 4, the final rule and forest plans respectively, as a result of increasing activity projections; however, the risk of adverse effects from uncharacteristic wildfire is lowest under forest plans. 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 final 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

Greenhouse Gas Emissions

Future activities or actions will undergo additional NEPA analysis. Any future activities or actions related to the alternatives and baseline conditions are uncertain at best and therefore emission inventories for GHGs are too speculative for estimation or quantification.

The 2001 rule would likely release the least amount of greenhouse gas emissions associated with coal mining, because this alternative does not recognize road construction exceptions for the North Fork Coal Mining Area. Tree cutting is restricted and would be further limited because of the costs of doing this work without roads. This alternative could result in highest emissions from wildfire since fuel treatments would be limited and fire suppression would be restricted with fewer projected roads.

The final rule would likely release more emissions from tree cutting, coal mining, and prescribed fire than the 2001 rule. The North Fork Coal Mining Area is the same for the final rule and Alternative 4, so emissions from coal are not expected to differ between these two alternatives. Wildfire emissions would likely be less under Alternative 4 compared to the 2001 rule, but more than the other alternatives.

Forest plans would likely release the highest emissions associated with tree cutting, coal mining, prescribed burning, and oil and gas development. However, this alternative would provide the most access and flexibility to treat fuels and suppress wildfire. Therefore, emissions associated with wildfires would likely be least under forest plans.

Adaptation to Climate Change

Projected impacts of climate change on forests are variable over space and time. Specific changes in temperature and precipitation regimes, as well as severity and frequency of storms and fires will influence vegetative structure and composition. These changes to forests and grasslands will not only determine the types of fish and wildlife habitat, but could also influence invasive species, recreational opportunities, and the continued provision for Colorado's National Forests to serve as the headwaters for western states.

Active management includes adaptive responses as additional information on forest vegetation is accumulated and monitoring results of actual management effects are evaluated. Active (adaptive) management strategies would generally promote management intervention to mitigate

climate change effects and proactively participate with evolutionary processes through management.

Passive management includes reserve networks that generally promote natural processes. As they relate to carbon storage and climate change, these strategies would include permitting plant communities and their species to be allowed to adapt to the changing circumstances, relying on evolutionary processes to control re-assemblage of species and genotypes within species, with the new climatic conditions presented.

The 2001 rule and Alternative 4 align closely to the passive management strategy, offering more restrictive management on all, or a majority of the roadless inventory. Current forest plan directionaligns closely with the active management philosophy and affords more management options for climate change adaptation. The final rule is a hybrid alternative, offering strict passive management strategies for the upper tier, as well as some active management options within the community protection zone, and beyond in some cases (tree cutting for ecosystem composition and structure, etc).

Carbon Storage and Cumulative Effects

It is reasonably foreseeable that global climate change would have potential effects on fire frequency and severity and forest insect and disease relationships. This increased fire activity could lead to increased emissions of carbon dioxide and other greenhouse gases from wildfires, and possibly to decreased stored carbon in western forests and rangelands.

Stored carbon in the roadless areas in Colorado can be expected to fluctuate over time due to timber harvesting, fires, and mortality from insects and disease. These fluctuations would be expected to be similar in all alternatives.

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 final 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 FEIS (USDA Forest Service, 2011) for details about treatment methods). Much of the road construction under the final 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 FEIS).

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 exceeded funding levels for at least the past couple of decades[14]. 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 decreased over the last 10 years as miles of roads decommissioned exceed 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

[14] 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.

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.

Under the final 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. Roads are often necessary to make treatments economically feasible. Compared to the 2001 rule, the final 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[15]. 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 final rule, treating 5,970 acres per year in CRAs 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 5,970 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 the final rule, 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 the final rule, decreasing to about 2 to 3 percent under the 2001 rule and Alternative 4.

Under forest plans, 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 17,380 acres of hazardous fuels treatments are projected for the analysis area (i.e., combined CRA and IRA areas) under forest plans, approximately 27 percent of annual fuel treatments (17,380 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 final rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs. Under forest plans, 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

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

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

The potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would remain low under the final rule and Alternative 4, and relatively low under forest plans 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 FEIS (USDA Forest Service, 2011), 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 this 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 oil, natural gas and coal vary by alternative. For oil and 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 economic specialist report (USDA Forest Service, 2011a).

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 9 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 9. Comparison of the energy roadless model area with other roadless model areas (2009)

	Output		Employment		Labor income	
Model Area	($ millions)	(percent)	(jobs)	(percent)	($ millions)	(percent)
Energy Roadless	20,877	5%	146,540	5%	6,747	4%
Rural Roadless	31,836	8%	262,780	9%	10,953	7%
Front Range Metro	349,800	85%	2,319,700	83%	129,716	86%
Eastern Plains	9,790	2%	72,160	3%	2,585	2%
Colorado	412,303	100%	2,801,180	100%	150,001	100%

Source: MIG, Inc. 2011 & Colorado Department of Local Affairs, Division of Local Government, State Demography Office 2011.

Table 10 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 10. Comparison of the mineral industry in roadless model areas (2009)

Model area	Output		Employment		Labor income	
	($ millions)	(percent)	(jobs)	(percent)	($ millions)	(percent)
Energy Roadless	5,152	41%	7,800	28%	656	25%
Rural Roadless	2,986	24%	3,190	12%	287	11%
Front Range Metro	3,960	32%	15,640	57%	1,568	61%
Eastern Plains	424	3%	1,020	4%	80	3%
Colorado	12,521	100%	27,650	100%	2,591	100%

Source: MIG Inc. 2011 & Colorado Department of Local Affairs, Division of Local Government, State Demography Office 2011.

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 11 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 11. Output, employment, and labor income in the energy roadless model area (2009)

Industry	Output	Employment	Labor income
	($ million)	(jobs)	($ millions)
Agriculture	558	4,550	114
Mining	5,152	7,800	656
Utilities	472	790	78
Construction	1,974	15,400	817
Manufacturing	1,521	4,990	248
Transportation & Warehousing	673	4,920	257
Trade	1,684	21,330	803
Finance, insurance, & real estate	3,109	11,180	530
Professional services	705	7,500	371
Administrative & waste services	608	6,770	275
Educational, health, & social services	1,390	16,510	742
Arts, entertainment, & recreation	137	2,550	53
Accommodation & food services	704	11,330	250
Other services	600	8,990	330
Government	1,590	21,930	1,223
Totals	20,877	146,540	6,747

Source: MIG Inc. 2011 & Colorado Department of Local Affairs, Division of Local Government, State Demography Office 2011.

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. Just over half of Colorado coal is shipped by rail to 24 states in the U.S. Most of this is exported to the South and Midwest where it is used in electricity generation. Forty-five percent of Colorado coal is used in-state, primarily for electricity generation (Colorado Department of Natural Resources, 2011). In 2009, coal from North Fork Valley mines accounted for 41 percent of all coal production in Colorado and 1.1 percent in the United States (U.S. Department of Energy [USDOE], Energy Information Administration 2010; Colorado Department of Natural Resources, Divison of Reclamation, Mining, and Safety 2010). 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; Dean Runyan Associates, Inc., 2010).

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

Table 12. Output, employment, and labor income in the rural roadless model area (2009)

Industry	Output ($ millions)	Employment (jobs)	Labor income ($ millions)
Agriculture	696	9,700	189
Mining	2,986	3,190	287
Utilities	783	1,440	144
Construction	3,166	26,220	1,251
Manufacturing	1,300	4,100	186
Transportation & Warehousing	601	4,620	219
Trade	2,352	31,390	1,124
Finance, insurance, & real estate	7,578	23,650	1,107
Professional services	1,402	14,630	722
Administrative & waste services	982	10,680	458
Educational, health, & social services	1,867	21,770	960
Arts, entertainment, & recreation	1,100	15,370	442
Accommodation & food services	2,750	35,290	999
Other services	1,322	17,050	664
Government	2,949	43,680	2,201
Totals	31,836	262,780	10,953

Source: MIG Inc. 2011 & Colorado Department of Local Affairs, Division of Local Government, State Demography Office 2011.

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 13 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 13 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 13. 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 13 (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 14. 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 the final rule and Alternative 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 develop 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: 44.6 wells/yr, 35 billion cubic feet gas/year (bcfg/year), and 8.5 million tons/year coal for the 2001 rule ; 44.6 wells/yr, 35 bcfg/year, and 9.9 million tons/year coal for the final rule and Alternative 4; and 50.4 wells/yr, 38.6 bcfg/year, and 9.9 million tons/year coal for forest plan directions. Annual gas production are therefore equal for the 2001 rule, the final rule and Alternative 4, and annual coal production is equal for the final rule, forst plans, and Alternative 4, and. Oil production is included in the impact analysis but is relatively inconsequential or negligible (production ranges from 1,750 (the final rule and Alternative 4, and) to 4,200 (forest plans) 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 forest plans, 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 35 bcfg/yr for the 2001 rule, the final rule and Alternative 4, and (i.e., 1,049 bcfg from the Piceance Basin under the White River and GMUG divided by 30 years) and slightly greater for forest plans at approximately 38.6 bcfg/yr (i.e., 1,157 bcfg from the Piceance Basin under the White River and GMUG divided by 30 years). Annual oil production is similarly estimated to be 1,750 (for the 2001 rule, the final rule and Alternative 4) and 4,200 (forest plans) barrels per year. The value of gas and oil production is

estimated by multiplying production by 2009 prices ($3.61/mcf or $3.61 million/bcfg and $53.62/bo) provided by the Energy Information Administration (Department of Energy [DOE], 2011) and Colorado Oil and Gas Conservation Commission, Composite Oil Index Price (Department of Natural Resources, 2011) for 2009. Prices from 2009 are consistent with the economic impact model used to create job and income multipliers which is based on 2009 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.

The accessible coal reserves that vary by alternative and are discussed in the Energy Minerals section of the FEIS (USDA Forest Service, 2011) are gross totals of potentially recoverable reserves requiring roads within roadless areas, estimated to range from 157 million tons under the 2001 rule (2001 Rule), to 504 million tons under the final rule and Alternative 4, to 715 million tons under forest plan directio. 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 FEIS.

- The analytical approach used for the FEIS employed updated and more extensive information than the approach used for the either the DEIS and RDEIS. Estimated recoverable reserves, recent mining production rates, estimates of current reserves under lease, and publicly expressed interests of mining companies are all used to estimate average annual production over the next 15 years for each alternative. Key assumptions are: Current coal production levels for each mine will continue until leased reserves are exhausted. Based on remaining mine lives provided either by corporate or BLM sources the Bowie mine will cease operations about 2015, Elk Creek mine about 2017, and West Elk mine about 2021.
- Unleased reserves available under each alternative would then be acquired and mined upon completion of the leasing and permitting processes.
- Consistent with recent history, no more than three mines would operate in the valley, each recovering up to 5 million tons per year.
- Oxbow Mining, LLC (Elk Creek Mine) has publicly announced plans to pursue coal under BLM and private lands, thereby shifting their operations from under National Forest System lands once current reserves under lease are exhausted. Thus, Oxbow Mining, LLC would remain in the valley, but their future operations are not included in effects.

Applying these assumptions, yields the following scenario for estimating economic impacts beyond current leased operations:

- The 2001 rule would have an additonal 5 years of operations at one mine, ending in 2026.
- The final rule and Alternative 4 would have an additonal 39 years of operations at two mines, ending in 2060.
- Forest plans would have an additional 60 years of operations at two mines, ending in 2081.

Average annual coal production during the 15-year analysis period is estimated to be 8.5 million tons per year under the 2001 rule and 9.9 million tons per year under the final rule, Alternative 4, and forest plans; these production rates are multiplied by $36.71/ton (2009$)[16] to estimate output value which is used to estimate economic impacts (see Table 14).

Tables 14 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 income paid by the companies directly and indirectly affected by extraction and well drilling activities.

Forest plans has the largest total effects on output, employment, and labor income contributions associated with oil, gas, and coal related activities. The final rule and Alternative 4 has the next largest effects. Compared with forest plans, average production levels would be lower by about 4 percent annually, and average employment would be lower by about 3 percent annually, and average income would be lower by about 2 percent annually. The 2001 rule has the smallest effects. Compared with forest plans, average production, employment, and labor income would all be lower by 13 percent annually over the 15 year analysis period.

Coal would provide about three-fourths of mineral-related employment and labor income under all alternatives. Coal would also provide about 60 percent of the production value under all alternatives.

Economic impacts displayed in Table 14 are generally smaller than those presented in the RDEIS. These changes are the result of substantially different economic conditions and updated data sources. The recession year of 2009 saw considerable changes in the price of natural gas (down) and coal (up) compared with 2006. Price changes alone profoundly affected estimates of production value, especially for natural gas. Revisions of worker productivity and compensation rates have reduced employment and income generally, but with notable consequences in natural gas extraction. A fully updated set of coal mine lives and development assumptions altered the direct effects of coal employment. New estimates of goods and services purchased locally by both businesses and households have substantially diminished indirect and induced effects across all mineral activity. When the impacts of drilling, oil and gas extraction, and coal mining are summed, the net change from the RDEIS exhibits two patterns. For The final rule, forest plans,

[16] Price of Colorado coal from US Department of Energy, Energy Information Administration. Annual Coal Report 2009 (Table 30). Prices from 2009 are consistent with the economic impact model used to create the job and income multipliers based on 2009 data, as noted in the economic section in Chapter 3 of the FEIS.

and Alternative 4 total aggregate production values for coal, oil, and gas are reduced by 22 percent, employment by 15 percent, and labor income by 10 percent in the FEIS compared to the RDEIS. Updates to the coal scenario, as discussed above, are largely responsible for a different pattern of net changes under the 2001 rule in the FEIS. Compared with the RDIES, the 2001 rule shows a total production value increase of 9 percent, employment increase by 33 percent, and labor income increase by 45 percent for coal, oil, and gas in aggregate in the FEIS.

Table 14. Average annual economic impacts by alternative for energy mineral activity in the energy roadless model area, 2012-2026 (2009 dollars)

	Value of Production ($ millions)			Employment (jobs)			Labor Income ($ millions)		
Activity/Effects	2001 rule	Final rule & Alt 4	Forest plans	2001 rule	final rule & Alt 4	Forest plans	2001 rule	Final rule & Alt 4	Forest plans
Oil & Gas Drilling									
Direct	107.0	107.0	121.0	164	164	185	12.6	12.6	14.2
Indirect	16.3	16.3	18.4	113	113	127	6.0	6.0	6.8
Induced	9.8	9.8	11.1	91	91	103	3.3	3.3	3.7
Total	133.1	133.1	150.4	367	367	415	21.9	21.9	24.7
Oil & Gas Production									
Direct	126.3	126.3	139.5	46	46	51	5.5	5.5	6.1
Indirect	15.6	15.6	17.2	102	102	113	5.7	5.7	6.3
Induced	5.5	5.5	6.1	52	52	57	1.8	1.8	2.0
Total	147.5	147.5	162.8	200	200	221	13.1	13.1	14.4
Coal Production									
Direct	312.9	362.3	362.3	752	871	871	78.4	90.8	90.8
Indirect	54.6	63.2	63.2	318	368	368	17.8	20.6	20.6
Induced	46.5	53.9	53.9	433	502	502	15.6	18.0	18.0
Total	414.1	479.3	479.3	1,504	1,741	1,741	111.8	129.4	129.4
Total Energy Minerals									
Direct	546.3	595.6	622.7	962	1080	1106	96.5	108.9	111.1
Indirect	86.5	95.1	98.8	533	583	609	29.5	32.3	33.7
Induced	61.9	69.2	71.1	576	644	661	20.7	23.1	23.7
Total	694.6	759.9	792.6	2,071	2,308	2,376	146.7	164.3	168.5

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 oil and gas leases; royalties of 8 percent are paid on production value from Federal coal leases for underground mines. 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.

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.

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 economic specialist report (USDA Forest Service, 2011a)). Payments are estimated for Delta, Garfield, Gunnison, Mesa, 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[17]. The timing and magnitude of actual revenues will be dependent upon factors such as market prices, tax laws, regulatory constraints, and availability of equipment and personnel. Tax receipts are based on production only. Personal and other real property may vary by alternative, but estimates for these could not be made.

As shown in Tables 15-17, revenue effects from oil and gas range from $13.1 million in the 2001 rule, the final rule, and Alternative 4 to $14.5 million in forest plans. Colorado's share of Federal mineral lease royalties are about three times larger than either severance or property tax receipts in all alternatives. Generally, property tax revenues account for the largest share of local government receipts when production occurs in the county. Other counties across Colorado share severance tax receipts and Federal mineral lease royalties through allocations directed by Colorado statute and executed by the Colorado Department of Local Affairs. Mesa County is projected to have the largest number of wells and natural gas production, and thus garners the largest share of local government revenues.

Revenue effects from coal range from $15.7 million under the 2001 rule to $18.1 million under

[17] 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.

the final rule, forest plans, and Alternative 4. Colorado's share of Federal mineral lease royalties for coal are generally five times larger than severance tax receipts and eleven times larger than property tax receipts in all alternatives. Generally, property tax revenues account for the largest share of local government receipts when production occurs in the county. Other counties across Colorado share severance tax receipts and Federal mineral lease royalties through allocations directed by Colorado statute and executed by the Colorado Department of Local Affairs. Gunnison County contains the vast majority of coal reserves, and therefore is projected to garner the largest share of local government revenues.

Aggregate revenue effects for the combination of coal, oil, and gas are estimated to be $28.8 million per year for the 2001 rule, $31.2 million per year for the final rule and Alternative 4, and $32.6 million per year under forest plans.

Among 64 counties in the state of Colorado, 36 counties (56%) are considered to be small governments (population less than 50,000). These 36 counties are considered to be small rural counties having NFS lands within roadless areas. Six counties are energy (coal, oil and gas) producing counties. These six counties (Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin) are expected to be the counties most likely to benefit from mineral lease payments and revenue sharing under the proposed rule (as well as Alternative 4), and Alternative 3. Changes in mineral lease payments would be minimal in Montrose County. The aggregate payments associated with property taxes, severance tax distributions, and federal royalty payment distributions from coal, oil and gas are estimated to be $5.9 million per year for the 2001 rule, $6.2 million per year for the final rule and Alternative 4, and $6.6 million per year for forest plans.

All of the energy area counties, with the exception of Mesa can be considered small governments (population less than 50,000). The small population counties within the energy impact area (i.e., Delta, Garfield, Gunnison, and Pitkin), are forecast to receive increases in aggregate payments associated with property tax receipts, severance tax distributions, and federal royalty distributions from coal, and oil and gas production under the final rule relative to the 2001 Roadless Rule. There are slight decreases in aggregate payments to the small population counties under the final rule, relative to Alternative 3 (aggregate payments decrease from $4.9 million to $4.7 million per year).

For the four small population counties (i.e., Delta, Garfield, Gunnison, and Pitkin), increases in total payments and taxes received from oil, gas, and coal under the final rule (and Alternative 4) compared to the 2001 rule baseline conditions range from no change to an increase of $200,000 per year per county, or an increase of 0% to 9% of baseline payments and taxes per county. Decreases in total payments and taxes per county under the final rule (and Alternative 4) compared to the forest plans range from $27,000 to $66,000 per year (3% to 11% decrease).

Impacts on revenues for state and local governments are smaller than the RDEIS. Reasons for the change follow those noted above for economic impacts.

Table 15. The 2001 Rule – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2012-2026 (thousands of 2009 dollars)

Description	Energy-Affected Counties					All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Pitkin		
O&G Production Value	$3,338	$11,817	$41,562	$46,743	$22,863	$0	$126,324
Local property tax receipts (production only)	$100	$311	$1,086	$1,009	$392	$0	***$2,898***
State severance tax receipts							***$2,526***
Federal mineral lease royalties							
Retained by U.S.							$8,053
Paid to Colorado							***$7,737***
*State distribution of severance tax & Federal royalties**							
Public schools							$3,869
State trust, water, & grant funds							$4,469
Direct distribution to counties/cities/towns	$109	$341	$98	$189	$0	$1,189	$1,926
Total payments & tax receipts from oil & gas	$209	$652	$1,183	$1,197	$392	$1,189	***$13,161***
Coal Production Value	$47,723	$0	$264,312	$0	$0	$0	$312,035
Local property tax receipts (production only)	$150	$0	$1,003	$0	$0	$0	***$1,153***
State severance tax receipts							***$2,295***
Federal mineral lease royalties							
Retained by U.S.							$12,731
Paid to Colorado							***$12,232***
*State distribution of severance tax & Federal royalties**							
Public schools							$9,422
State trust, water, & grant funds							$10,635
Direct distribution to counties/cities/towns	$164	$500	$143	$266	$0	$1,717	$2,791
Total payments & taxes from coal	$314	$500	$1,146	$266	$0	$1,717	***$15,679***
Aggregate payments to energy counties	***$523***	***$1,152***	***$2,329***	***$1,463***	***$392***		***$5,859***

Table 16. The Final Rule and Alternative 4 – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2012-2026 (thousands of 2009 dollars)

Description	Energy-Affected Counties					All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Pitkin		
O&G Production Value	$3,338	$11,817	$41,562	$46,743	$22,863	$0	$126,324
Local property tax receipts (production only)	$100	$311	$1,086	$1,009	$392	$0	***$2,898***
State severance tax receipts							***$2,526***
Federal mineral lease royalties							
Retained by U.S.							$8,053
Paid to Colorado							***$7,737***
*State distribution of severance tax & Federal royalties**							
Public schools							$3,869
State trust, water, & grant funds							$4,469
Direct distribution to counties/cities/towns	$109	$341	$98	$189	$0	$1,189	$1,926
Total payments & tax receipts from oil & gas	$209	$652	$1,183	$1,197	$392	$1,189	***$13,161***
Coal Production Value	$47,723	$0	$312,035	$0	$0	$0	$359,758
Local property tax receipts (production only)	$150	$0	$1,184	$0	$0	$0	***$1,334***
State severance tax receipts							***$2,646***
Federal mineral lease royalties							
Retained by U.S.							$14,678
Paid to Colorado							***$14,103***
*State distribution of severance tax & Federal royalties**							
Public schools							$7,051
State trust, water, & grant funds							$6,480
Direct distribution to counties/cities/towns	$190	$577	$164	$307	$0	$1,976	$3,217
Total payments & tax receipts from coal	$340	$577	$1,348	$307	$0	$1,976	***$18,082***
Aggregate payments to energy counties	***$549***	***$1,229***	***$2,531***	***$1,504***	***$392***		***$6,205***

Table 17. Forest Plans – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2012-2026 (thousands of 2009 dollars)

Description	Energy-Affected Counties					All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Pitkin		
O&G Production Value	$3,855	$13,345	$43,671	$52,792	$25,812	$0	$139,475
Local property tax receipts (production only)	$116	$351	$1,141	$1,139	$442	$0	***$3,190***
State severance tax receipts							***$2,789***
Federal mineral lease royalties							
Retained by U.S.							$8,892
Paid to Colorado							***$8,543***
*State distribution of severance tax & Federal royalties**							
Public schools							$4,271
State trust, water, & grant funds							$4,934
Direct distribution to counties/cities/towns	$120	$377	$108	$208	$0	$1,314	$2,127
Total payments & tax receipts from oil & gas	$236	$728	$1,249	$1,348	$442	$1,314	***$14,522***
Coal Production Value	$47,723	$0	$312,035	$0	$0	$0	$359,758
Local property tax receipts (production only)	$150	$0	$1,184	$0	$0	$0	***$1,334***
State severance tax receipts							***$2,646***
Federal mineral lease royalties							
Retained by U.S.							$14,678
Paid to Colorado							***$14,103***
*State distribution of severance tax & Federal royalties**							
Public schools							$7,051
State trust, water, & grant funds							$6,480
Direct distribution to counties/cities/towns	$190	$577	$164	$307	$0	$1,976	$3,217
Total payments & tax receipts from coal	$340	$577	$1,348	$307	$0	$1,976	***$18,082***
Aggregate payments to energy counties	***$576***	***$1,305***	***$2,597***	***$1,655***	***$442***		***$6,575***

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[18]. 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.

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

[18] 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.

be to reduce the risk of losses from wildfire in nearby at-risk communities. The likelihood ranged from “none” to “low” to “high”. Table 18 shows the CPZ land area, by county, that overlaps with roadless areas (i.e., CRAs and/or IRAs) where likelihood of treatmentsare 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 18 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 The final rule and forest plans. 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 13 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 the 2001 rule, 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 and Larimer. 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 Larimer, La Plata, Park, and Douglas.

Table 19 provides a comparison of potential treatment acres between each alternative and forest plans. This table shows more clearly that there are few differences between the final rule and forst plans with only two counties showing a decrease and two counties showing an increase in potential under the final rule. It also shows clearly a reduction in overlap with areas of low to high potential treatment acres under the 2001 rule and Alternative 4, compared to forest plans. Thirteen counties would have a lower potential of treatment under the 2001 rule, while 16 counties would have a lower potential of treatment under Alternative 4, compared to forest plans. Based on Table 13, Park County has 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 the 2001 rule. No county is likely to have an increase in overlap under the 2001 rule. Dolores and Montezuma Counties could have an increase in overlap under Alternative 4, mostly with lower potential for treatment. As with the 2001 rule, Park County has both a high tax dependence on properties in the urban interface and faces the large reduction of acres with potential for treatment.

Table 19a provides a comparison of potential treatment acres under the final rule and Alternative 4 with the 2001 rule. This table shows clearly that there are more potential treatment acres under the final rule, but fewer under Alternative 4. Under the final rule, 13 counties have increased potential for treatments, and one county has lower potential, compared to the 2001 rule. There are substantially more acres with some potential than high potential under the final rule, especially in Park, Custer, Eagle, and Pitkin Counties. Park and Custer Counties have the greatest number of high potential acres. Grand County has fewer acres with treatment potential

under the final rule compared with the 2001 rule. Under Alternative 4, six counties have lower potential for treatments compared with the 2001 rule, most notably La Plata and Archuleta Counties. Thirteen counties have greater potential for treatment, especially Park and Pitkin Counties. Based on Table 13, Eagle, Park, and Pitkin Counties all have high tax dependence on properties in the urban interface and may also have higher potential treatment acres compared with the 2001 rule. Grand County also has high tax dependence, but would have fewer acres of potential treatment.

Tables 20, 21, and 21a provide another context for understanding potential treatment acres. 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 The final rule and forest plans in IRAs or CRAs may be especially important for La Plata, Custer, Huerfano, Pueblo, and Fremont Counties. Acres with a high likelihood of treatment range from about 15% to 30% 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 the 2001 rule, Archuleta and La Plata Counties 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 21 shows the difference in shares of CPZ acres when comparing each alternative to forest plans. This table clearly shows that there are very small differences between the final rule and forest plans when considering the share of all NFS acres available for fuel treatment in the CPZ. The 2001 rule and Alternative 4, on the other hand, are lower compared with forest plan in the proportion of NFS acres available for fuel treatment in the CPZ. Compared with forest plans, 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 21a shows the difference in shares of CPZ acres when comparing the final rule and Alternative s 4 with the 2001 rule. This table clearly shows that the final rule has a net increase in potential treatment acres as a share of all NFS acres in the CPZ. This is especially true for Pueblo, Custer, Fremont, and Huerfano Counties. Alternative 4 is a mix of larger and smaller shares of CPZ acres with potential treatment compared with the 2001 rule. La Plata County would have the largest reduction in the share of CPZ acres, while Fremont and Custer Counties would have the largest increase. Overall, a slightly smaller share of CPZ acres would have potential for treatment under Alternative 4 resulting in a very modest reduction in the role of IRAs and CRAs to protect communities from wildfire losses compared with the 2001 rule.

Table 18. Potential Fuel Treatment Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities, by County (1)

County	The 2001 rule				The final rule				Forest Plans				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	2,785	18,743	2,785	18,743	2,785	18,743	2,785	18,743	2,785	18,743	2,785	18,743	1,493	5,708	1,493	5,708
Boulder	0	5,089	0	3,908	0	5,089	0	3,908	0	5,089	0	3,908	0	5,089	0	3,908
Chaffee	941	3,944	941	3,944	3,700	11,891	3,700	11,891	3,700	11,891	3,700	11,891	410	5,725	410	1,649
Clear Creek	3,049	13,886	0	0	3,049	13,886	0	0	3,049	13,886	0	0	3,049	13,886	0	0
Custer	0	0	0	0	4,301	12,997	4,301	12,997	4,301	12,997	4,301	12,997	2,123	6,540	0	175
Dolores	853	1,911	0	0	853	1,911	0	0	853	1,911	0	0	1,347	1,908	0	0
Douglas	2,449	10,165	2,449	10,165	2,506	11,794	2,506	11,794	2,506	11,794	2,506	11,794	2,506	11,794	2,506	11,794
Eagle	0	0	0	0	13,278	25,332	2,195	5,027	13,278	25,332	0	0	3,528	0	0	0
El Paso	0	0	0	0	0	883	0	883	0	883	0	883	0	883	0	883
Fremont	0	0	0	0	1,092	3,640	1,092	3,640	1,092	3,640	1,092	3,640	1,083	3,593	0	0
Garfield	0	0	0	0	542	2,141	0	0	542	2,141	0	0	0	0	0	0
Grand	2,580	13,975	150	2,820	2,430	11,960	0	805	2,580	13,975	150	2,820	2,430	11,714	0	559
Gunnison	78	1,185	78	1,185	933	2,551	78	1,185	933	2,551	78	1,185	78	1,185	78	1,185
Huerfano	0	0	0	0	1,693	6,550	1,693	6,550	1,693	6,550	1,693	6,550	136	2,560	136	2,560
Jefferson	467	4,425	467	4,425	467	4,425	467	4,425	467	4,425	467	4,425	467	4,425	467	4,425
La Plata	17,633	69,556	16,736	66,727	17,633	69,556	16,736	66,727	17,633	69,556	16,736	66,727	8,323	20,708	8,323	20,708
Lake	256	273	256	273	256	273	256	273	256	273	256	273	256	273	256	273
Larimer	22,492	61,712	14,278	35,539	22,492	61,712	14,278	35,539	22,492	61,712	14,278	35,539	21,016	58,846	14,275	35,534
Mineral	0	471	0	471	0	471	0	471	0	471	0	471	0	0	0	0
Monte-zuma	3,982	22,857	0	0	3,982	22,857	0	0	3,982	22,857	0	0	5,670	22,813	0	0
Park	1,070	5,829	1,070	5,829	8,239	29,683	8,239	29,683	8,239	29,683	8,239	29,683	8,206	25,560	4,239	9,886
Pitkin	0	0	0	0	11,318	36,279	0	0	9,912	33,922	0	0	901	17,618	0	0
Pueblo	0	0	0	0	2,907	9,436	1,605	5,644	2,907	9,436	2,907	9,436	0	269	0	269

Summit	166	1,361	0	0	2,158	8,969	166	1,361	2,158	8,969	166	1,361	1,130	3,079	0	0
Total	58,801	235,382	39,210	154,029	106,614	373,029	60,097	221,546	105,358	372,687	59,354	222,326	64,152	224,176	32,183	99,516

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 2011)

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 2011)

Table 19. Potential Fuel Treatment Acres in the Community Protection Zone within 0.5 and 1.5 miles of At-Risk Communities Compared with Forest plans, Totals by County (1)

County	The 2001 rule vs Forest plans				The final rule vs Forest plans				Alternative 4 vs Forest plans			
	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	0	0	0	0	0	0	0	0	-1,291	-13,035	-1,291	-13,035
Chaffee	-2,760	-7,947	-2,760	-7,947	0	0	0	0	-3,290	-6,166	-3,290	-10,242
Custer	-4,301	-12,997	-4,301	-12,997	0	0	0	0	-2,179	-6,457	-4,301	-12,822
Dolores	0	0	0	0	0	0	0	0	494	-3	0	0
Douglas	-57	-1,629	-57	-1,629	0	0	0	0	0	0	0	0
Eagle	-13,278	-25,332	0	0	0	0	2,195	5,027	-9,750	-25,332	0	0
El Paso	0	-883	0	-883	0	0	0	0	0	0	0	0
Fremont	-1,092	-3,640	-1,092	-3,640	0	0	0	0	-9	-47	-1,092	-3,640
Garfield	-542	-2,141	0	0	0	0	0	0	-542	-2,141	0	0
Grand	0	0	0	0	-150	-2,015	-150	-2,015	-150	-2,261	-150	-2,261
Gunnison	-854	-1,366	0	0	0	0	0	0	-854	-1,366	0	0
Huerfano	-1,693	-6,550	-1,693	-6,550	0	0	0	0	-1,557	-3,990	-1,557	-3,990
La Plata	0	0	0	0	0	0	0	0	-9,309	-48,848	-8,412	-46,019
Larimer	0	0	0	0	0	0	0	0	-1,475	-2,866	-2	-5
Mineral	0	0	0	0	0	0	0	0	0	-471	0	-471
Montezuma	0	0	0	0	0	0	0	0	1,688	-43	0	0
Park	-7,169	-23,853	-7,169	-23,853	0	0	0	0	-33	-4,123	-4,000	-19,797
Pitkin	-9,912	-33,922	0	0	1,406	2,357	0	0	-9,011	-16,304	0	0
Pueblo	-2,907	-9,436	-2,907	-9,436	0	0	-1,302	-3,792	-2,907	-9,167	-2,907	-9,167
Summit	-1,992	-7,607	-166	-1,361	0	0	0	0	-1,028	-5,890	-166	-1,361
Total	-46,557	-137,303	-20,145	-68,296	1,256	342	743	-780	-41,203	-148,510	-27,168	-122,810

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 2011)

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 2011)

Table 19a – Potential Fuel Treatment Acres in the Community Protection Zone where Potential[1] Exists for Fuel Treatment Compared with the 2001 rule by County

County	The final rule vs the 2001 rule				Alternative 4 vs the 2001 rule			
	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
Archuleta	0	0	0	0	-1,291	-13,035	-1,291	-13,035
Chaffee	2,760	7,947	2,760	7,947	-530	1,781	-530	-2,295
Custer	4,301	12,997	4,301	12,997	2,123	6,540	0	175
Dolores	0	0	0	0	494	-3	0	0
Douglas	57	1,629	57	1,629	57	1,629	57	1,629
Eagle	13,278	25,332	2,195	5,027	3,528	0	0	0
El Paso	0	883	0	883	0	883	0	883
Fremont	1,092	3,640	1,092	3,640	1,083	3,593	0	0
Garfield	542	2,141	0	0	0	0	0	0
Grand	-150	-2,015	-150	-2,015	-150	-2,261	-150	-2,261
Gunnison	854	1,366	0	0	0	0	0	0
Huerfano	1,693	6,550	1,693	6,550	136	2,560	136	2,560
La Plata	0	0	0	0	-9,309	-48,848	-8,412	-46,019
Larimer	0	0	0	0	-1,475	-2,866	-2	-5
Mineral	0	0	0	0	0	-471	0	-471
Montezuma	0	0	0	0	1,688	-43	0	0
Park	7,169	23,853	7,169	23,853	7,136	19,730	3,168	4,057
Pitkin	11,318	36,279	0	0	901	17,618	0	0
Pueblo	2,907	9,436	1,605	5,644	0	269	0	269
Summit	1,992	7,607	166	1,361	964	1,717	0	0
Total	47,813	137,645	20,888	67,516	5,355	-11,207	-7,024	-54,513

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 2011)

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 2011)

The 2001 rule and forest plans are compared in Table 16b.

Table 20 - Share of Total NFS Lands in the Community Protection Zone where Potential Exists for Fuel Treatment by County (1)

County	The 2001 rule				The final rule				Forest plans				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%	2.9%	3.7%	2.9%	3.7%
Boulder	-	3.4%	-	2.6%	-	3.4%	-	2.6%	-	3.4%	-	2.6%	-	3.4%	-	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	7.1%	13.9%	-	-	7.1%	13.9%	-	-	7.1%	13.9%	-	-	7.1%	13.9%	-	-
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	7.7%	12.0%	0.4%	2.4%	7.2%	10.3%	-	0.7%	7.7%	12.0%	0.4%	2.4%	7.2%	10.1%	-	0.5%
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%	8.4%	9.3%	13.2%	16.1%	8.4%	9.3%	13.2%	16.1%	8.4%	9.3%	12.3%	15.4%	8.4%	9.3%
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%	-	-	15.2%	19.5%	-	-	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	The 2001 rule				The final rule				Forest plans				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	**3.8%**	**5.9%**	**2.5%**	**3.9%**	**6.9%**	**9.3%**	**3.9%**	**5.5%**	**6.8%**	**9.3%**	**3.8%**	**5.6%**	**4.1%**	**5.6%**	**2.1%**	**2.5%**

[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, 2011)
[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, 2011)

Table 21 - Change in Share of Total NFS Lands in the Community Protection Zone where Potential[1] Exists for Fuel Treatment Compared with Forest plans by County

County	The 2001 rule vs Forest plans				The final rule vs Forest plans				Alternative 4 vs Forest plans			
	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	-	-	-	-	-	-	-	-	-2.5%	-8.5%	-2.5%	-8.5%
Boulder	-5.1%	-4.3%	-5.1%	-4.3%	-	-	-	-	-6.0%	-3.3%	-6.0%	-5.5%
Chaffee	-28.1%	-23.7%	-28.1%	-23.7%	-	-	-	-	-14.2%	-11.8%	-28.1%	-23.4%
Clear Creek	-	-	-	-	-	-	-	-	5.3%	-	-	-
Custer	-0.1%	-1.5%	-0.1%	-1.5%	-	-	-	-	-	-	-	-
Dolores	-13.9%	-1-	-	-	-	-	2.3%	2.0%	-10.2%	-10.0%	-	-
Douglas	-	-1.0%	-	-1.0%	-	-	-	-	-	-	-	-
Eagle	-27.6%	-18.4%	-27.6%	-18.4%	-	-	-	-	-0.2%	-0.2%	-27.6%	-18.4%
El Paso	-7.6%	-6.4%	-	-	-	-	-	-	-7.6%	-6.4%	-	-
Fremont	-	-	-	-	-0.4%	-1.7%	-0.4%	-1.7%	-0.4%	-1.9%	-0.4%	-1.9%
Garfield	-1.0%	-0.5%	-	-	-	-	-	-	-1.0%	-0.5%	-	-
Grand	-17.3%	-20.4%	-17.3%	-20.4%	-	-	-	-	-15.9%	-12.4%	-15.9%	-12.4%
Gunnison	-	-	-	-	-	-	-	-	-8.6%	-21.0%	-7.8%	-19.8%
Huerfano	-	-	-	-	-	-	-	-	-0.9%	-0.7%	-	-
La Plata	-	-	-	-	-	-	-	-	-	-0.4%	-	-0.4%
Lake	-	-	-	-	-	-	-	-	4.3%	-	-	-
Larimer	-4.4%	-6.7%	-4.4%	-6.7%	-	-	-	-	-	-1.2%	-2.5%	-5.6%
Mineral	-15.2%	-19.5%	-	-	2.2%	1.4%	-	-	-13.8%	-9.4%	-	-
Montezuma	-27.2%	-38.4%	-27.2%	-38.4%	-	-	-12.2%	-15.4%	-27.2%	-37.3%	-27.2%	-37.3%
Park	-1.6%	-3.0%	-0.1%	-0.5%	-	-	-	-	-0.8%	-2.3%	-0.1%	-0.5%
Pitkin	-3.0%	-3.4%	-1.3%	-1.7%	0.1%	-	-	-	-2.7%	-3.7%	-1.8%	-3.1%
Pueblo	-	-	-	-	-	-	-	-	-2.5%	-8.5%	-2.5%	-8.5%
Summit	-5.1%	-4.3%	-5.1%	-4.3%	-	-	-	-	-6.0%	-3.3%	-6.0%	-5.5%

County	The 2001 rule vs Forest plans				The final rule vs Forest plans				Alternative 4 vs Forest plans			
	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	**-28.1%**	**-23.7%**	**-28.1%**	**-23.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**-14.2%**	**-11.8%**	**-28.1%**	**-23.4%**

[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, 2011)

[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, 2011)

Table 21a - Change in Share of Total NFS Lands in the Community Protection Zone where Potential[1] Exists for Fuel Treatment Compared with the 2001 rule by County

County	The final rule vs the 2001 rule				Alternative 4 vs the 2001 rule			
	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
Archuleta	-	-	-	-	-2.5%	-8.5%	-2.5%	-8.5%
Chaffee	5.1%	4.3%	5.1%	4.3%	-1.0%	1.0%	-1.0%	-1.2%
Custer	28.1%	23.7%	28.1%	23.7%	13.9%	11.9%	-	0.3%
Dolores	-	-	-	-	5.3%	-	-	-
Douglas	0.1%	1.5%	0.1%	1.5%	0.1%	1.5%	0.1%	1.5%
Eagle	13.9%	10.0%	2.3%	2.0%	3.7%	-	-	-
El Paso	-	1.0%	-	1.0%	-	1.0%	-	1.0%
Fremont	27.6%	18.4%	27.6%	18.4%	27.4%	18.1%	-	-
Garfield	7.6%	6.4%	-	-	-	-	-	-
Grand	-0.4%	-1.7%	-0.4%	-1.7%	-0.4%	-1.9%	-0.4%	-1.9%
Gunnison	1.0%	0.5%	-	-	-	-	-	-
Huerfano	17.3%	20.4%	17.3%	20.4%	1.4%	8.0%	1.4%	8.0%
La Plata	-	-	-	-	-8.6%	-21.0%	-7.8%	-19.8%
Larimer	-	-	-	-	-0.9%	-0.7%	-	-
Mineral	-	-	-	-	-	-0.4%	-	-0.4%
Montezuma	-	-	-	-	4.3%	-	-	-
Park	4.4%	6.7%	4.4%	6.7%	4.4%	5.6%	2.0%	1.1%
Pitkin	17.3%	20.9%	-	-	1.4%	10.2%	-	-
Pueblo	27.2%	38.4%	15.0%	22.9%	-	1.1%	-	1.1%
Summit	1.6%	3.0%	0.1%	0.5%	0.8%	0.7%	-	-
Total	-	-	-	-	-2.5%	-8.5%	-2.5%	-8.5%

[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, 2011)
[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, 2011)

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.

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