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

This report summarizes the regulatory impact analysis for the proposed Colorado Roadless Rule (proposed rule) as directed by Executive Order (E.O.) 12866 issued September 30, 1993, as amended by E.O. 13258 and E.O. 13422 on Regulatory Planning and Review. These executive orders address regulatory planning and review and require that agencies conduct a regulatory analysis for economically significant regulatory actions. Significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors. Office of Management and Budget (OMB) Circulars as well as guidance regarding E.O. 12866 indicate that regulatory impact analysis should include benefit cost analysis and an assessment of distributional effects. Due to the level of interest in inventoried roadless area management, the proposed rule is designated as significant and is therefore subject to E.O. 12866.

The proposed rule is programmatic in nature and intended to guide future development of proposed actions in roadless areas. The proposed rule is intended to provide greater management flexibility under certain circumstances to address unique and local land management challenges, while continuing to conserve roadless values and characteristics. Increased management flexibility is primarily needed to reduce hazardous fuels and large-scale insect and disease outbreaks, to allow access to coal reserves in the North Fork coal mining areas, and to allow access to future utility and water conveyances, while continuing to conserve roadless area values and characteristics. This proposal does not authorize the implementation of any ground-disturbing activities, but rather it describes circumstances under which certain activities may be allowed or restricted in roadless areas. Before authorizing land use activities in roadless areas, the Forest Service must complete a more detailed and site-specific environmental analysis pursuant to the National Environmental Policy Act (NEPA) and its implementing regulations at 40 CFR 1500-1508. Because the proposed rule does not prescribe site-specific activities, it is difficult to predict changes in benefits under the different alternatives. It should also be emphasized that the types of benefits derived from uses of roadless areas in Colorado are far ranging and include a number of non-market and non-use benefit categories. As a consequence, benefits are discussed qualitatively in many sections of this report.

Details about the environmental effects of the proposed rule can be found in the draft environmental impact statement (DEIS) for the proposed rule (USDA Forest Service, 2008), as well as 'specialist' reports developed to support the effects summarized in the DEIS. 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 DEIS for details about these resource areas.

Methods and Assumptions

This report summarizes the benefits, costs, and distributional effects of three alternatives referred to as follows: alternative 1 - the 2001 Roadless Rule (2001 rule), alternative 2 - the proposed rule, and alternative 3 - the land management plans.

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

The State's petition also requested that the rulemaking process use the most updated roadless boundaries and that all existing congressionally designated areas (e.g., wilderness) be removed from roadless areas for all alternatives. In addition, the Colorado roadless areas (CRAs) under the proposed rule exclude ski areas and current inventoried roadless areas that do not meet roadless criteria (referred to as substantially altered areas), but include new roadless acres that meet roadless criteria. As a consequence of these adjustments, inventoried roadless areas (IRAs) under the 2001 rule and the land management plans alternative (IRAs) are approximately 4.25 million acres, while roadless areas under the proposed rule (CRAs) cover approximately 4.03 million acres. The IRAs described in the original environmental analysis for the 2001 rule covered approximately 4.43 million acres.

As of the printing of this proposed rule, the 2001 rule is in operation by court order. For the purpose of regulatory impact analysis, the 2001 rule represents baseline conditions or goods and services provided by NFS lands in the near future in the absence of the proposed rule.

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

The assessment of benefits and costs begins by distinguishing between the *creation of potential opportunities* and the *projection of reasonably foreseeable activities*. Potential opportunities for generating goods and services are affected by the extent to which activities are permitted in roadless areas under each alternative. Projections of reasonable foreseeable activities take into account area-specific data and evidence regarding resource utilization and development trends, location of resources, and other factors affecting the likelihood that land will be used for specific uses. This information is aggregated into assumptions about reasonably foreseeable flows of goods (e.g., coal, oil and gas production), services (e.g., reduction of risks from wildfire in the wildland urban interface), and resource utilization and then used to project activity levels (tree-cutting, roading) for each alternative over a 15 year time period. Projected activity levels are also used to describe potential changes in benefits derived from roadless characteristics. Details about the derivation of activity projections are described in the DEIS for the proposed rule (USDA Forest Service 2008), as well as the resource specialist reports supporting the DEIS, and are not reiterated in this regulatory impact analysis document.

Distributional effects or economic impacts, in terms of jobs and labor income, are quantified for the oil and gas and the coal sectors for an economic area consisting of five Colorado counties (Delta, Garfield, Mesa, Montrose, and Rio Blanco) using a regional impact model. Fiscal impacts (i.e., mineral lease payments) are estimated for counties where changes in mineral activity are expected to be physically located (Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin). The distributional effects associated with reducing wildfire hazard are characterized by estimating the number and values of -at-risk-communities expecting to benefit from fuel treatments in roadless areas. Distributional effects or economic impacts are not evaluated for other economic sectors (e.g., timber harvest, recreation) due to evidence presented in respective resource sections suggesting that the extent or magnitude of changes in output or services are not sufficient to cause significant changes in distributional effects.

Local Resource Challenges

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

Projected levels of treatment involving tree-cutting, are greatest under the land management plans alternative (16,300 acres per year; 244,500 acres over 15 years) followed by the proposed rule (7,600 acres per year; 144,000 acres over 15 years) and the 2001 rule (800 acres per year; 12,000 acres over 15 years). Timber harvest volumes associated with treatments are estimated to be 800 hundred cubic feet (ccf), 6,700 ccf (1,700 ccf on CRAs only), and 24,400 ccf per year for the 2001 rule, the proposed rule and land management plans respectively. When considering the assumption that agency or program budgets will remain flat, average total volume sold from NFS lands may well remain unchanged under all alternatives. Overall, the volume differences across alternatives are not anticipated to result in significant impacts to the wood products and forest service sectors.

Approximately 14 percent (600,000 acres) of roadless areas in Colorado are considered high risk for insect and disease mortality. The percent of roadless areas that are projected to be treated under each alternative over a 15-year period are approximately 2 percent under the 2001 rule, 19

percent under the proposed rule, and 41 percent under the land management plans alternative, some of which would be directed toward reducing insect and disease risk.

Other potential changes to forest or rangeland vegetation in the roadless areas include short-term, localized changes in vegetation composition, structure and function related to increases in roads and tree-cutting activities. Long term, more widespread improvements in forest and rangeland health would be more pronounced under the land management plans alternative and least pronounced under the 2001 rule, with the proposed rule somewhere in between. There would be no expectation that the boundary differences in CRAs under the proposed rule would have a measurable impact on the opportunities to conduct treatments with the exception that a total of 2,400 to 3,000 acres out of the total acres treated, are projected to occur in substantially altered areas (these treatments are also projected under the land management plans alternative).

Fuel reduction treatments on all NFS lands in Colorado average approximately 61,000 acres per year. The 2001 rule provides the lowest probability of conducting hazardous fuel and forest health treatments in roadless areas, and least likelihood of reducing wildfire hazards to communities in and adjacent to roadless areas. Approximately 1 percent of annual fuel treatments on NFS lands in Colorado would occur in roadless areas if the Agency continues to conduct treatments on 61,000 acres per year. Treating 12,000 acres (<1 percent) of the 4.25 million acres in IRAs would not result in a significant reduction in wildfire hazard to many of the more than 600 at-risk communities that lie within the vicinity (3 miles) of an IRA.

The proposed rule and the land management plans alternative both provide flexibility to prioritize where hazardous fuel and forest health treatments would occur in CRAs, and the associated ability to reduce the high-severity wildfire threats to communities and municipal watersheds that lie near the roadless areas. For the proposed rule, hazardous fuel reduction treatments, including tree-cutting and temporary road construction, may occur in CRAs if they are in community wildfire protection plan (CWPP) areas or wildland urban interface (WUI) areas, and are consistent with forest plan direction. Approximately 12 percent of annual treatments on all NFS land in Colorado could occur in CWPP or WUI areas in CRAs. Treating 114,000 acres (3 percent of the 4.031 million acres in CRAs) offers more opportunity for improving fuels and fire management effectiveness and could result in significantly more fuels and fire hazard reduction compared to the 2001 rule. The proposed rule would result in reduced hazard for at-risk communities and other values in proximity to the CRAs. The land management plan alternative offers the greatest opportunity to reduce wildfire threats to values at risk. When compared to the average of 61,000 acres annually treated on all NFS lands in Colorado, the 16,300 acres projected to occur in IRAs could represent 27 percent of the total NFS acres treated annually. Treating 244,000 of the 4.25 million acres in IRAs would result in reducing the fuel hazard on about 6 percent of the total in IRA acreage, offering the greatest opportunity to improve fuels management effectiveness.

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, road roading would be allowed in IRAs on oil and gas leases that were issued (became effective) before January 12, 2001, and those leases allowed for road construction; foreseeable development and production would be limited to 68,400 leased acres on 18 IRAs on the Grand Mesa-Uncompahgre-Gunnison (GMUG), San Juan, and White River NFs (i.e., areas in the Piceance Basin). Under the proposed rule, roading

would be allowed on oil and gas leases that allow surface occupancy and are issued before the proposed Colorado Roadless Rule becomes effective. Forseeable production could occur on about 129,200 acres of leased acres on 19 CRAs on the same forests. Under the land management plans alternative, roading would be allowed on existing and future oil and gas leases where roads are allowed under lease terms and stipulations. Foreseeable production under the land management plans alternative could occur on 219,417 leased acres on 21 IRAs. Based on these conditions, the land management plans alternative would have the most roads, oil and gas wells, and related infrastructure in roadless areas, and therefore opportunity for oil and gas development and foreseeable production (projected 731 wells over a 15 year period with access to 1,023.6 billion cubic feet of gas (bcfg)), and the 2001 rule would have the least (252 wells over 15 years with access to 418.6 bcfg). The proposed rule would have slightly fewer road miles, wells, and lower production compared to the land management plans alternative, but slightly more opportunity and foreseeable production (674 wells over 15 years with access to 1005.6 bcfg) than the 2001 rule.

Under the 2001 rule, roading in IRAs would be allowed on coal leases issued prior to January 12, 2001, and prohibited on coal leases issued after that date; foreseeable production opportunities would be limited to 3,700 acres of road-accessible coal reserves (135 million tons) in the West Elk IRA in the GMUG NFs. Under the proposed rule, roading would be approved pursuant to existing and future coal leases and coal exploration licenses in CRAs in the North Fork coal mining area on the GMUG NFs; foreseeable production opportunities would be limited to 29,000 acres of road-accessible coal reserves (1 billion tons). Under the land management plans alternative, roading could be approved on existing and future coal leases and exploration licenses in IRAs; reasonably foreseeable production opportunities would exist on 31,000 acres of coal reserves (1.1 billion tons) on the GMUG NFs. Consideration could also be given to non-quantified reserves on 46,000 acres in the Pagosa Springs coalfield on the San Juan NF, as well as the unexplored and unleased coal resources on the Pike and San Isabel, Routt, and White River NFs.

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

The Forest Service will continue to respond, under all alternatives, to all potential public health and safety situations in roadless areas. Under the 2001 rule, the lower number of road miles projected to occur in roadless areas would continue to limit the responsiveness and timeliness to emergency health and safety situations. Under the proposed rule, and even more so under the land management plans alternative, the increases in road miles projected to occur in roadless areas could better facilitate rapid responses to emergency health and safety situations.

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.

Future special use authorizations for utilities and water conveyance systems in IRAs are allowed but unlikely to occur under the 2001 rule due to road construction prohibitions in association with utility or water conveyance facilities that were not authorized prior to 2001. Under alternative 1, approximately 0.7 miles of road construction in IRAs per year are projected in association with existing special use authorizations, which could include utility or water conveyance facilities, under the 2001 rule. The proposed rule allows road building for future utilities and water conveyance systems. However, the definition of utilities does not include water reservoirs or communications facilities; permissions do not apply to uses other than utilities and water conveyance. Estimates under this alternative project approximately 0.9 miles of roading would occur annually in CRAs for future authorizations. Approximately 0.3 road miles per year are projected for existing authorizations in CRAs. The construction of oil or gas pipelines through a CRA from a source or sources outside a CRA would be prohibited under the proposed rule; this may affect efforts to increase capacity in the future. Under the land management plans alternative, most forests would allow new roads in IRAs in support of current as well as future special use authorizations. Projections for roading in roadless areas for existing special land use authorizations are approximately 1.2 miles in IRAs, with 1.5 miles projected for future utility or water conveyance facilities. Estimates are not available for future projected pipeline miles.

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 January 12, 2001. As a result, development may occur on 3,200 acres in IRAs across six ski areas. Under the proposed rule, the ski areas that are currently in IRAs would not be included in the CRAs. This would allow road construction and tree-cutting on a total of 8,200 acres in CRAs across 13 ski areas. Under the land management plans alternative the potential to construct roads and cut trees in IRAs in ski areas would be the same as under the proposed rule. Authorization of roads in developed ski areas might facilitate the implementation of required ski area vegetation management plans to improve forest health, remove hazard trees, and manage fuels.

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

Roadless Characteristics

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

Roadless area characteristics and values typically include "natural-appearing landscapes with high scenic quality. The CRAs currently have a high degree of scenic integrity. The 2001 rule would retain the greatest number of roadless area acres at high to very high scenic integrity levels; scenic quality would remain largely unaltered. Many substantially altered area acres would continue to reflect moderate to low scenic integrity levels, inconsistent with general roadless area characteristics and values. The proposed rule would retain the majority of the 4.03 million acres of CRAs at high to very high scenic integrity levels. Projected levels of road construction and other activity could result in a higher potential than the 2001 rule for portions of roadless areas to shift to a moderate to low scenic integrity levels. Substantially altered landscapes would not be included in the CRAs and would therefore not detract from scenic integrity in designated roadless areas. The new unroaded areas included in CRAs would likely add to the number of areas protected at high to very high scenic integrity levels compared to the land management plans alternative. The land management plans alternative would retain fewer acres in the IRAs at the current high to very high scenic integrity levels, compared to the other alternatives. More portions of IRAs would gradually shift to a moderate to low scenic integrity level due to the levels of projected activity. Potential effects would be moderated under all alternatives through project-level compliance with scenic integrity and visual quality objectives specified in land management plans.

There are a total of 35 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 457,000 acres in 13 IRAs have been recommended for wilderness in land management plans. None of the three alternatives, including the proposed rule, will have a direct effect on designated wilderness, because these areas are outside of IRAs or CRAs. The effects to areas recommended as wilderness in land management plans, likewise, do not differ across alternatives, because land management plans generally prohibit road construction and tree-cutting and removal activities in those areas. The 2001 rule generally prohibits tree cutting and road building in IRAs and would therefore be least likely to result in effects that detract from wilderness characteristics in the adjacent wilderness areas. The restrictions on activities in IRAs under the 2001 rule provide a greater opportunity to maintain future options for new recommendations of roadless acres as wilderness. The activity prohibitions under the proposed rule would minimize the potential risk of detracting from wilderness characteristics or experience in adjacent wilderness areas, but projected activity levels, including coal mining, could increase risks compared to the 2001 rule. Projections of increased activity could also reduce the number of roadless acres that might support future wilderness recommendations. The risk of detracting from wilderness characteristics in adjacent wilderness areas would be highest under the land management plan alternative. This alternative could also potentially create the greatest reduction in the number of roadless acres that would be capable of supporting new wilderness recommendations.

There are portions of a congressionally designated wild and scenic river (Cache la Poudre river), and a National Scenic Trail in roadless areas. None of the alternatives would directly impact the congressionally designated trail, and none of the alternatives would directly impact the stretches of the wild and scenic river corridor classified as "wild" or "recreation," because the statute designating the river is equally or more restrictive. Due to similar statutory precedence, none of the altenatives would alter the management or scenic values of the Continental Divide National Scenic Trail. However, there could be indirect effects from projected activity levels under the

various alternatives on the characteristics and values of adjacent designated areas. Road construction and tree-cutting are not projected to occur on Research Natural Areas (RNAs) or Special Interest Areas (SIAs) under any alternative. Some land management plans allow roads or facilities to be built in RNAs or SIAs, although the values for which the area was established would need to be maintained.

Soil disturbance from road construction and other ground-disturbing activities can affect the soil resource by increasing erosion, compaction, and other soil quality conditions. The potential for adverse impacts on the soil resource in roadless areas would differ slightly among the alternatives based on different levels of projected roading, tree removal, and energy resource development activities. The 2001 rule would have the least potential for adverse impacts and the land management plans alternative would have the greatest potential for adverse soil impacts. However, the differences among alternatives would be insignificant because effects from those projected activities would be mitigated through the use of site-specific analysis, watershed conservation practices, and other best management practices (BMPs), including post-project rehabilitation of disturbed soil. Impacts would also be limited in geographic extent and would be distributed over many different roadless areas. Thus, the actual effects on soil quality would be minor and of short duration.

The relative differences in potential water quality impacts in roadless areas under any of the alternatives would be negligible. The 2001 rule would have the least risk of adverse effects on water quality, and the proposed rule would have a slightly higher risk, followed by the land management plans alternative with the greatest risk of adverse impacts in the roadless areas. However, these differences are insignificant because the 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. Potential water quality impacts from authorized activities in roadless areas would be effectively mitigated by site-specific watershed conservation practices, BMPs, and regulatory permit requirements. Future activities under the alternatives are not expected to cause exceedences of water quality standards or contribute to the list of impaired water bodies.

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

Threatened and endangered (T&E) species are listed by the US Fish and Wildlife Service to satisfy the goals of the Endangered Species Act (ESA), while *sensitive* plant species are designated by a regional forester for which population viability is a concern. Two T&E plant species and 44 sensitive plant species are known or likely to occur in roadless areas in Colorado. The alternatives do not substantially differ in their estimated effect on T&E plant species, because no additional roading, tree-cutting, or energy development activities are projected to occur in the portions of roadless areas that support T&E plants. The only difference among

alternatives in the risk to T&E plants is related to the higher risk under the proposed rule and the land management plans alternative, compared to the 2001 rule that invasive plants would spread into T&E plant communities. There are 116 IRAs where sensitive plant species are known or likely to occur. There are 117 CRAs where sensitive plant species are known or likely to occur. Of the 116 IRAs and the 117 CRAs, activity projections differ across alternatives on 57 of the roadless areas. Under the 2001 rule, 12 of these areas are projected to experience roading, tree-cutting, or energy-related activities. In contrast, activities are expected to occur on 54 of the CRAs under the Colorado Roadless Rule, and 53 of the 57 IRAs under the land management plans alternative. This difference is unlikely to result in measurable differences in effects across these last two alternatives. The risk of impact on sensitive plants would be higher under the proposed rule and the land management plans alternative compared to the 2001 rule primarily because of (a) the higher likelihood of increases in invasive plants spreading into sensitive plant communities, and (b) the higher likelihood of inadvertent mistakes that may be made during project implementation. These differences in risk are correlated with the differences in the amount of projected activities in roadless areas that support sensitive plants.

One T&E fish species, five sensitive fish species, six management indicator fish species (MIS) (MIS are identified in a forest plan as an indicator of management effectiveness), one aquatic mammal MIS (American beaver), and an array of benthic invertebrate MIS are known or likely to occur in roadless areas in Colorado. There are also aquatic habitats in many roadless areas that have been identified as being ecologically important as well as "rare" (e.g., fens, other wetlands). Considering the overall effects of each alternative, regardless of the differences on each forest, the 2001 rule would pose the least risk of adverse impact, and would generally have the least potential for adverse effects on protecting aquatic species and habitat compared to the more intensively managed lands outside roadless areas. The proposed rule would have more potential for adverse impacts to aquatic species due to projected activities, with the greatest potential for adverse effects under the land management plans alternative. Activities projected under the proposed rule would not likely result in measurable declines in overall population trends on any national forest for any of the aquatic T&E species, sensitive species, or MIS. A beneficial effect of the proposed rule and the land management plans alternative would be associated with the increased amount of fuel reduction treatment acres in IRAs, which could reduce wildfire severity in the IRAs and CRAs, resulting in beneficial effects on aquatic habitat and species.

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

For terrestrial wildlife, six T&E species, 34 sensitive species, and 36 MIS are known or likely to occur in roadless areas in Colorado. The 2001 rule would afford terrestrial species and habitats the most protection because it is most restrictive for activities in the roadless areas that could be detrimental to T&E, sensitive, MIS, and migratory bird species. By comparison, the proposed rule offers a lower level of protection in roadless areas than the 2001 rule due to activity permissions in areas with important terrestrial species and habitats. The land management plans

alternative correspondingly would have the highest potential for adverse impacts to terrestrial species and habitat. Detrimental effects from an expected increase in invasive plants, animals, and pathogens would be of greater risk under the proposed rule and the land management plans alternative respectively. Given the temporary status of most roads projected for roadless areas, the impact of these roads would be relatively short-term. However, increases in roads could encourage non-motorized recreational use as well as unauthorized motorized use that could increase potential impacts to wildlife. The increased ability to treat acres for forest health and fuels under the proposed rule and the land management plans alternative could improve habitats for early seral species in some areas and reduce the potential for a severe stand-replacing wildfire that could adversely impact terrestrial habitat. In general, for all alternatives, activities may affect individual animals but are not likely to adversely affect populations or critical habitat of T&E species, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. There is increasing potential for change in population trends for MIS under the proposed rule and the land management plans alternative respectively, depending upon the location, timing, intensity, and magnitude of activity. But, as with plants and aquatic species, potential adverse effects to terrestrial species are expected to be either avoided or minimized through compliance with standards and guidelines in land management plans and other applicable laws, regulations, and policy.

The value of roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude in lands outside of roadless areas. Potential benefits of conserving roadless areas include protected large contiguous blocks of habitat and biological strongholds as well as providing habitat connectivity. These types of benefits would be similar for the proposed rule and the 2001 rule but would be realized to a lesser degree under the proposed rule. The land management plans alternative, because of fewer restrictions, would probably pose a higher risk of affecting biological diversity.

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 (estimated 4 acres invaded per year). The risk of increasing invasive plant occurrences would remain relatively low under the proposed rule (38 acres invaded per year), with the greatest relative risk (82 acres invaded per year) under the the land management plans alternative. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would still be relatively low under the land management plans alternative.

The 2001 rule would retain the greatest proportion of roadless area acres in a primitive or semi-primitive setting, at the lowest level of human development. Smaller proportions of the IRAs would show evidence of motorized vehicle use or be in a roaded natural setting. None of the projected activities under the 2001 rule would be expected to reduce the quality of hunting and fishing opportunities. The proposed rule would retain the majority of the CRA acres in a semi-primitive setting, although there would be more CRA acres with roads and energy operations. The higher levels of human activity and development would shift some areas from offering semi-primitive opportunities to a more roaded natural setting. Excluding the substantially altered areas and developed ski areas in CRAs would allow the CRAs to appear more consistent with semi-

primitive and unroaded characteristics expected in roadless areas. The inclusion of unroaded areas in CRAs would further protect and provide for dispersed recreation in generally unroaded and semi-primitive settings. Hunting and fishing opportunities likely would not change under the proposed rule because of the dispersed nature of projected road and tree-cutting activity and the large amount of NFS lands not altered by these activities. The land management plans alternative would result in higher levels of human activity and development in IRAs that are not consistent with typical roadless area characteristics. The effects of the IRA boundaries would be the same as described for the 2001 rule; however, more of the IRAs that offer semi-primitive settings would shift toward roaded natural settings as more roading, tree cutting and energy resource development occurs in the IRAs.

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

Neither the proposed rule nor the land management plans alternative would be expected to cause a measurable change in the amount of carbon dioxide nor other greenhouse gas emissions compared to current conditions and trends in the roadless areas under the no-action alternative (the 2001 rule). The cumulative effects of climate change, in combination with the direct effects associated with the alternatives, on roadless area conditions (e.g., drought, wildfire, insects/disease) and resources (e.g., water yield, air quality, T&E species and habitat) cannot be quantitatively described in this programmatic evaluation. However, the risk of cumulative effects would be somewhat lower under the 2001 rule because the total amount of ground-disturbing activity would be less than under the proposed rule or the land management plans alternative.

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

Agency Costs

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

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

assumption that program budgets will remain relatively flat, it is unlikely that the alternatives will result in significant changes in administrative costs.

Under the 2001 rule, fuel treatments would likely be more expensive and less efficient to implement in IRAs because of the lack of established roads and inability to reconstruct or construct roads. Compared to the 2001 rule, the proposed rule would provide increased flexibility to achieve fire and fuels management objectives in critical areas in CWPPs and WUI areas where consistent with forest plan direction. Circumstances allowing construction of temporary road miles would increase the Agency's ability to strategically locate fuel treatment areas on the landscape to improve effectiveness and possibly reduce the total amount of the landscape that requires treatment. Under the proposed rule, treating 7,600 acres per year implies that more hazardous fuel treatments would occur in CRAs, compared with the 4,300 acres of CRAs treated annually on average from the past several decades, if budgets remain flat. Correspondingly, fewer treatments would occur outside CRAs. Under the land management plans alternative, there would be a shift to treating even more acres (up to 16,300 acres per year) in IRAs and fewer acres outside IRAs compared to the past 7-year trend. The effects of building more roads for fuel treatments would generally be the same as described for the proposed rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs.

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

Distributional Effects

The distributional effects are listed in Table E.3. Many roadless areas (IRAs and CRAs) are in rural counties in the western and southwestern regions of Colorado, though some roadless areas are in counties in the Front Range metro area. A large majority of counties are considered small (population less than 50,000). The only resource outputs with measurable and quantifiable differences between alternatives are oil and gas, and coal. Jobs and income contributed by these output levels are estimated for a five county "energy model" area (Delta, Garfield, Mesa, Montrose, Rio Blanco counties). Changes in output of goods or services associated with timber harvest, livestock, recreation/special use permits, and other resource sectors are not projected to be significant across alternatives.

The provisions for enhanced energy mineral development under the proposed rule and the land management plans alternative are likely to result in sizeable increases of average annual production, employment, and labor income contributed by energy sectors over the next 15 years. Total value of annual output from the oil, gas, and coal sectors is estimated to be similar for the proposed rule and the land management plans alternative ($565.7 and $621.7 million per year respectively) and signicantly higher than output under the 2001 rule ($149.5 million). Total jobs contributed under the 2001 rule are estimated to be 297 jobs, increasing to 1,481 under the proposed rule and to 1,592 under the land management plans alternative. Respective annual labor

income is estimated to be $17.5 million, $96.2 million, and $102.7 million (2006 dollars). The total annual output, employment, and labor income associated with the entire mining sector in the five-county energy model area is estimated to be approximately $5.1 billion, 7,027 jobs, and $662.1 million for 2006.

A pattern similar to economic impacts emerges for average annual State and local government revenues (i.e., revenue sharing) from energy mineral leases. Compared with $6.1 million per year total payments and taxes received by the State and counties under the 2001 rule, payments are estimated to be approximately four times larger for the proposed rule ($24.5 million per year) and the land management plans alternative ($26.8 million per year). Other Federal payments to State and local governments, such as those from National Forest (25 percent) Fund and Payments in Lieu of Taxes (PILT), are expected to either not change or be more than offset by revenues from Federal mineral lease payments.

The distribution of projected fuel treatments and corresponding reduction in wildfire hazard to at-risk-communities near roadless areas varies by alternative. Values at risk can include citizen health, reliable water and power supplies, infrastructure (e.g., buildings, both public and private), business activity, and general quality of life. An estimated 619 at-risk-communities are within 3 miles of IRAs. Under the proposed rule, the likelihood of fuel treatments and corresponding opportunities for hazardous fuel reductions increases for 118 communities, relative to the 2001 rule. Under the land management plans alternative, fuel reduction opportunities increase for 196 at-risk-communities, relative to the 2001 rule. 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

	2001 Roadless Rule	**Proposed Rule**	**Land Management Plans (LMPs)**
Aggregate Roadless Areas	Inventoried Roadless Areas (IRAs) = 4,249,000 acres	Colorado Roadless Areas (CRAs) = 4,031,000 acres	Inventoried Roadless Areas (IRAs) = 4,249,000 acres
Total Existing Authorized Road Miles in Roadless Areas	1,396 miles	216 miles	1,396 miles
Road Construction and Reconstruction Projected in Roadless Areas (1)	6 miles/year	21 miles/year	30 miles/year
Tree-cutting Projected in Roadless Areas	800 acres/year (12,000 acres over 15 yrs)	7,600 acres/year (114,000 acres over 15 yrs)	16,300 acres/year (244,500 acres over 15 yrs)
Harvest volume Projected in Roadless Areas	800 ccf/year	1,700 ccf/year: CRAs only 6,700 ccf/year:CRAs and Substantially Altered areas	24,400 ccf/year

(1) More than 10 miles road decommissioning expected per year for all alternatives.
Ccf = hundred cubic feet.

Table E. 2 – Summary of net benefits of the proposed rule and alternatives.

Category	2001 Roadless Rule	Proposed Rule	LMPs
Local Challenges: Roadless Area Management			
Wildfire hazard (1)	**1 percent of the annual fuel treatments on NFS lands in Colorado could occur in roadless areas.** **Lowest opportunity to improve fuels and fire management efficiency.**	**12 percent of the annual fuel treatments on NFS lands in Colorado could occur in roadless areas (in CWPP areas or WUIs).** **Moderate opportunity to improve fuels and fire management efficiency.**	**27 percent of the annual fuel treatments on NFS lands in Colorado could occur in roadless areas.** **Greatest opportunity to improve fuels and fire management efficiency.**
Insect and disease (1)	**2 percent of the high risk acres in roadless areas would likely be treated.**	**19 percent of the high risk acres in roadless areas would likely be treated.**	**41 percent of the high risk acres in roadless areas would likely be treated.**
Reduction of wildfire hazard for at-risk-communities and values	**Opportunities to reduce wildfire hazard for at-risk communities would be lowest under this alternative compared to the others.**	**Opportunities to reduce wildfire hazard for at-risk communities would be available but somewhat limited under this alternative compared to the others.**	**Opportunities to reduce wildfire hazard for at-risk communities would be greatest under this alternative compared to the others.**
Wildlife and plant habitat including special status species	**Not allowing new roads in conjunction with treatments to reduce wildfire hazard could result in a higher risk of severe wildfires causing adverse impacts to habitat for some species.**	**Allowing new roads in conjunction with treatments to reduce wildfire hazard could result in reducing the hazard of severe wildfires causing adverse impacts to habitat for some species.** **Increased ability to cut trees on more acres for forest health and fuels management could improve habitat for early seral species in some areas in the short-term.**	**Same flexibility to improve habitat conditions as the proposed rule, but to a greater extent.**

Utility and water facilities and conveyances	**Does not allow new roads to provide for future utility or water conveyances in roadless areas (limited to those under an existing permit issued prior to January 2001).**	**Allows new roads to provide for future electrical transmission utilities and water conveyances (not reservoirs) in roadless areas (other then where prohibited by forest plan direction).**	**Same flexibility as the proposed rule, with additional flexibility for new roads to provide for other types of utilities such as telephone and fiber optic lines, water reservoirs, and others (other then where prohibited by forest plan direction).**
Roadless area boundary Updates	**Does not provide a process for updating roadless area boundaries.** **Changes could be allowed in the future if authorized by the Secretary of Agriculture through rule making.**	**Provides a process for updating roadless area boundaries.** **Modifications based on changed circumstances or public need require at least 60 days public notice and opportunity to comment.**	**Like the proposed rule, provides a process for updating roadless area boundaries.** **Boundary changes may be made through a forest plan amendment or revision process, subject to public involvement and analysis under NFMA and NEPA regulations (36 CFR 219 and 40 CFR 1500).**
Public safety and Safety	**All of the alternatives provide adequate flexibility to respond to emergency situations or major threats to public health and safety in roadless areas (refer to features common to all alternatives). The Forest Service will continue to respond to wildfires, chemical or oil spills, abandoned mine hazards, road-design hazards, hazard trees, and other similar situations. Roads for this purpose must be temporary under the proposed rule, and would be expected to be temporary under the 2001 rule and land management plans.**		
	Limited capacity to respond to emergency situations.	**Roads improve capacity to respond to emergency situations.**	**Roads provide greatest capacity to respond to emergency situations.**
Outstanding rights and existing authorized uses of NFS lands	**All of the alternatives allow the exercise of outstanding rights for access, occupancy, and use of NFS lands in roadless areas, including those that exist by law, treaty rights, or other authority (e.g., access to private property, valid mining claims for locatable minerals, land uses protected by American Indian treaty rights).** **All of the alternatives allow for the continuation, transfer, or renewal of existing land use authorizations in roadless areas that exist at the time the applicable roadless rule becomes effective, including discretionary authorizations such as for livestock grazing and other permitted activities. For clarification, "existing" authorizations under the 2001 rule are those issued prior to January 12, 2001, while "existing" authorizations under the proposed Colorado Roadless Rule would be those issued prior to adoption of the final rule.** **Thus, outstanding rights and existing authorized uses may continue in roadless areas except where limited by applicable laws, regulations, Forest Service directives, or forest plan direction.**		
Ski Areas	**Road building and tree-cutting may occur on 3,200 IRA acres under permits authorized prior to 1/12/2001.**	**Road building and tree-cutting may occur on 8,200 IRA acres (acres not included in CRAs).**	

Leasable Minerals: Energy Resources			
Pipelines and Access energy resources	**Provides the least opportunity for access to develop oil, natural gas, or coal resources in roadless areas.** **No prohibition on oil or gas pipelines through IRAs from sources outside IRAs.**	**Access to develop oil and natural gas is similar to 2001 roadless rule. Increases roaded access to future coal resources in the North Fork coal mining area.** **Prohibits construction of oil and gas pipelines through CRAs from sources exclusively outside the CRAs.**	**Provides the most opportunity for access to develop future oil, natural gas, and coal resources compared to the other alternatives.** **No prohibition on oil or gas pipelines through IRAs from sources outside IRAs.**
Oil and gas	**Projections are for approximately 252 oil and gas wells in IRAs with access to 418.6 bcfg over a 15-year period; providing the least opportunity for oil and natural gas development and production among the alternatives.**	**Projections are for approximately 674 oil and gas wells in CRAs with access to 1005.6 bcfg over a 15-year period; providing more opportunity for oil and natural gas development and production than the 2001 rule and less than the land management plans alternative.**	**Projections are for approximately 731 oil and gas wells in IRAs with access to 1.023.6 bcfg over a 15-year period; providing the most opportunity for oil and gas development and production than other alternatives.**
Coal	**Projections are for 6.0 miles of new roads for coal-related activity in IRAs.** **Restricts access to potential coal resources in IRAs more than other alternatives.** **3,700 acres of road-accessible reserves (135 million tons).**	**Projections are for 45 miles of new roads for coal-related activity in CRAs.** **Reduces restrictions on access to potential coal resources in CRAs compared to the 2001 rule, but is more restrictive than the land management plans alternative (limits new roads to the North Fork coal mining area).** **29,000 acres of road-accessible reserves (1 billion tons).**	**Projections are for 66 miles of new roads for coal-related activity in IRAs.** **Least restrictive on access to potential coal resources in IRAs compared to the other two alternatives.** **31,000 acres of road-accessible reserves (1.1 billion tons)**
Geothermal	**Opportunities for geothermal development in roadless areas would not occur under the 2001 rule and the proposed rule due to new road prohibitions. Opportunities for geothermal development in roadless areas would occur under the land management plans alternative as most land management plans allow new roads in roadless areas for this purpose.**		

Other Resource Effects			
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.**		
Locatable and saleable minerals	**Opportunities to develop locatable minerals resources held by valid mining claims in roadless areas would continue to occur and would not differ by alternative.** **Opportunities for saleable minerals production would not likely differ by alternative because little to no saleable mineral operations would likely occur in the roadless areas.**		
Roadless Area Characteristics and Values			
Soil and water quality, including public drinking water sources	**No major difference among alternatives related to the risk of adverse water quality and soil impacts. The 2001 rule would have the least risk of adverse effects, and the proposed rule would have a slightly higher risk, followed by the land management plans alternative with the greatest risk of adverse impacts. However, these differences are insignificant because the actual impacts would be small in magnitude and scattered over a wide geographic area. Most of the potential effects would be of short duration, and effectively mitigated by site-specific watershed conservation practices, BMPs, post-project rehabilitation of disturbed soil, and regulatory permit requirements.**		
Air quality	**No major difference among alternatives related to the risk of adverse impacts on air quality. One minor difference is related to potential smoke-related impacts from wildfires, which would be more likely to occur in roadless areas under the 2001 rule, and least likely to occur under the land management plans alternative. None of the alternatives is likely to result in emissions that would exceed air quality standards; most would be of short duration with site-specific mitigation measures applied as needed.**		
Invasive plants	**An increase of about 4 acres per year of invasive plants in IRAs.**	**An increase of about 38 acres per year of invasive plants in CRAs.**	**An increase of about 82 acres per year of invasive plants in IRAs.**
Scenic quality (integrity)	**Maintains the most IRA acreage at high to very high scenic integrity levels where it exists.**	**Retains majority of CRAs at high or very high integrity; the scenic integrity of some areas would be reduced by the roads and road-related activities projected as likely to occur in CRAs.**	**Maintains the least IRA acreage at high to very high scenic integrity levels, as more IRA acres would be reduced by shifting to a moderate to low scenic integrity from the roads and road-related activities projected as likely to occur in IRAs**

Cultural properties and sacred sites	**No major difference among alternatives related to the risk of adverse effects on traditional cultural properties, sacred sites or other cultural (heritage) resources. The 2001 rule offers the most protection from development in roadless areas, which translates to fewer potential effects to historic properties; this is offset somewhat by a slightly increased potential for uncharacteristic wildfire. The proposed rule offers fewer acres of roadless protection, so there is an increase in potential development activities that may have an effect on cultural resources; wildfire risk is slightly reduced in this alternative. The land management plans alternative has the most potential for direct effects on cultural resources; this alternative may also have the lowest risk of uncharacteristic wildfire.**		
Wilderness and other congressionally designated areas	**No major difference among the alternatives related to the risk of adverse effects on congressionally designated areas. There would be no potential direct effect on these areas as they are outside the roadless areas that are the subject of each alternative. There could be indirect effects on wilderness characteristics due to some noise and visibility of human activities in adjacent roadless areas, with the highest potential for indirect impacts under the land management plans alternative, and the lowest potential under the 2001 rule.** **Effects on areas al in land management plans as recommended wilderness would not differ by alternative as land management plans generally prohibit roading and tree-cutting and removal activities in those areas. However, the restrictions on activities in IRAs under the 2001 rule provide a greater opportunity to maintain future options for recommending roadless acres as wilderness in the future, compared to the proposed rule and land management plans.**		
Protected Species, Habitat, and Biodiversity			
Biodiversity	**The value of roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude in lands outside of roadless areas. Opportunities for protected large contiguous blocks of habitat, biological strongholds, and habitat connectivity would be greatest for the 2001 rule and lowest under the land management plans alternative**.		
Terrestrial species and habitat	**Provides terrestrial species and habitat the most protection compared to other alternatives, based on the IRAs with important wildlife habitat and projected activities that differ among alternatives.**	**Provides terrestrial species and habitat moderate protection (less than the 2001 rule and more than the land management plans alternative), based on the CRAs with important wildlife habitat and projected activities that differ among alternatives.**	**Provides terrestrial species and habitat the least amount of protection compared to the other two alternatives, based on IRAs with important wildlife habitat and projected activities that differ among the alternatives.**
	For all alternatives, potential adverse effects are expected to be avoided or minimized through compliance with standards and guidelines in land management plans and other applicable laws and policies. For all alternatives, activities may affect individual animals but are not likely to adversely affect populations or critical habitat of T&E species, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species.		

Aquatic species and habitat	**Provides aquatic species and habitat the most protection compared to other alternatives, based on the IRAs with important aquatic habitat and projected activities that differ among alternatives.**	**Provides aquatic species and habitat moderate protection (less than the 2001 rule and more than the land management plans alternative), based on the CRAs with important aquatic habitat and projected activities that differ among alternatives.**	**Provides aquatic species and habitat the least amount of protection compared to the other two alternatives, based on IRAs with important aquatic habitat and projected activities that differ among the alternatives.**
Native plants, including special status plants	**No major difference among alternatives related to the risk of adverse effects on native threatened, endangered or sensitive plant species. There would be very little to no increases in roads, tree-cutting, or energy development activities in the roadless areas that support those plant species. The main difference is the higher risk under the proposed rule and the land management plans alternative that invasive plants would increase from the higher levels of ground-disturbance, thereby increasing this threat to native plant communities.**		
Recreation			
Primitive and semi-primitive recreation settings and opportunities	**Likely to retain the greatest 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.**	**Likely to retain a high proportion of CRA acreage in a semi-primitive setting; although some CRA acres would shift toward roaded natural in areas where the most roads and energy operations are projected to occur in CRAs.** **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.**	**Likely to retain lower proportions of IRA acreage in a semi-primitive setting; more acres would shift toward roaded natural in areas where the most roads and energy operations are projected to occur in IRAs.** **The substantially altered areas and developed ski areas in IRAs may continue to appear inconsistent with semi-primitive characteristics expected in roadless areas.**
Other General Resource Effects			
Geological and Paleontological	**None of the projected activities in roadless areas that vary by alternative would be likely to adversely affect geological or paleontological resources, which would either be avoided or otherwise protected from potential adverse impacts.**		
Outfitters and guides and other special uses	**The alternatives are expected to have negligible adverse effects on recreational special uses, including outfitter and guide opportunities, based on reasonably foreseeable activity projections. Limitations on roading and tree-cutting under any alternative would not be likely to affect ability to obtain or use a recreation use authorization.**		

Climate Change	**None of the alternatives are expected to cause a measurable change in the amount of carbon dioxide or other greenhouse gas emissions. The cumulative effects of climate change on roadless area conditions cannot be quantitatively described in this programmatic evaluation. The risk of cumulative effects would be somewhat lower under the 2001 rule, and incrementally larger under the proposed rule and the land management plans alternative due to projected levels of ground-disturbing activity.**		
Agency Costs			
Vegetation and Fuel Treatments	**Treatments are likely to be less efficient and more costly in IRAs.**	**Increased flexibility to achieve management objectives in critical insect and disease areas; increase ability to strategically locate treatments and improve efficiency.**	**Capacity to shift even more treatment acres into IRAs; increased efficiency, effectiveness and timeliness of wildfire suppression response as well as fuel reductions in WUIs**
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.**		

(1) Percentages assume that all projected tree-cutting acres target the respective objectives (fuels or insect/disease); high risk insect and disease areas may not overlap with WUI/CWPP areas during actual implementation.

Bcfg = billion cubic feet gas

Ccf = hundred cubic feet timber

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

	2001 Rule	Proposed Rule	LMPs alternative
Leaseable minerals: coal, oil and gas – Output Value, Jobs and Income (2006$) Contributed (1)	**$149.5 million/yr Output** **297 Jobs supported** **$17.5 million per year Labor Income**	**$565.7 million/yr Output** **1,481 Jobs supported** **$96.2 million per year Labor Income**	**$621.7 million/yr Output** **1,592 Jobs supported** **$102.7 million per year Labor Income**
Revenue Sharing: Mineral Lease Payments and Tax Revenues (2007$) (2)	**State Total: $6,146,000** **Energy-Affected Counties: $2,240,000** **All other CO Counties: $193,000**	**State Total: $24,481,000** **Energy-Affected Counties: $6,847,000** **All other CO Counties: $904,000**	**State Total: $26,825** **Energy-Affected Counties: $7,729,000** **All other CO Counties: $976,000**
Values at risk: Number of At-Risk-Communities where opportunities for hazardous fuel reductions in the WUI may increase, relative to the 2001 rule (3)	**NA (4)**	**118 communities in 20 Counties**	**196 communities in 23 Counties**

(1) Jobs and income contributed annually (2006 dollars) based on projected levels of coal, oil, and gas production and regional economic modeling multipliers.

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

(3) At-risk-communities are assumed to experience an increase in likelihood if the probability of tree-cutting in association with the WUI changes from "unlikely or somewhat likely" to "very likely or plans underway" in at least one CRA within 3 miles according to forest unit survey responses (see Appendix C of the draft EIS).

(4) WUI treatments are projected to be 'very likely' or 'already planned' for 82 at-risk-communities under the 2001 rule, 183 communities under the proposed rule, and 250 communities under land management plans. Some at-risk communities may benefit from fuel reductions under all alternatives but are within 3 miles of multiple CRAs; these communities may therefore experience incremental increases in opportunities when comparing alternatives.

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 Procedures Act, section 553(e) of the U.S. Code of Federal Regulations (CFR) and the Department of Agriculture's rulemaking procedures at 7 CFR §1.28. After Governor Owens submitted the State's petition to the Department of Agriculture, Bill Ritter, Jr. was elected Governor of Colorado. In April 2007, Governor Ritter resubmitted the petition with a substantive letter of transmittal. In June 2007, the State and the U.S. Forest Service presented the petition with some modifications to the Department's Roadless Area Conservation National Advisory Committee. In August 2007, based on the advisory committee's review and report, the Secretary of Agriculture accepted the State's petition and directed the Forest Service to work in cooperation with the State of Colorado to initiate rulemaking (USDA RACNAC 2007).

The State's petition requested the rulemaking process use the most updated roadless boundaries (State of Colorado 2007). Updating roadless area evaluation for Colorado resulted in identifying approximately 4.031 million acres or about 29 percent of National Forest System (NFS) lands in Colorado, as appropriate for management as Colorado's roadless areas (fig. 1.2). Based on the petition, the State and the Forest Service collaboratively developed the rulemaking (regulatory) language for a proposed Colorado Roadless Rule that would govern management of roadless areas on NFS lands in Colorado.

This report summarizes the regulatory impact analysis for the proposed Colorado Roadless Rule (proposed rule) as directed by Executive Order (E.O.) 12866 issued September 30, 1993, as amended by E.O. 13422 on Regulatory Planning and Review. These executive orders address regulatory planning and review and require that agencies conduct a regulatory analysis for economically significant regulatory actions. Significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors. The proposed rule will not have annual effect of $100 million nor is it expected to have an adverse effect on the economy. However, due to the level of interest in inventoried roadless area management, the proposed rule is designated as significant and is therefore subject to E.O. 12866.

The Office of Management and Budget Circular A-4 provides guidance to Federal agencies on the development of regulatory analysis including the use of benefit-cost analysis. Circular A-4 also recognizes that "it is not always possible to express in monetary units all of the important benefits and costs" and that agencies should exercise "professional judgment in determining how important the non-quantified benefits or costs are likely to be in the context of the overall analysis." The guidance also notes that regulatory analyses include a "discussion of non-quantified as well as quantified benefits and costs." Included in the analysis of benefits and costs should be an assessment of distributional effects and equity.

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

This document summarizes information about the benefits, costs, and distributional effects of the proposed rule. For details about resource and/or program-specific environmental effects, the reader is referred to the draft environmental impact statement (DEIS) for the proposed rule (USDA Forest Service 2008), as well as resource specialist reports cited in the DEIS.

Purpose and Need

The Department of Agriculture, the Forest Service, and the State of Colorado are committed to conserving and managing roadless areas on NFS lands in Colorado. The Department, Forest Service, and State are seeking to establish lasting direction for the management of roadless areas in Colorado.

The proposed State-specific rule is intended to provide greater management flexibility under certain circumstances to address unique and local land management challenges, while continuing to conserve roadless values and characteristics. Increased management flexibility is primarily needed to reduce hazardous fuels and large-scale insect and disease outbreaks, allow access to coal reserves in the North Fork coal mining areas, and to allow access to future utility and water conveyances, while continuing to conserve roadless area values and characteristics.

The State-specific rule presents an opportunity to effectively integrate local and national perspectives on roadless area management. It offers a greater opportunity for collaboration among government officials and the citizens of Colorado in creating a solution for conserving the integrity and beauty of Colorado's roadless areas along with increasing flexibility to address other important land and resource management concerns.

Further, the State requested and the Forest Service agreed that the roadless area boundaries be reviewed and where necessary be adjusted to more accurately reflect roadless characteristics and to correct outdated boundaries and mapping errors.

In summary, the Department of Agriculture, the Forest Service, and the State of Colorado agree there is a need to balance local and national interests in providing management direction for roadless areas on NFS lands in Colorado. There is a need to refine and adjust some of the provisions of the 2001 rule in order to improve the balance between conserving roadless characteristics while addressing forest health and community wildfire protection needs and access to valuable energy resources.

At the same time, there was a desire for the Colorado Roadless Rule to retain many of the key provisions from the existing 2001 rule, in order to

- Maintain existing rights and permitted uses, including those provided by statute, treaty, and other legal instruments, for occupancy and use of NFS lands.
- Provide reasonable access to publicly and privately owned property and facilities.
- Maintain the ability to respond to emergency situations and major threats to human life and property.
- Protect human health and safety.
- Prevent irreparable resource damage.
- Protect wildlife habitat, especially for threatened, endangered, or sensitive species.
- Protect roadless characteristics and values.

Roadless area characteristics and values, as defined in the 2001 rule preamble (66 FR 3244) and referred to in the proposed Colorado Roadless Rule, are summarized as follows:

- High quality or undisturbed soil, water, or air.
- Sources of public drinking water.
- Diversity of plant and animal communities.
- Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land.
- Primitive, semi-primitive motorized, and semi-primitive non-motorized.
- Reference landscapes.
- Natural-appearing landscapes with high scenic quality.
- Traditional cultural properties and sacred sites.
- Other locally identified unique characteristics (e.g., uncommon geological formations, unique wetland complexes, unique social/cultural/historical characteristics, areas prized for collection of non-timber forest products, or exceptional hunting and fishing opportunities).

Proposed Rule and Alternatives

Roadless Area Boundaries

For the purposes of this analysis, all existing congressionally designated acres (nine designated protection, wilderness, or special management areas included in IRA boundaries) are removed from the roadless areas for all alternatives. This provides a consistent framework upon which to compare the consequences of each alternative. The IRAs described in the 2001 rule final environmental impact statement (EIS) publication and associated map database cover approximately 4.43 million acres, while the roadless areas described in this EIS cover approximately 4.25 million acres, owing to removal of the congressionally designated lands (see Figure 1).

All alternatives identify specific NFS lands in Colorado to be managed as roadless areas. Generally, they have a minimum size of 5,000 acres, unless they are adjacent to existing wilderness and contain many of the roadless area characteristics, as described in the Purpose and Need.

For purposes of this analysis, alternatives 1 and 3 share common roadless area boundaries, referred to in this EIS as IRAs. The proposed rule proposes modifications of those roadless area boundaries and are referred to in this EIS as CRAs, amounting to 4.031 million acres (see Figure 2). Table 1 provides an overview of the IRA and CRA acres, by national forest administrative unit. Under any of the alternatives, 29 to 31 percent of the total NFS lands in Colorado are in identified roadless areas.

Table 1 shows that 2 percent fewer acres of NFS lands in Colorado would be in roadless areas under the proposed rule compared to alternatives 1 and 3. The change in acreage for CRAs is a result of correcting mapping errors, not including areas that do not meet the criteria for roadless, not including ski areas, and adding new roadless acres as explained later in the detailed description of the proposed rule. Also, the acres included and not included in IRAs compared to CRAs, along with the names of IRAs and CRAs, are displayed in Appendix A of the DEIS (USDA Forest Service 2008).

Table 1. Acreages and percentages of roadless areas in Colorado under each alternative, by national forest

National forest administrative unit	NFS acres in Colorado	2001 rule and LMPs Alternative		The proposed rule	
		IRA acres	Percent of NFS acres in IRAs	CRA acres	Percent of NFS acres in CRAs
Arapaho and Roosevelt	1,537,000	354,000	23	350,000	23
Grand Mesa, Uncompahgre, and Gunnison	2,974,000	1,060,000	36	853,000	29
Manti – La Sal	27,000[1]	11,000	41	8,000	30
Pike and San Isabel	2,230,000	669,000	30	674,000	30
Rio Grande	1,823,000	530,000	29	518,000	28
Routt	1,125,000	442,000	39	434,000	39
San Juan	1,879,000	544,000	29	558,000	30
White River	2,286,000	640,000	28	636,000	28
Total[2]	**13,881,000**	**4,249,000**	**31**	**4,031,000**	**29**

[1] The Manti-La Sal is a 1.4-million-acre national forest mostly in Utah, with only 2 percent of those acres in Colorado.

[2] Totals may not add due to rounding to nearest 1,000 acre.

(Source: Roadless Area EIS database 2008.)

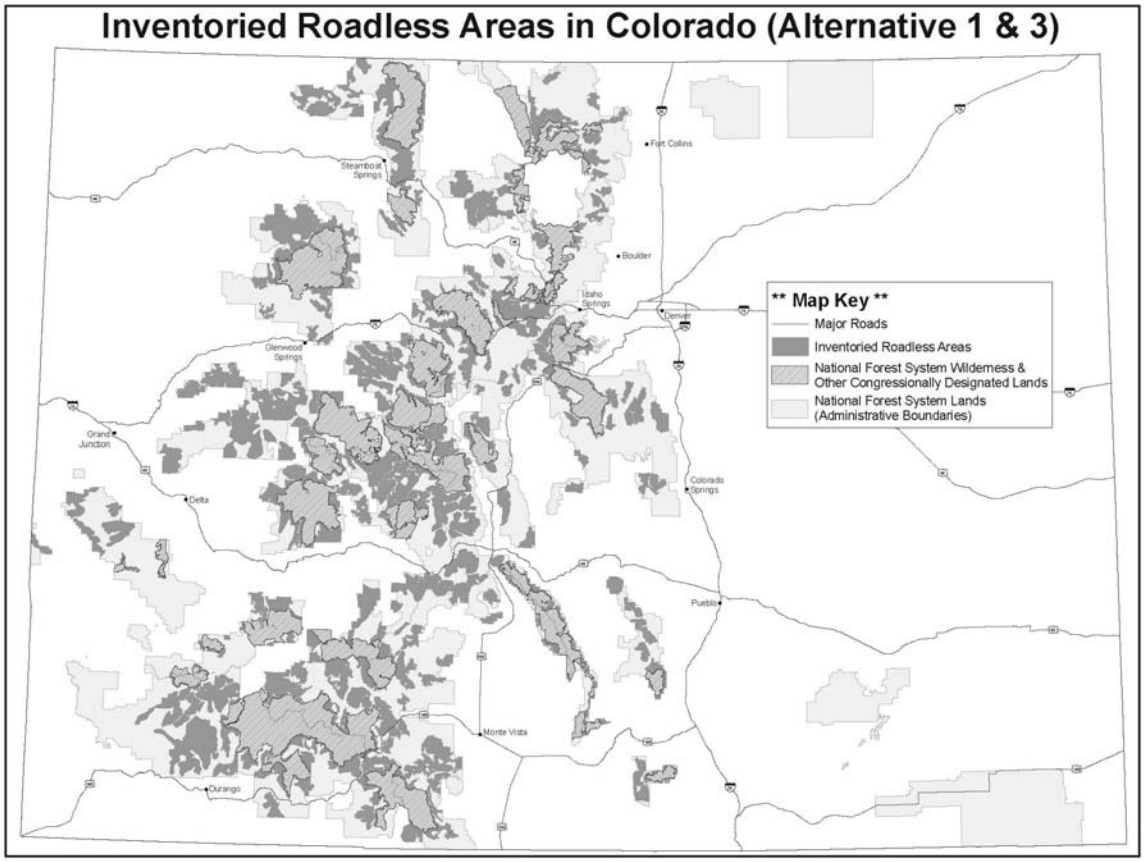

Figure 1 Inventoried roadless areas in Colorado

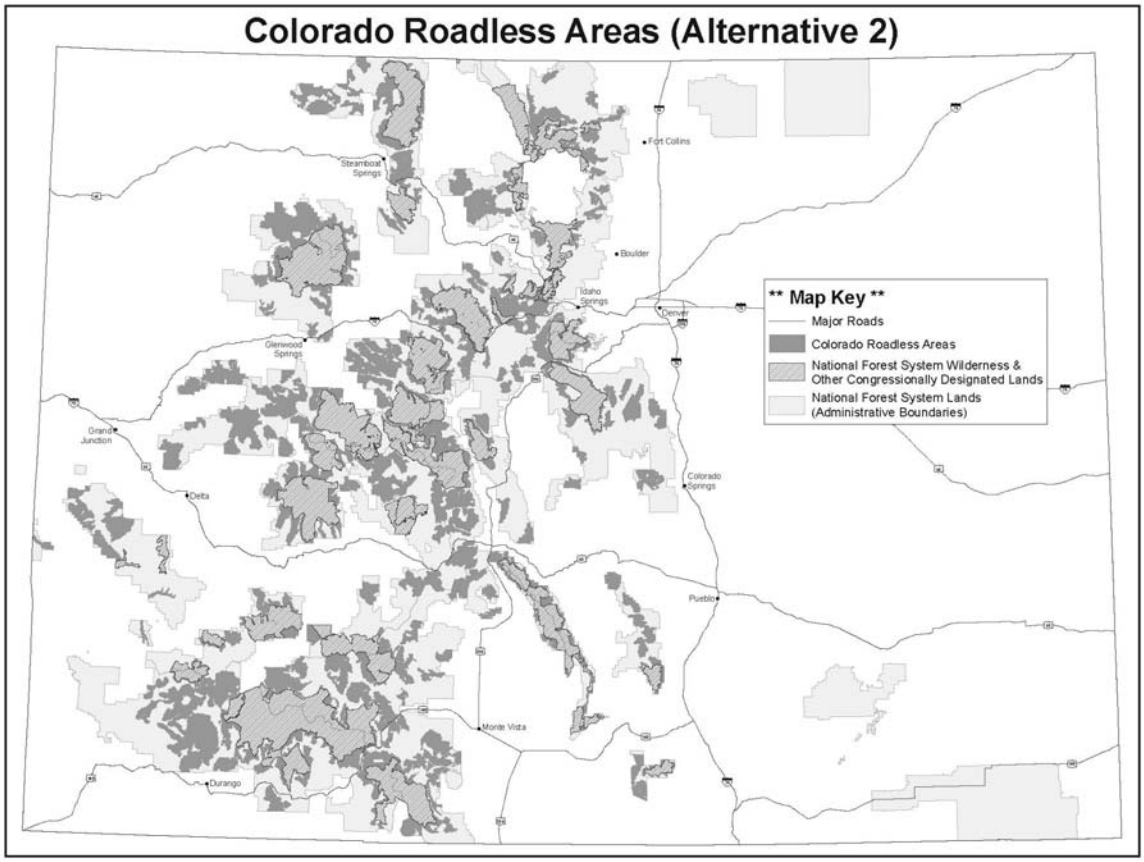

Figure 2 - Proposed Colorado roadless areas

Alternatives

This section summarizes each of the three alternatives considered. For more specific language and a detailed comparison of alternatives, the reader should consult chapter 2 of the DEIS (USDA Forest Service, 2008). The three alternatives are:

- 2001 rule (no action, referred to as Alternative 1 in the DEIS),[1]
- Colorado Roadless Rule (proposed rule, referred to as Alternative 2 in the DEIS), and
- Land Management Plans Alternative (referred to as Alternative 3 in the DEIS)

Management of NFS lands in Colorado is governed by a variety of Federal land management statutes (laws), regulations (also called rules), Executive orders, and the Forest Service directive system (manuals and handbooks). In addition, some State and local laws and regulations apply on NFS lands in the State. All alternatives in this analysis assume that these governing authorities are not affected. All alternatives, unless otherwise superseded by a roadless rule,

1 "2001 Rule" refers to Federal regulations in the Code of Federal Regulations at 36 CFR 294- Special Areas, regarding Forest Service management of roadless areas.

assume that direction set forth in land management plans for the NFs in Colorado would continue to govern project and activity decisionmaking on NFS lands, including roadless areas.

2001 Rule

This alternative reflects current management under the 2001 rule, which was promulgated to ensure "that inventoried roadless areas will be managed in a manner that sustains their values now and for future generations" (66 FR 3247). The 2001 rule provides a baseline for comparing the environmental consequences of the proposal and any other alternatives. This alternative is the most constrained in terms of circumstances for road building and tree-cutting activities in roadless areas.

Roadless areas consist of IRAs identified in the 2001 rule. The IRAs analyzed as part of this alternative include approximately 4.25 million acres of NFS lands in Colorado.

The 2001 rule generally prohibits roading in IRAs with the exceptions noted in Table 2.

Table 2. The 2001 rule, circumstances in which roading may occur in IRAs

Description
• Where a road is needed to protect **public health and safety** in cases of imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property.
• Where a road is needed to conduct a response action under the **Comprehensive Environmental Response, Compensation, and Liability Act** (CERCLA), or to conduct a natural resource restoration action under CERCLA, section 311 of the Clean Water Act, or the Oil Pollution Act.
• Where a road is needed pursuant to reserved or outstanding rights, or continuance of existing land use authorizations.
• Where road realignment is needed to **prevent irreparable resource damage** that arises from the design, location, use, or deterioration of a NFS road that cannot be mitigated by road maintenance.
• Where road reconstruction is needed to implement a **road safety improvement project** on a forest road determined to be hazardous on the basis of accident experience or accident potential on that road.
• Where the Secretary of Agriculture determines that a **Federal Aid Highway project**, authorized pursuant to Title 23 of the United States Code, is in the public interest or is consistent with the purposes for which the land was reserved or acquired and no other reasonable and prudent alternative exists.
• Where a road is needed in conjunction with the **continuation, extension, or renewal of a**

mineral lease issued prior to adopting the 2001 rule (January 12, 2001), and includes any new lease issued immediately upon expiration of an existing lease. Such roading must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable forest plan direction, regulations, and laws. These roads must be obliterated when no longer needed for the purposes of the lease or upon termination or expiration of the lease, whichever is sooner.

The 2001 rule generally prohibits timber harvest (also referred to in this EIS as tree-cutting, sale, and removal) with the exceptions noted in Table 3.

Table 3. The 2001 rule, circumstances in which tree-cutting, sale, or removal would be allowed in IRAs

Description
• The cutting, sale, or removal of generally small-diameter timber may occur in IRAs where needed to maintain or improve **threatened, endangered, proposed, or sensitive species habitat**, consistent with maintaining or improving roadless area characteristics defined in §294.11.
• The cutting, sale, or removal of generally small-diameter timber may occur in IRAs where needed to **maintain or restore the characteristics of ecosystem composition and structure**, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period, consistent with maintaining or improving roadless area characteristics defined in §294.11.
• The cutting, sale, or removal of timber may occur in IRAs where it is **incidental** to the implementation of a management activity not otherwise prohibited by this subpart.
• The cutting, sale, or removal of timber may occur in IRAs where needed for **personal or administrative uses** provided for in 36 CFR part 223.
• The cutting, sale, or removal of timber may occur in parts of IRAs where roadless characteristics have been **substantially altered** by the construction of a NFS road and subsequent timber harvest. Both the road construction and timber harvest must have occurred after the IRAs were established and prior to adoption of the 2001 rule (January 12, 2001).

The 2001 rule does not revoke, suspend, or modify any permit, contract, or other legal instrument authorized prior to January 12, 2001. Also, the 2001 rule does not revoke, suspend, or modify any project or activity decision made prior to January 12, 2001.

Proposed Rule

The Colorado Roadless rule or 'proposed rule' would supersede forest plan direction for roading and tree-cutting in CRAs, except where forest plan direction is more restrictive.

This alternative incorporates updated roadless area evaluations from the four NFs currently completing forest plan revisions, as well as roadless area evaluations and inventory updates completed on all the NFs in Colorado as part of this proposed rulemaking process. The CRAs are designed to eliminate inconsistencies between roadless characteristics and existing conditions in roadless areas.

In establishing CRAs for the proposed Colorado Roadless Rule, this alternative does not include 520,800 acres of substantially altered land (including corrections for mapping errors and landownership boundaries), and does not include 8,200 acres in existing ski permits or ski area development allocations in the land management plans. The substantially altered lands are those that do not have roadless area characteristics, primarily because of roads and timber harvest activities that have occurred in the area. The 8,200 acres of ski area terrain not included in CRAs include 6,600 acres in ski areas under existing permits and 1,600 acres outside permit boundaries but in forest plan allocations for future ski area development. The CRAs under this alternative include approximately 309,000 acres of unroaded NFS lands outside the current IRAs that have roadless characteristics that would be conserved under the proposed Colorado Roadless Rule.

This alternative specifically identifies 29,000 acres in CRAs on the Grand Mesa, Uncompahgre, and Gunnison (GMUG) NF as the North Fork coal mining area, in which certain roadless area management circumstances would apply.

The proposed rule provides for the Chief of the Forest Service to issue administrative corrections to the maps effective upon public notice.

In summary, the proposed Colorado Roadless Rule identifies approximately 4.031 million acres of NFS land in Colorado to be managed as CRAs. Details of acreage adjustments by forest are displayed in Appendix A of the DEIS (USDA Forest Service, 2008).

The proposed rule expands upon the circumstances in which roading and tree-cutting may occur in CRAs. This alternative generally prohibits roading in CRAs, but it does provide for exceptions to this general prohibition (see Table 4).

Table 4. The proposed rule, circumstances in which roading would be allowed in roadless areas

Description
Roads
• Where a road is needed to conduct a response action under the CERCLA, or to conduct a natural resource restoration action under CERCLA, Section 311 of the Clean Water Act, or the Oil Pollution Act.
• Where a road is needed pursuant to reserved or outstanding rights, or continuance of existing

land use authorizations.

- Where road realignment is needed to prevent irreparable resource damage that arises from the design, location, use, or deterioration of a NFS road that cannot be mitigated by road maintenance.

- Where road reconstruction is needed to implement a road safety improvement project on a forest road determined to be hazardous on the basis of accident experience or accident potential on that road.

- Where the Secretary of Agriculture determines that a Federal Aid Highway project (pursuant to Title 23 of the United States Code) is in the public interest or is consistent with the purposes for which the land was reserved or acquired and no other reasonable and prudent alternative exists.

- Where a road is needed to allow for construction, reconstruction, or maintenance of existing or future authorized utility and water conveyance structures, if consistent with the applicable forest plan.

- Where a road is needed in conjunction with the continuation, extension, or renewal of an oil and gas lease, including construction of infrastructure necessary to transport the product on lands under an existing lease as of the effective date of this rule. Any roads constructed pursuant to rights granted under an oil and gas lease shall be decommissioned and the affected landscape restored when the road is no longer needed to facilitate oil and gas activities or upon termination of the lease.

- Where a road is needed in conjunction with existing or future coal leases, for coal exploration and development activities on certain CRA lands in the identified North Fork coal mining area. In the North Fork coal mining area, roads constructed pursuant to rights granted under a coal lease for the purposes of methane removal from underground mines may be used by an oil and gas lessee for the purpose of collecting and transporting coal mine methane, if applicable. These roads shall be closed to all motorized vehicles not specifically used for the purpose of access, except for administrative use by the Forest Service and other agencies with jurisdictional authority over coal mining, including emergency response. These roads will be restored and reclaimed pursuant to section 294.33(c) once coal mining or the collection/transportation of coal mine methane under an oil and gas lease is completed.

Temporary Roads Only

- Where a road is needed for treatment actions and in areas identified in a CWPP as defined in section 101(3) of the Healthy Forest Restoration Act of 2003 (Public Law Number 1080148) or, if a CWPP is not present, in areas of the WUI as defined in section 101(16) of the Healthy Forest Restoration Act of 2003.

- Where a road is needed for public health and safety in cases of threat of flood, fire, or other potential catastrophic event that without intervention, would cause the loss of life, or property.

Unlike the 2001 rule, the proposed rule adds circumstances allowing road building in CRAs to support future authorizations of utility and water conveyance structures[2], subject to applicable forest plan direction, and to support future coal leases in the North Fork coal mining area. The proposed Colorado Roadless Rule also includes circumstances allowing temporary road building in CRAs to support CWPPs or WUI fuels projects, if the applicable forest plan would allow the action.

Roads can be built for accessing existing oil and gas leases, as of the date of the Colorado Roadless Rule, and will be considered forest roads, thus part of the NFS. Forest roads built for access to existing oil and gas leases and coal mining and related surface activities, will be decommissioned and the affected landscape restored when the road is no longer needed or upon termination of the license or lease.

The proposed rule further specifies that the responsible official may consider construction of a temporary road only after reviewing and rejecting other access options, resource and community protection needs, and consistency with applicable land management plans. If it is determined that a temporary road is needed, construction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbances, and complies with all applicable lease requirements, forest plan direction, regulations, and laws. When temporary roads are no longer needed for the established purpose, or upon termination or expiration of the contract or permit, whichever is sooner, those roads shall be decommissioned and the affected landscape restored.

All roads constructed in CRAs under all circumstances will be closed to motorized vehicles, including off-highway vehicles (OHVs), not specifically used for the purpose of the access except for administrative use by the Forest Service.

The provisions of the proposed Colorado Roadless Rule prohibit the cutting, sale, or removal of trees in CRAs unless one of four circumstances described in table 5 is met. The responsible official must consider the need for the cutting, sale, or removal of trees along with other resource and community protection needs, consistency with applicable land management plans, and effects on roadless characteristics.

[2] Utilities are defined as existing and future powerlines. Water conveyance structures are defined as existing and future diversion structures, headgates, pipelines, ditches, canals, and tunnels; the term water conveyance structure does not include reservoirs.

Table 5. The proposed rule, circumstances in which tree-cutting, sale, or removal would be allowed in roadless areas

Description
Where needed for **management and improvement of wildlife and plant species**, including threatened, endangered, proposed, or sensitive species in coordination with the Colorado Department of Natural Resources, including the Colorado Division of Wildlife. Such activities should be designed to maintain or improve roadless characteristics as defined by this rule.
Where needed to **reduce the hazard of wildfire effects or large-scale insect and disease outbreaks**, in areas covered by and as provided in a CWPP as defined in section 101(3) of the Healthy Forests Restoration Act of 2003 (Public Law Number 108-148), or, if a CWPP is not present, in areas of the WUI as defined in section 101(16) of the Healthy Forests Restoration Act of 2003. To the extent practicable, consistent with the purposes of this paragraph, the responsible official shall implement projects to reduce the wildfire hazard to communities in balance with roadless area characteristics as defined by this rule.
Where it is **incidental** to the implementation of a management activity not otherwise prohibited by this subpart.
Where needed and appropriate for **personal or administrative use**, as provided for in 36 CFR 223- Sale and Disposal of NFS Timber.

The Colorado Roadless Rule would not revoke, suspend, or modify any permit, contract, or other legal instrument authorized prior to the date of the rule. Also, the Colorado Roadless Rule would not revoke, suspend, or modify any project or activity decision made prior the date of the rule.

Land Management Plans Alternative

The land management plans alternative would promulgate a state-specific rule directing that management of IRAs in Colorado will be based on direction in the land management plans for the eight NFs. This alternative uses the IRAs identified in each forest plan or its associated records of decision, which currently coincides with the 2001 rule IRAs. Effectively, this alternative would exempt IRAs in Colorado from the 2001 rule. As with the 2001 rule, the roadless areas under the land management plans alternative cover 4.25 million acres. In general, the land management plans alternative allows for more roading and tree-cutting in roadless areas compared to the other two alternatives.

This alternative follows forest plan direction regarding roading and applicable Forest Service directives and regulations. The directives discourage construction of new permanent roads and require responsible officials to minimize the miles of permanent roads to those determined to be necessary. Furthermore, the directives encourage use of temporary roads when needed for single-use projects and authorizations. Road construction and decommissioning policies are the same as those previously described for the other alternatives.

The land management plans alternative differs from the other two alternatives in that it does not include a general prohibition on roading in the roadless areas. Roading in these roadless areas is prohibited or limited only where there is specific land management plan direction. The DEIS

record contains a report that excerpts the management direction from each forest plan relevant to prohibitions or limitations on roading or tree-cutting, sale, or removal activities on NFS land.

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

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

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 the President's budget for FY 2009, the portion of the Forest Service budget devoted to fire preparedness and suppression has steadily increased from 25% to 44%. Basically for the next 15 years, the Agency expects to have a "flat" budget, with nearly half of the budget going to fire suppression. A flat budget will not allow the Agency to increase funding for proposed projects in inventoried roadless areas over the current level nationally, regionally, and within the State of Colorado. There will also be little funding to deal with the backlog of road and facilities work. Priority is expected to continue to be given to projects and proposals in response the Healthy Forest Restoration Act of 2003 (HFRA) and the Energy Policy Act of 2005. Those effects are discussed below.

Planning Rule

On April 21, 2008, the Agency published 36 CFR 219 National Forest System Land Management Planning Final Rule (the 2008 Planning Rule) in the **Federal Register**. The 2008 Planning Rule offers a more strategic approach to land management plan development,

amendment, and revision. It uses a collaborative approach to expand the public's opportunities to be more involved in planning. The 2008 Planning Rule requires the Forest Service to fully comply with the National Environmental Policy Act (NEPA). The responsible official will disclose environmental effects to a proposed forest plan using the appropriate level of analysis and documentation as required by NEPA. This could be an EIS, an environmental assessment (EA), or a categorical exclusion (CE) depending on the character of the proposed plan.

The 2008 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, 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 2008 Planning Rule establishes administrative procedures. The 2008 Planning Rule 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 2008 Planning Rule affect provisions of the roadless rule. However, the Agency recognizes the 2001 rule or State-specific roadless rule would place constraints on individual IRAs in individual land management plans. In the case of the proposed Colorado Roadless Rule, the proposed rule seeks to narrow differences between the rule and land management plans. Therefore, a responsible officials' discretion on the development, amendment, or revision of individual land management plans developed under any planning rule (all alternatives) would be constrained to ensure compliance with any roadless rule in effect for the specific IRAs.

Travel Management Rule
In response to its growing backlog in road maintenance and the increase of motorized cross-country travel, the Agency implemented its travel management regulations in November 2005. (70 FR 68264). This rule requires the designation of routes (roads and trails) on each NF and grassland. The public is allowed to participate. Motor vehicle use outside of designated routes will be prohibited. This is a procedural rule and there is no mandated outcome that would affect this Colorado Roadless Rule. Additionally, the Governor of Colorado has specifically stated his desire to keep travel management separate from the State's roadless petition.

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

Proposed Forest Service NEPA Procedures
The Agency will soon finalize a procedural rule to guide its implementation of NEPA. While the proposal will include some changes, most of the Agency's existing NEPA procedures currently in Agency directives would be moved to regulation unchanged including categorical exclusions. No cumulative effects are expected from these actions because these are procedural requirements, which do not have effects on the human environment.

Healthy Forest Restoration Act (HFRA) of 2003
The Healthy Forests Restoration Act (HFRA) (Pub.L. 108-148), provides processes for implementing hazardous fuel reduction projects on certain types of "at-risk" NFS and Bureau of Land Management (BLM) lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. When implementing hazardous fuel reduction projects, HFRA protects existing old growth stands and "[f]ocuses largely on small diameter trees, thinning, strategic fuel breaks, and prescribed fire to modify fire behavior, as measured by the projected reduction of uncharacteristically severe wildfire effects for the forest type (such as adverse soil impacts, tree mortality or other impacts);" and "maximizes the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fires-resilient stands"[4]

The establishment of WUI areas and CWPPs helps to implement the Act. At the national-level, the majority of WUIs areas are not in IRAs; however, there are overlaps. WUI distances vary by

[3] Section 294.14(e) states: The prohibitions and restrictions established in this subpart are not subject to reconsideration, revision, or rescission in subsequent project decisions or land and resource management plan amendments or revisions undertaken pursuant to 36 CFR part 219.
[4] See Sections 102(e) and (f) of HFRA

individual CWPP.[5] These plans are developed following *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy (2001).*

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

Energy Policy Act of 2005
Key provisions of the Act provide for the development of streamline procedures for energy exploration and development, but the Act does not direct energy development in areas, such as IRAs. In response to the Act, there is a multi-agency team developing a proposal to designate a system of West-wide energy corridors. While it is in the draft stage, the team is aware of the Agency's policy on IRAs. Any proposal derived from this effort will be subject to this rule.

METHODS, DATA, AND ASSUMPTIONS

Scope of Analysis

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

The scope of the proposal for 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 proposal—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 DEIS).

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.

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

Thus, to set the stage for subsequent sections, this section describes the relative differences in the amount of tree-cutting and roading projected to occur in roadless areas over the next 15 years. Projecting the potential for future tree-cutting and roading activities in roadless areas beyond a 15-year time horizon would be overly speculative in the context of this analysis.

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

Benefits and Costs

Because the proposed rule does not prescribe site-specific activities, it is difficult to predict the benefits and costs of the different alternatives. In addition, the types of benefits derived from roadless characteristics and the uses of roadless areas are far ranging and include a number of non-market and non-use benefit categories that are difficult to measure in monetary terms. The proposed 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 separately for each resource area in a quantitative or qualitative manner in the context of the following measures:

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

The assessment of benefits and costs begins by distinguishing between the *creation of potential opportunities* and the *projection of reasonably foreseeable activities*. Potential opportunities for generating goods and services are affected by the extent to which activities are permitted in roadless areas under each alternative. Projections of reasonable foreseeable activities take into account area-specific data and evidence regarding resource utilization and development trends, location of resources, and other factors affecting the likelihood that land will be used for specific uses. This information is aggregated into assumptions about reasonably foreseeable flows of goods (e.g., coal, oil and gas production), services (e.g., reduction of risks from wildfire in the wildland urban interface), and resource utilization and then used to project activity levels (tree-cutting, roading) for each alternative over a 15 year time period. Projected activity levels are also used to describe potential changes in benefits derived from roadless characteristics. Details about the derivation of activity projections are described in the DEIS for the proposed rule (USDA Forest Service 2008), as well as the resource specialist reports supporting the DEIS, and are not reiterated in this regulatory impact analysis document.

Benefits and costs are organized and discussed in the context of 'local resource challenges' and 'roadless characteristics' in an effort to remain consistent with the overall purpose of the proposed rule, recognizing that benefits associated local concerns may trigger indirect benefits in the roadless characteristics in some cases (e.g., forest health). Access and designations for motorized versus non-motorized recreation are topics raised in comments during scoping, however, the proposed rule does not provide direction on where and when OHV use would be permissible and makes clear that travel planning-related actions should be addressed through travel management planning and individual land management plans.

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

Distributional Effects

The details about economic impact analysis for the proposed rule are provided in the Economics Specialist Report (USDA Forest Service 2008b). Distributional effects are discussed in the context of (1) changes in jobs and income for sectors where measurable output differs significantly across alternatives, (2) changes in revenue sharing (payments to states and counties) associated with receipts from sectors where output differs significantly, and (3) changes in opportunities for protecting values at risk in communities and counties adjacent to roadless areas.

Economic impact analysis is used to evaluate potential direct, indirect, and induced effects on the economy. Economic impacts are estimated using input-output analysis. Input-output analysis is a means of examining relationships in an economy, both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy, all else constant. This examination is called impact analysis. IMPLAN (Minnesota IMPLAN Group 2003) translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. The IMPLAN modeling system allows the user to build regional economic models of one or more counties for a particular year. The regional model for this analysis uses the 2006 IMPLAN data.

To provide a statewide context for the analysis, all Colorado counties were organized into four model areas. Table 6 summaries the counties in each of these model areas. Figure 3 is map displaying the county composition of each model area.

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

Table 6. 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

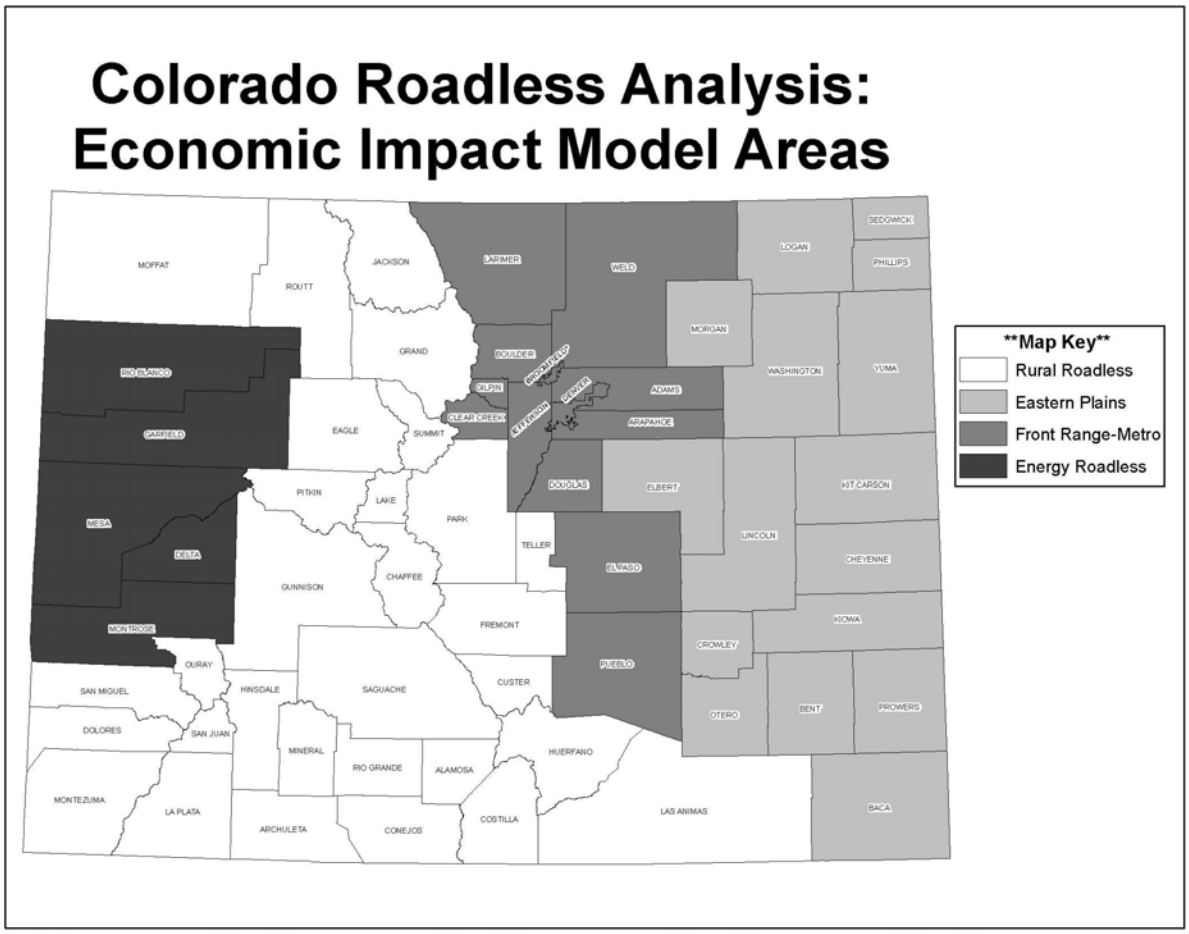

Figure 3. Colorado Roadless Analysis: Economic Impact Model Areas

Natural gas and coal industry sectors, potentially affected by roadless area management, are primarily in five western slope counties: Delta, Garfield, Mesa, Montrose, and Rio Blanco. The physical locations of natural gas and coal resources are found in other counties around the State of Colorado, but these locations are either (1) not affected by roadless management alternatives or (2) are isolated with somewhat small deposits. Pitkin and Gunnison Counties are exceptions to this characterization.

Important natural gas and coal resources associated with roadless areas are in the northwest corners of Pitkin and Gunnison Counties[7]. Development of these resources would likely impact jobs and labor income in the five counties noted above rather than in the counties where the deposits are located. Labor and material flows to the resource locations, as well as production transport after extraction, are far more likely to impact Mesa, Garfield, and Delta Counties instead of Pitkin and Gunnison Counties. Two coal mining operations in Gunnison County currently provide a good example of these flows. Nearly all employees working at the mines

[7] Other counties within the San Juan basin (e.g., Archuleta, Mineral) have gas reserves and roadless area boundaries that change by alternative in Archuleta. However, oil and gas development is not projected to vary by alternative in the San Juan basin (see Energy and Minerals section of the DEIS (USDA Forest Service, 2008)).

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

For the reasons cited above, the economic impacts for oil, gas, and coal are modeled using only Delta, Garfield, Mesa, Montrose, and Rio Blanco Counties to represent changes in oil and gas production that occurs in the Piceance Basin. Oil and gas reserves are also in roadless areas in other basins (San Juan Sag and Paradox Basin); however, production does not vary across alternatives for these basins[8]. As a consequence, the economic model (see Methods: Distributional Effects section of this report) for leasable energy minerals estimates impacts associated with changes in production in the Piceance Basin only (i.e., oil and gas activity on the GMUG and White River NFs). Total production for the respective energy sectors (see Leasable Minerals Section) for the Piceance basin are divided by 30 years (life of a well) and multiplied by current prices[9] 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.

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. Accessible coal reserves vary by alternative and are discussed in the Energy Minerals section of the DEIS (USDA Forest Service, 2008) are gross totals which may or may not be economically viable. Coal reserves used for economic impact purposes are those adjacent to existing mines for which there is known expressed interest (Dyer, 2008). These coal reserves are in Gunnison County adjacent to the Elk Creek and West Elk mines. Average annual coal production is estimated to be 4 million tons per year under the proposed rule and the land management plans alternative; no production is anticipated under the 2001 rule. Production amounts are based on average annual production for each mine over the period 2009 to 2023, recognizing that the Elk Creek mine is expected to close near the end of 2016 and West Elk at the end of 2026.

Bowie Resources Limited is exploring for but has not confirmed additional reserves adjacent to their existing lease holdings. These potential reserves are not in roadless areas. It is assumed that current coal production levels for each mine will continue in the future until these reserves are exhausted. Projected mines lives by alternative are shown in Table 7.

Table 7. Estimated mine life based on existing plus adjacent coal reserves in roadless areas by alternative.

County	Mine name	Approximate year recoverable reserves depleted		
		The 2001 tule	The proposed rule	Land management plans

[8] The allocation of oil and gas production across roadless and non-roadless areas varies by alternative for the San Juan and Paradox Basins on account of changes in roadless boundaries, but total aggregate production remains the same.

[9] $6.13/Mcf and $60.23/bo. Source: Colorado Oil & Gas Conservation Commission web: Colorado Oil and Gas Price indices for Calendar Year 2006 (http://oil-gas.state.co.us/).

				alternative
Delta	Bowie No. 2&3	2013	2013	2013
Gunnison	Elk Creek	2011	2016	2016
Gunnison	West Elk	2018	2026	2026

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

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 DEIS (USDA Forest Service, 2008).The model[10], 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). For this analysis, at-risk communities within 3 miles of CRAs are identified. The communities that could potentially benefit from protection are assumed to be those at-risk communities that are within 3 miles of roadless areas where fuel treatments are projected to be highly likely under each alternative (see *Fire Ecology and Fuels* and *Economic Impacts* sections in this document for details).

[10] 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

As of the printing of this notice, the 2001 rule is in operation by court order and represents the legal status quo. For the purpose of regulatory impact analysis, the 2001 rule is assumed to represent baseline conditions or goods and services provided by NFs and grasslands in the near future in the absence of the proposed rule.

Time Frame and Geographic Scope

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

Data Sources

The results discussed in this report are often based on analyses presented in the DEIS for the proposed rule (USDA Forest Service 2007) as well as separate resource *Specialist Reports* (e.g., Minerals, Social and Economics, Recreation) completed to support and cited in the DEIS. As such, this report makes frequent reference to the DEIS 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 DEIS for details about environmental effects as well as sources of data and information for effects analysis. Examples of data sources cited in specialist reports include:

Forest Service

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

Other Agencies

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

State of Colorado

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

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

Public comments, collected during scoping for the proposed rule, were considered. In addition, each forest provided information regarding projected tree-cutting, harvest volumes, and roading that would likely occur in CRAs and substantially altered areas under each alternative. Projections for activity levels consider flat budget trends. Each resource area section in the DEIS provides further descriptions of the information used to project activity levels (USDA Forest Service 2008).

Road Construction and Tree-Cutting Projections

Projections of roading and tree-cutting activities are made based on the 4.25 million acres of IRAs for alternatives 1 and 3, and the 4.03 million acres of CRAs for the proposed rule. In addition, projections for the proposed rule include the activities that would likely occur in the substantially altered acres and ski area acres included in IRAs and not included in CRAs, for comparison purposes. The appendices in the DEIS provide more detail regarding the foreseeable (projected) likelihood of roading, tree-cutting and energy resource operations in each roadless area for each alternative.

Road Construction and Reconstruction (roading)

The Forest Service manages a system of roads on NFS lands and assigns road management objectives for each NFS road. Road management objectives define the road design standard and maintenance level, the type of vehicle that may be used on the road, travel restrictions such as seasonal or year-round closures to public use, and other traffic requirements, as described in the Forest Service manual (FSM) on transportation analysis (FSM 7712.5). In addition to the NFS roads, there are State, county, and local municipality roads that also occur on NFS lands, as well as privately owned roads that are needed to access private property.

The Forest Service authorizes and manages the NFS roads that are determined to be needed for permanent long-term use. From the 1940s through 1980s, most roads on NFS lands, including some that occur in roadless areas, were constructed to support timber harvest activities. Roads that currently exist on NFS lands have also been constructed to support recreational activities, special use permits, mineral and energy development, access to private land, and other multiple uses. Recreation is currently the single largest land use activity supported by the NFS roads in Colorado, with administrative and commercial uses making up the balance.

The Agency may also authorize the construction and use of temporary roads where needed for short-term, one-time, single use purposes. Temporary roads that have been built in roadless areas are typically those needed for a short-term, single land use activity. They are authorized for contracts and permits such as timber sale contracts, special use permits including oil and gas exploration permits, utility or other facility construction contracts, and other authorized uses, or they may be constructed for the Forest Service to use for administrative purposes.

Temporary roads must be decommissioned after use. The Forest Service decommissions authorized roads that are determined to be no longer needed. Road decommissioning involves

activities designed to stabilize and reestablish the roads to vegetative cover similar to the surrounding landscape, as directed in FSM 7703. The Forest and Rangelands Renewable Resources Planning Act requires that temporary roads be closed and revegetated within 10 years after the use of that road has ended. Decommissioning actions may involve the use of logs, rocks, or other natural materials to discourage people from driving on the road, as well as the restoration of vegetative ground cover. Tilling, seeding, and recontouring may also be done when needed.

Unauthorized roads are those roads created without the Agency's express permission. They include remnants of historical uses, such as old logging and mining roads, along with user-created roads that resulted from vehicle travel off designated roads and trails. The Forest Service rehabilitates unauthorized roads where necessary to reduce resource damage.

Roads built to support mineral and energy developments—such as for oil, gas, and coal development—are long-term NFS roads that must be maintained during their life. These mineral and energy development roads are closed to the public wherever possible, and decommissioned after they are no longer needed for that specific authorized use.

All roads authorized to be constructed on NFS lands are designed in accordance with a comprehensive set of road engineering design standards in (Forest Service Handbook (FSH) 7709.59, along with the applicable forest plan standards and guidelines and road standards, which include requirements for environmental protection.

The Forest Service maintains NFS roads based on road maintenance levels that are part of the road management objectives assigned to each road, as described in the FSH 7709.58 on transportation system maintenance. Road maintenance levels assigned to NFS roads are defined as follows:

- Maintenance level 1 roads are *closed to vehicular traffic for periods of more than one year.* Only basic custodial maintenance is performed to keep resource damage to an acceptable level and perpetuate the road for future use.
- Maintenance level 2 roads are maintained to a low standard for *high-clearance vehicles* such as sport-utility vehicles, pickups, and jeeps. Traffic is normally minor and they usually have a native (dirt) surface. Design and maintenance standards require control of accelerated erosion and water runoff.
- Maintenance levels 3, 4, and 5 are designed at a higher standard to accommodate *low-clearance passenger vehicles*. These roads may be single or double lane and usually have gravel or paved surface.

The current distribution of NFS road maintenance levels in Colorado is 20 percent Level 1, 58 percent Level 2, and 22 percent Level 3/4/5.

Annual maintenance averages $500 to $6,500 per mile depending on the road maintenance level and other factors (based on the Forest Service Region 2 cost guide, forest planning cost estimates and a 2008 inflation rate). Road maintenance costs have been exceeding funding levels for at least the past several 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 roads on NFS lands have been decommissioned or closed. It is expected that the trend in closing and decommissioning more road miles than are constructed would continue. There will be a net reduction in road density in roadless areas as the Forest Service continues to decommission unauthorized roads or formerly authorized roads that are no longer needed.

In addition to maintaining roads on the system, the Forest Service may also authorize road reconstruction prior to using the road. Road reconstruction actions may include improving the road to increase the traffic service level or expand the capacity of the road, such as by surfacing or widening. Reconstruction may also include realigning or relocating road segments to a new location to reduce resource impacts.

There are approximately 18,700 miles of roads on NFS lands in Colorado (Forest Service Region 2 INFRA-GIS roads databases, April 2008). Approximately 1,400 miles occur in IRAs and 220 miles occur in CRAs. Of the 1,400 miles in IRAs, approximately 1,160 miles (83 percent) are in the substantially altered portions of the IRAs, which are not included in the CRAs. Roads in the roadless areas are generally low-standard, low-volume roads that restrict public motor vehicle access and are mostly used for specific land use authorizations.

Table 8 displays the miles of NFS roads and other authorized roads on NFS lands in roadless areas by alternative. The other authorized road miles shown include State, county, local, and private roads. The table does not include unauthorized or non-system roads. Inventories indicate that there are at least 35 to 45 miles of unauthorized roads in the roadless areas, and it is suspected that additional unauthorized roads in roadless areas have not been identified (Forest Service Region 2 INFRA-Roads database, April 2008).

In addition, table 3-1 shows roads identified in the inventory as no longer needed and scheduled to be decommissioned and removed from the system, based on budget and other factors.

Table 8. Miles of existing authorized roads in roadless areas

	Roads in IRAs (alternatives 1 and 3)	Roads in CRAs (the proposed rule)
NFS road miles	1322	166
Other authorized road miles	22	7
Road miles no longer needed	52	43
Total existing road miles	1,396	216

CRAs=Colorado roadless areas; IRAs=inventoried roadless areas; NFS=National Forest System
Data source: Forest Service Region 2 INFRA-GIS roads databases, April 2008.

Projections

Each alternative analyzed includes a different set of management direction in which roads may be constructed or reconstructed in roadless areas (IRAs or CRAs). Based on this direction, resource specialists on each NF made projections about the extent to which roading may occur in each roadless area over the next 15 years. They considered the differences among alternatives that allow roading, as well as any major topographic or economic constraints that would make roading unfeasible (see table 3-3) (details are in Appendix C of the DEIS and the EIS record).

Under the proposed rule, roads built in CRAs for forest health or hazardous fuel reduction purposes must be temporary roads that remain closed to the general public and are decommissioned after the intended use has terminated. Under alternatives 1 and 3, where roads are allowed to be constructed for those purposes in IRAs, they would most often be temporary roads, based on agency road management policies and recent past trends for road building in IRAs. Recent past trends also indicate that roads built for energy operations (oil, gas, coal) would likewise be closed to public vehicle traffic and decommissioned after use, although those roads would be maintained on the system and typically used for a longer period of time (several decades or longer).

Table 9 projects the reasonably foreseeable yearly average roading by alternative to occur in roadless areas in the next 15 years. The table does not show roads that may be needed in response to emergencies that cannot reasonably be predicted. While these are projections, there is no way to predict when (or even if) construction would occur. The average annual miles shown in the table do not reflect the high degree of variability in the miles of road expected each year over the 15-year time horizon.

Table 9. Average annual roading miles projected by alternative

	Average annual roading		
	The 2001 rule: 2001 rule	The proposed rule: Colorado Roadless Rule	Land management plans alternative: land management plans
	IRAs	CRAs	IRAs
Type of projected roading activity	---------- miles ----------		
Road construction	5	21	28
Road reconstruction	1	0	2
Total construction/reconstruction	**6**	**21**	**30**

Note: As explained in chapter 2, the CRAs include 309,000 acres of unroaded areas that are not included in IRAs, and exclude 520,800 acres of substantially altered areas and 8,200 acres of ski areas that are included in IRAs.

Miles are rounded to the nearest mile.

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

Table 10 shows the distribution of road building, in terms of the anticipated need for the road. The table shows that most road miles projected to be constructed or reconstructed in roadless areas would be for energy resource development, followed by utility and water conveyances. The roads built for energy resource operations, fuels, and forest health purposes would be expected to be eventually be decommissioned. Table 11 shows the projections of oil and gas wells and associated well drilling pads, and acres of coal reserves, where supporting roads would be allowed and expected under each alternative. The projections shown in the table were used in part to estimate the miles of new roads projected for each alternative. The assumptions used to project new roads needed in support of oil, gas, and coal operations are discussed in chapter 3 of the DEIS.

Table 10. Distribution of average annual roading projections in roadless areas for each alternative, by purpose for the road

Purpose for projected roading	Average annual roading		
	The 2001 rule: 2001 rule IRAs	The proposed rule: Colorado Roadless Rule CRAs	Land management plans alternative: Land management plans IRAs
	---------- *miles* ----------		
Fuels or forest health	0	5.9	10.6
Existing special use authorizations (ski areas, recreation residences, etc.)	0.7	0.3	1.2
Utility and water conveyances	1.0	0.9	1.5
Hard rock minerals	0.2	0.2	0.2
Other roads (health and safety, Federal Highway, CERCLA)	0.3	0.3	0.7
Recreation management	0	0	0.1
Grazing administration	0	0	0
Oil or gas	3.7	10.2	11.1
Coal operations	0.4	3.0	4.4
Total road construction	**6.3**	**20.8**	**29.8**

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

Table 11. Average annual projections of oil and gas wells and pads, and total coal reserve acres where roading is allowed in roadless areas, by alternative

	Projected amount		
	The 2001 rule (IRAs)	The proposed rule (CRAs)	Land management plans alternative (IRAs)
Number of wells[1]	16	45	48
Number of well pads[1]	4	11	11
Acres of coal reserves[2]	3,700	29,000	31,000

[1]Sources: U.S. Forest Service, Region 2 GIS-Roadless Areas; U.S. Geological Service, Colorado Geological Survey; and U.S. Bureau of Land Management leaseable minerals databases (April 2008).

[2]Sources: U.S. Forest Service, Region 2 GIS-Roadless Areas; US Geological Service, Colorado Geological Survey; and U.S. Bureau of Land Management leaseable minerals databases (April 2008).

Tree-cutting and Removal

Tree-cutting anticipated to occur in roadless areas may or may not result in removal of wood products. Tree-cutting in roadless areas, with or without wood product removal, would primarily be used for hazardous fuel reduction and forest health improvement purposes. The most prevalent treatments would be to reduce hazardous fuels near at-risk communities and municipal water supplies from adverse wildfire-related impacts, followed by tree-cutting in roadless areas to reduce forest insect and disease levels (i.e., improve forest health). Tree-cutting would also continue to occur at previous levels under any of the alternatives in localized areas for incidental purposes such as mineral operations, special use permits, hazard tree removal, and trails.

Most of the treatments would occur in lodgepole pine forest cover types, as well as in ponderosa pine and pinyon-juniper. Tree-cutting in lodgepole pine, much of which has been affected by bark beetles, is expected to include commercial timber harvest. Tree-cutting in the pinyon-juniper and ponderosa pine cover types for fuel reduction purposes is projected to entail tree-cutting of mostly smaller size trees rather than larger, commercial size trees. Tree-cutting treatments without wood product removal may involve masticating (using machines that effectively shred standing trees), chipping, or slashing methods. Wood product removals may also be non-commercial, such as for personal use firewood or fence posts.

Timber sales are often the least-cost method for meeting vegetation management objectives by offsetting some operating costs through commercial sales.

Activities related to tree-cutting or timber harvesting may include: roading or maintenance; manually felling trees and scattering or piling the slash (unmerchantable trees, treetops, and limbs remaining on-site after tree-cutting); and use of large machines for cutting, masticating, chipping, or piling. Merchantable logs would primarily be skidded (dragged) to nearby roads using conventional ground-based systems, although cable or helicopter yarding equipment may also be used to transport logs (partially or fully suspended off the ground) to a landing site or clearing along a road. From the log landings, logs are loaded onto log trucks and hauled away.

Tree-cutting in roadless areas would most often be followed by prescribed burning, to reduce slash accumulations from the thinning treatments and restore favorable conditions for seeds to germinate. None of the alternatives preclude the use of prescribed burning in roadless areas, and prescribed burning may in some situations occur without first thinning the trees. Also, none of the alternatives preclude the manipulation of shrubs or grasslands. All alternatives differ in the extent to which tree-cutting and/or harvest is allowed.

Tree-cutting requires silvicultural (forest management) prescriptions. Silvicultural prescriptions in roadless areas would mostly entail thinning dense forest stands in the lower elevations of the mountains. Typically the smaller understory trees (ladder fuels) would be removed and the healthiest dominant trees retained, favoring species that are adapted to the natural ecosystem and its fire regimes. Prescriptions may also include sanitation or salvage treatments that primarily remove dead or dying trees. Salvage, including clearcuts, would be expected in areas with beetle epidemics.

All tree-cutting and removal treatments in roadless areas would incorporate applicable forest plan standards and guidelines and other environmental protection requirements. For example, ground-disturbing activities would not likely occur in wetlands, riparian areas, rare plant populations, heritage resource sites, or on very steep erodible slopes. In addition, tree-cutting and removal activities would be specifically designed to protect roadless characteristics.
Other assumptions used in projecting tree-cutting activities include the fact that budgets for vegetation management and fuel reduction would likely remain flat. Flat budgets, the low market value of small-diameter trees, and high cost of treatments, would limit the amount of tree-cutting treatments in roadless areas. The steep, rugged terrain in many roadless areas; the lack of existing roads; and the high costs associated with either helicopter logging or road building, further limit the amount of tree-cutting activity that would be economically feasible.

Projections

Table 12 projects the total tree-cutting acres and merchantable wood removal volumes foreseeable in the next 15 years in roadless areas for each alternative. All estimates shown are annual averages and would be expected to vary from year to year. For alternatives 1 and 3, projections considered the total 4.25 million acres included in IRAs, and for the proposed rule the projections considered the total 4.03 million acres included in CRAs. For each alternative, projections are based on the circumstances where tree-cutting may occur in roadless areas (outlined in chapter 2), along with the other assumptions just described. The projected harvest volumes shown in the table include both commercial and non-commercial wood product removals. Details about the likelihood of tree-cutting activities in each roadless area are in Appendix C of the DEIS and the EIS record.

Table 12. Projected average annual tree-cutting acres and harvest volumes in roadless areas by alternative

	Average annual projections		
Type of activity	**The 2001 rule: 2001 rule (IRAs)**	**The proposed rule: Colorado Roadless Rule (CRAs)**	**Land management plans alternative: Land management plans (IRAs)**
Tree-cutting acres without harvest	700	6,300	12,200
Tree-cutting acres with harvest	50	1,300	4,100
Total tree-cutting acres	**800**	**7,600**	**16,300**
Harvest volume (ccf)*	800	1,700 on CRAs only; 6,700 on CRAs and substantially altered areas	24,400

1 ccf (hundred cubic feet) = approximately 0.5 Mbf (thousand board feet).

All figures have been rounded to the nearest hundred.

Totals may not add due to rounding.

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

Benefits and Costs

Overview of Benefits Associated with Roadless Areas

Benefits and costs are divided into two parts: 1) those which are financial and captured in the fiscal records of the Forest Service, and 2) those which are realized by any organization or individual. Financial considerations include revenues and costs from the perspective of the Forest Service or other government agencies. Other benefits and costs can be realized by users of roadless areas in NFs, including backpackers, hunters, viewers of wildlife, permitted outfitters and guides, ski areas, ranchers, timber processors, and water users. Other benefits and costs can

also be realized by those who never set foot in CRAs areas and/or who desire the retention of wildland characteristics for their children.

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

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

In considering non-financial benefits and costs of roadless area management, both market and non-market goods and services can vary widely. Market goods or services are those for which one can observe transactions in the marketplace. Water rights, ski lift tickets, and the sale of cattle which graze on public lands are some examples of market values that are not captured in the financial records of government agencies. When road building and vegetative treatments are not allowed, these values may be minimal or non-existent. With roads and treatment options, these uses of roadless areas have a greater opportunity to develop and market values are realized.

Goods and services not found in the marketplace are also affected by roadless area management. Non-market goods and services are those for which there are no observable transactions. The value of these benefits are often estimated by economists using "willingness to pay" concepts (Peterson et al., 1988). Examples of non-market benefits include dispersed recreation, viewing scenery and wildlife, solitude, health benefits, biological diversity, and ecosystem functions. Another group of benefits includes those who desire to retain options for the future use, either for themselves or for others. All of these pertain to roadless areas in Colorado, and can potentially be affected by road or vegetative treatment activities.

Preferences and Values Affected by Alternatives

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

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

Forest values represent the importance and worth that people have assigned to CRAs. Forest values include, but are not limited to, aesthetic (e.g., scenery), biological diversity, cultural, economic/markets, bequest (consideration of future generations), ecosystem services/life sustaining, recreation, spiritual, subsistence, and existence/intrinsic (no direct or indirect use of forest is needed to gain value). People can hold multiple values for the same resource or may hold very separate values for specific places or experiences. The same place or roadless area will have different values to different people.

The values and interests associated with roadless area management in Colorado can be identified from responses to comments the public has provided during the 2001 rule comment periods, the 2006 Colorado Task Force public hearings, and to the 2007 Colorado Roadless Rulemaking Notice of Intent comment period. 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 13) and can be used to display the differences between alternatives, recognizing that value categories do not define specific individuals or groups.

Table 13. 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

Value/Interest Category	Defined for Colorado roadless area analysis
	into the forest without the road system. For others, desire for additional roaded access is the preferred method of travel, the travel itself is the recreational experience.
Tourism (including ski resorts)	This category is another commercial interest, but capitalizing on the roadless areas as a natural amenity that attracts customers to the area for leisure activities. Scenery is of concern to this category, but the value of roading depends on the types of experiences the operation is providing.
Wilderness	Values roadless areas as roadless so those areas can be included in the wilderness system in the future. This category focuses on future primitive and protected wilderness experiences and wilderness resources.
Wildland urban interface	This category is specific to those activities in WUI or CWPP acres that overlap in roadless areas where vegetation treatments are desired to reduce hazards of wildfire. This category values reducing wildfire hazards to houses and communities no matter the location. This category does not focus on individuals living in the WUI.

Table 14 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 14. Summary of social value and interest preference for alternatives by interest category.

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

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

proposed rule to achieve a balance between local management challenges or concerns and roadless characteristics, benefits are grouped and presented according to these two areas.

Analysis of Local Resource Concerns

Timber (Wood Products) Supply

As summarized in the DEIS (USDA Forest Service, 2008a), reasonably foreseeable harvest volumes projected under each of the alternatives are approximately: 800 ccf (0.4 MMBF), 6,700 ccf (3.35 MMBF), and 24,400 ccf (12.2 MMBF) for the 2001 rule, the proposed rule, and the land management plan alternatives respectively. These volumes are aggregate volumes from roadless areas across seven forest units. Volumes projected under the 2001 rule and the proposed rule are 3 percent and 26 percent of average total annual volume sold from 10/1/2000 to 9/30/2005 by the seven forest units affected (USDA Forest Service 2005a). The average annual volume sold by the seven forest units (26,000 ccf per year) is similar to the volume projected under the land management plans alternative (94 percent), but it is difficult to predict the extent to which potential increases in volumes from roadless areas will alter total volume supplied from NFS lands in aggregate. When considering the assumption that agency or program budgets will remain flat, average total volume sold from NFS land may well remain unchanged under all alternatives. Overall, the volume differences across alternatives are not anticipated to result in significant impacts to the wood products and forest service sectors[11].

All harvest volume under the 2001 rule is attributable to the GMUG NF, while approximately 90 percent of the volume under the proposed rule is distributed evenly across the Pike San Isabel (PSI), GMUG, and Rio Grande NFs. Under the land management plans alternative, 58 percent of the volume is associated with the PSI NF, with the Arapahoe, GMUG, Rio Grande, Routt, and San Juan forests each making up between 5 percent and 12 percent of the volume.

Minerals and Energy

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

A wide variety of mineral and energy resources occur in CRAs. Mineral resources may be classified into three categories: locatable minerals, leasable minerals, and saleable minerals. Locatable minerals include commodities like gold, silver, molybdenum, copper, lead, zinc, cobalt, uranium, dimension stone, and certain varieties of limestone. Leasable minerals in Colorado include energy mineral resources such as oil, gas, coal and geothermal. Saleable minerals are common varieties of sand, stone, gravel, soil, and clay. Generally, they are

[11] 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).

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.

This section focuses on oil and gas, as well as coal and geothermal development; the effects of the proposed rule on other minerals and energy sectors are expected to be minimal (see section "Other Resources, Services, and Programs"). For details about the discussion below, see Leasable Minerals and Social and Economic sections in chapter 3 of the DEIS (USDA Forest Service, 2008)

A relatively small number of roadless areas (CRAs and IRAs) in Colorado are covered by oil and gas and coal leases. There are no geothermal leases in any roadless areas in Colorado.

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.

Analysis of Alternatives: Oil and Gas

A number of roadless areas on the GMUG, White River, and San Juan NFs have high potential for development of natural gas resources in the next 15 years, with potential for minor quantities of oil associated with the natural gas on the GMUG. The roadless areas identified in this EIS analysis as having a high potential for oil or gas development are those that are in nationally significant oil and gas basins, are adjacent or close to producing wells, and are extensively leased.

Relatively small parts of IRAs have existing leases on the GMUG and Manti-LaSal NFs in the Paradox Basin, on the White River and Routt NF in the Sand Wash Basin, on the Pike-San Isabel NF on the Rocky Mountain Front, and on the San Juan NF in the San Juan Sag. Relative to the other areas, these leases are considered to have low potential for development in the next 15 years due to less favorable positions in oil and gas basins, relatively small lease areas, distance from ongoing development, restrictive lease stipulations, and expiration dates within a few years.

The extent to which oil and gas production can occur in roadless areas varies by alternative as noted below.

<u>2001 Rule</u>

Under The 2001 rule, roading would be allowed in IRAs on oil and gas leases that were issued (became effective) before January 12, 2001.

There are 21 IRAs in Colorado with over 640 acres leased for oil and gas, as shown in table 15. These 21 IRAs contain a total of approximately 158,500 leased acres; 43 percent (68,700 acres) were leased before 2001 and 57 percent (89,800 acres) were leased after 2001. Consequently,

under current roadless area management (2001 rule), road building is allowed on 68,400 acres leased in IRAs and prohibited on 90,100 acres leased in IRAs. Approximately 300 acres (in Housetop Mountain IRA) leased prior to January 12, 2001, has a no surface occupancy stipulation.

Table 15. Inventoried roadless area acres under oil and gas leases before and after January 12, 2001, and lease acres in IRAs where new roads are allowed or prohibited under alternative (1).

Forest	Inventoried roadless area	Acres leased	Acres leased before 1/12/01	Acres leased after 1/12/01	Acres with roads allowed	Acres with roads prohibited[1]
GMUG	Battlement Mesa	8,754	0	8754	0	8,754
	Clear Creek	22,794	15,943	6,851	15,943	6,851
	Drift Creek	4,149	3,436	712	3,436	712
	Hightower	1,867	935	933	935	933
	Nick Mountain	886	886	0	886	0
	Priest Mountain	3,991	1,281	2,711	1,281	2,711
	Raggeds	2,088	0	2,088	0	2,088
	Salt Creek	1,017	1,017	0	1,017	0
	Springhouse Creek	17,594	1,270	16,325	1,270	16,325
Manti-LaSal	Roc Creek	2,758	0	2,758	0	2,758
Pike-San Isabel	Front Range	8,116	8,116	0	8,116	0
Routt	Black Mountain	1,222	1,222	0	1,222	0
San Juan	HD Mountains	13,514	11,968	1,547	11,968	1,547
	South San Juan	3,303	3,303	0	3,303	0
White River	Baldy Mountain	6,030	5,599	431	5,599	431
	East Divide/Four Mile Park	8,909	418	8,491	418	8,491
	East Willow	5,666	4,779	886	4,779	886
	Housetop Mountain	8,308	307	8,001	0	8,308
	Mamm Peak	11,905	4,969	6,935	4,969	6,935
	Reno Mountain	9,702	2,004	7,698	2,004	7,698
	Thompson Creek	15,960	1,265	14,696	1,265	14,696
Totals		158,533	68,718	89,817	68,411	**90,124**

(1)Acres with roads prohibited (89,817 acres) = 20,792 acres with no surface occupancy (NSO) stipulations + 11,336 acres with stipulations prohibiting roads as long as the 2001 rule is in effect + 57,692 acres that do not have specific stipulations prohibiting roads but are subject to the 2001Rule road prohibitions based on the 2006 court ruling.

Of those acres leased between January 12, 2001, and September 19, 2006, while the 2001 rule was not in affect, surface occupancy (including roads) was allowed on about 74 percent of those lease acres (57,700 acres), while lease stipulations prohibited surface occupancy (including roads) on the remaining 26 percent of those acres (20,800 Ac).

On February 7, 2007, the Court ruled specifically that the 2001 rule prohibitions on new roads would apply retroactively to all leases in IRAs issued after January 12, 2001, regardless of lease terms that allow roads. Thus, that ruling affects about 73 percent (57,700 acres) of leases issued between January 12, 2001, and September 19, 2006, with terms allowing surface occupancy and roads.

Of those 21 IRAs containing oil and gas leases, the Front Range IRA leases (Pike and San Isabel NF) are in suspension and the Black Mountain IRA leases (Routt NF) will expire in October 2008. The potential for drilling to occur on these leases so that they would be extended is very low, therefore these leases are not included in estimates of future oil and gas activities and production in IRAs. Additionally, potential activity and production in the Roc Creek IRA (Manti-LaSal NF) were not projected due to unavailability of Reasonably Foreseeable Development Scenario information. The GMUG, San Juan, and White River NFs are therefore the only NFs in Colorado in which oil or gas development in roadless areas would likely occur.

Under this and other alternatives, projections were made for foreseeable oil or gas wells and associated road miles in IRAs, as well as oil and gas production. These projections are speculative and intended for general comparisons among alternatives; see Leasable Minerals section in chapter 3 of the DEIS for details about derivation of projections,

Table 16. Total 15-year projections of wells, well pads, roads and production on oil and gas leases in roadless areas (IRAs and CRAs) under each alternative

15-year estimates	The 2001 rule (in IRAs)	The proposed rule (in CRAs)	Land management plans alternative (in IRAs)
Number of wells	252 wells	674 wells	731 wells
Well pads	59 pads	143 pads	132 pads
Pad acres	209 pad acres	570.5 acres	617 acres
Miles of road	54 miles	136.5 miles	140 miles
Projected Production (billion cubic feet of gas, barrels of oil) [4]	418.6 bcfg* 38,500 bo	1,005.6 bcfg 77,000 bo	1,023.6 bcfg 87,500 bo

*** Estimated volume accessible from leases issued prior to January 12, 2001.**

Table 16 shows the cumulative 15-year projections of wells, well pads, roads and production in IRAs under this alternative. It also displays the amount that would occur in CRAs under the proposed rule and IRAs under the land management plans alternative, for ease of comparison among alternatives.

The effects on the development of oil and gas resources under The 2001 rule are summarized as follows:

- Oil and gas development and production would be limited to 18 IRAs covering portions of the GMUG, San Juan, and White River NFs.
- Access to an estimated ultimate recovery of 418.6 billion cubic feet of gas and 38,500 barrels of associated oil on leases issued before January 12, 2001, would be allowed.

- The extent of potential oil and gas resources in IRAs that are not leased has not been estimated for this analysis. Consequently, the quantities of oil and gas that road prohibitions might preclude from development in un-leased IRAs are unknown.

Proposed Rule

Under the proposed rule, roading would be allowed on oil and gas leases that allow surface occupancy and are issued before the proposed Colorado Roadless Rule becomes effective. Roading would be prohibited on oil and gas leases that are or were issued with stipulations prohibiting surface occupancy and/or roads and on leases that are issued after the effective date of the rule. Future leasing would be allowed under the proposed rule, but roads on those leases would be prohibited.

There are 22 CRAs (with more than 640 acres under lease) on the GMUG, White River, and San Juan NFs that have current oil and gas leases (see Table 17). These existing leases total about 152,500 acres in the CRAs. Of these leased CRA acres, roads would be allowed on about 129,200 acres (85 percent), and roads would be prohibited on about 23,200 acres (15 percent), due to lease stipulations prohibiting surface occupancy or roads.

Table 17. Roadless area (CRA) acres under oil and gas leases as of March 2008, and lease acres in CRAs where new roads are allowed or prohibited under alternative (2).

Forest	Colorado Roadless Area	Acres leased	Acres with roads allowed	Acres with roads prohibited[1]
GMUG	Battlements	4,176	0	4,176
	Clear Fork	14,519	14,519	0
	Cottonwoods	886	886	0
	Currant Creek	792	792	0
	Flat Tops/Elk	1,475	1,475	0
	Horsefly Canyon	2,043	2,043	0
	Huntsman Ridge	4,596	4,596	0
	Pilot Knob	16,207	16,207	0
	Sunnyside	4,236	0	4,236
	Tomahawk	1,916	1,916	0
	Turner Creek	6,865	6,865	0
Manti-LaSal[2]	Roc Creek	2,766	2,766	0
Pike-San Isabel[2]	Rampart East	7,535	7,535	0
Routt[2]	Black Mountain	1,225	1,225	0
San Juan	HD Mountains	17,218	14,749	2,469
White River	Baldy Mountain	5,988	5,988	0
	East Divide/Four Mile Park	8,587	8,587	0
	East Willow	5,657	5,657	0
	Housetop Mountain	8,308	0	8,308
	Mamm Peak	11,902	7,869	4,033
	Reno Mountain	9,698	9,698	0
	Thompson Creek	15,864	15,864	0

Forest	Colorado Roadless Area	Acres leased	Acres with roads allowed	Acres with roads prohibited[1]
Totals		152,459	129,238	23,222

[1] Acres with roads prohibited = acres in leases on which surface occupancy is prohibited on 100 percent of the lease area.

[2]The Manti-LaSal Rock CRA leases are represented in this table, but potential activity and production are not projected due to unavailability of Reasonably Foreseeable Development Scenario information. The Pike-San Isabel Rampart East CRA leases are represented in this table, but potential activity and production are not projected because the leases are in suspension. The Routt Black Mountain leases are included in this table, but potential activity and production are not projected because the leases will expire in October 2008.

In addition to oil and gas activities projected in CRAs, the substantially altered acres and other acres in IRAs that are not included in CRAs under the proposed rule have 17,299 acres leased. Oil and gas development in those IRA acres not included in CRAs could result in 7 wells on 3 pads covering 5.5 acres with 3 miles of road, with wells potentially producing 22.4 billion cubic feet of gas and 10,500 barrels of oil (see table 16).

Effects of the proposed rule on the development of oil and gas resources are summarized as follows:

- Oil and gas development and production would be likely to be limited to 19 CRAs on the GMUG, San Juan, and White River NFs.
- The potential for future oil and gas leases and production in un-leased CRA acres cannot be reasonably estimated at this time.
- Lessees of approximately 57,500 CRA acres that were issued between January 12, 2001, and September 19, 2006, and that do not have lease stipulations prohibiting surface occupancy or road construction would be allowed to establish road access to their leases.
- Lessees of approximately 10,100 CRA acres that were issued since September 20, 2006, and that have road prohibitions in stipulations directly linked to the 2001 rule, could potentially be allowed to establish road access to their leases.
- Access to an estimated ultimate recovery of 1,006 billion cubic feet of gas and 77,000 barrels of associated oil (see Table 3-9).

Land Management Plans Alternative

Under the land management plans alternative, roading would be allowed on existing and future oil and gas leases where roads are allowed under lease terms and stipulations. Future oil and gas leases would be offered, sold, and issued under the applicable forest plan direction and leasing availability decisions.[12] Roading in IRAs would be prohibited on existing and future leases where lease stipulations prohibit surface occupancy or roads.

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

Approximately 372,584 acres are available for leasing in 21 IRAs that currently have more than 640 acres under lease on the GMUG, White River, and San Juan NFs (see Table 18). There are 158,533 acres currently leased in these 21 roadless areas (as of March 2008). Roads would be allowed on existing and future leases covering 219,417 acres, and roads would be prohibited on leases covering 153,129 acres.

Table 18. Inventoried roadless area (IRA) acres under oil and gas leases as of March 2008, and lease acres in IRAs where roads are allowed or prohibited under the land management plans Alternative.

Forest	Inventoried Roadless Area (IRA)	Acres leased	Acres available (includes leased acres)	Acres leased + acres available roads allowed	Acres leased + acres available roads prohibited
GMUG	Battlement Mesa	8,754	35,993	480	35,515
	Clear Creek	22,794	42,756	37,458	5,298
	Drift Creek	4,149	9,299	8,682	616
	Hightower	1,867	4,556	3,967	489
	Nick Mountain	886	10,399	3,939	6,460
	Priest Mountain[1]	3,991	43,177	32,640	10,537
	Raggeds[2]	2,088	13,338	12,251	1,087
	Salt Creek	1,017	11,026	1,391	9,635
	Springhouse Creek	17,594	17,487	17,594	0
Manti-LaSal	Roc Creek	2,758	0	0	0
Pike-San Isabel	Front Range	8,116	0	0	0
Routt	Black Mountain	1,222	22,594	12,239	10,355
San Juan	HD Mountains	13,514	20,018	11,968	8,051
	South San Juan	3,303	51,070	17,863	33,160
White River	Baldy Mountain	6,030	6,030	6,030	0
	East Divide/Four Mile Park	8,909	8,909	8,909	0
	East Willow	5,666	7,118	7,070	48
	Housetop Mountain	8,308	12,651	0	12,651
	Mamm Peak	11,905	25,340	8,126	17,214
	Reno Mountain	9,702	12,425	12,361	64
	Thompson Creek	15,960	18,398	16,142	2,256
Totals		158,533	372,584	219,110	153,436

[1] 51,658 acres of Priest Mountain IRA is designated not available for leasing.
[2] 3,091 acres of Raggeds IRA is designated not available for leasing.

The land management plans alternative could result in oil and gas development and production from IRAs with high potential for oil and gas occurrence and development, at levels slightly higher than those under the proposed rule.

Effects of the land management plans alternative on the development of oil and gas resources are summarized as follows:

- Oil and gas development and production would be likely to occur in at least 21 IRAs (with over 640 acres under lease as of March 2008), and in an undetermined number of other IRAs identified as available for leasing under land management plans and oil and gas leasing decisions.
- Access to an estimated 1,023.6 billion cubic feet of gas and 87,500 barrels of associated oil. This is approximately 605 billion cubic feet of gas and 49,000 barrels of oil more than could be accessed under the 2001 rule and 18 billion cubic feet of gas and 10,500 barrels of oil more than under the proposed rule.
- Lost opportunities for exploration and development of oil and gas resources in IRAs with potential for oil and gas resource occurrence would be reduced under this alternative. Forest plan direction and leasing availability decisions prohibit roading for oil and gas operations in a limited number of IRAs in areas with potential for oil and gas resource occurrence.

Analysis of Alternatives: Coal

Based on the land management plans and their associated EISs, five NFs in Colorado acknowledge the presence of coal resources within their boundaries: the GMUG, Pike and San Isabel, San Juan, Routt, and White River. Of these five NFs, only the GMUG has existing coal leases. The GMUG has about 13,000 acres leased for coal, including about 6,000 acres leased in parts of the West Elk and Springhouse Park IRAs. Refer to the map of coal leases in IRAs in the map packet.

The Forest Service does not currently have sufficient site-specific information to estimate the amount of coal resources that may occur in roadless areas on the Pike-San Isabel, Routt, or White River NFs. On the San Juan NF, an estimated 1.5 billion tons of coal reserves may exist in the Durango Known Recoverable Coal Resource Area (overlaps with Pagosa Springs coalfield) in both roadless and non-roadless lands according to the forest plan for the San Juan NF. On the GMUG NFs, there is currently insufficient site-specific information to estimate the amount of coal resources in the Carbondale, Crested Butte and Tongue Mesa coalfields.

In the Somerset and Grand Mesa coalfields, including the North Fork coal mining area, it is estimated that recoverable coal resources have the potential to occur on about 58,000 acres of both roadless and non-roadless lands.

Coal exploration and development has occurred in the North Fork coal mining area (Somerset coalfield) on the GMUG since the 1960s. Coal exploration licenses may be issued by BLM for un-leased areas, for a two year period. There are currently no existing coal exploration licenses in any roadless areas in Colorado (as of March 2008). Three underground mines currently produce coal from Federal leases in the North Fork coal mining area (Somerset coalfield) on the GMUG. Projected coal activity would likely occur in the Grand Mesa and Somerset coalfields.

The coal resources in the Somerset and Grand Mesa coalfields that include the North Fork coal mining area meet the definition of compliant and super-compliant coal reserves according to the Clean Air Act. The coal has high energy value (Btu), and low sulphur, ash, and mercury content,

and is thus desirable for use in electric generation plants. The bulk of the coal produced from that area is shipped to the Eastern U.S.

For all alternatives, roading and mining activities would be done in a way that minimizes adverse effects by complying with lease stipulations, forest plan direction, regulations, and laws.

2001 Rule

Under The 2001 rule, roading in IRAs would be allowed on coal leases issued prior to January 12, 2001 and prohibited on coal leases issued after that date. As of March 2008, only the West Elk IRA on the GMUG NFs had coal leases. About 3,700 acres of these leases were effective prior to January 12, 2001 in the West Elk IRA, so roading would continue to be allowed on those acres for coal-related purposes.

Affects of the 2001 rule on coal leasing and development include the following estimated projections of activities in the West Elk IRA on the GMUG NFs:

- About 6.5 miles of roads over the 15-year analysis period on the 3,700 acres of leased land in the West Elk IRA, providing access to 135 million tons of coal.
- The extent of these coal resources in areas with coal resources not leases as of January 12, 2001 are unknown, therefore the quantity of coal affected by road prohibitions cannot be estimated.
- An estimated 84 million tons of leased coal reserves could be foregone due to restricted construction of methane drainage wells on about 2,300 acres of existing leases effective after January 12, 2001. About 2.5 years of overall production could be lost, based on current production rates and estimated coal recovery of 50 percent of in-place reserves.[13]
- Lost opportunity for exploration of un-leased Federal coal resources on about 31,000 acres of the GMUG NFs in IRAs that overlap with the Somerset and Grand Mesa coalfields.

Proposed Rule

Under the proposed rule, roading could be approved only pursuant to existing and future coal leases, and on coal exploration licenses, in CRAs in the North Fork coal mining area on the GMUG NFs.

Effects of the proposed rule on coal leasing and development include the following projected activities in the North Fork coal mining area:

- A total 15-year projection of 45 miles of roading would occur for coal mining-related purposes, primarily to access methane drainage wells.

[13] In-place coal reserve estimations by alternative are only for the lands in roadless areas, and do not include reserve estimates for lands outside of roadless areas, since this analysis is focused on activity in roadless areas. The estimates were made using methodology recommended by BLM. For The 2001 rule, reserve estimations were made based on the acreage of lands in roadless areas under lease prior to 2001.

- Access to an estimated total of 1 billion tons of in-place coal resources on 29,000 acres of road-accessible reserves. [14] This could represent 29 additional years of coal production. All existing leased reserves could be mined. Coal resources are expected to have similar quality to those currently being mined in the Somerset field, although coal quality is generally known to decrease in the Grand Mesa coalfield.
- Lost opportunities for exploration and development of Federal coal resources in any potential coal resources outside the North Fork coal mining area, as roading in support of coal mining outside that area is prohibited. The potential for development and production on lands outside that area cannot be reasonably estimated at this time.

Land Management Plans Alternative

Under the land management plans alternative, roading could be approved on existing and future coal leases and coal exploration licenses in IRAs with coal resource potential according to forest plan direction.

Effects of coal leasing and development under the land management plans alternative include the following projected activities and expectations in IRAs during the 15-year analysis period:

- Consideration of about 46,000 acres of land in the Pagosa Springs coalfield on the San Juan NF, lands in the Trinidad coalfield on the Pike-San Isabel NFs, lands in the Carbondale coalfield on the White River NF, and lands in the Green River coal region on the Routt NF for coal leasing.
- Various coal exploration and development activities would be likely to occur on the GMUG NFs, as follows:
    - Approximately 66 miles total of roading on about 31,000 acres of IRAs in the Somerset and Grand Mesa coalfields.
    - Access to an estimated 1.1 billion tons of in-place coal resources. All existing leased reserves could be mined. Coal quality would be the same as for the proposed rule[15].
    - Access to lands in the Carbondale, Crested Butte and Tongue Mesa coalfields.

Analysis of Opportunities: Geothermal

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.

Currently, there are no geothermal leases, lease applications, operations, or applications for operations on NFS lands in Colorado, nor has there been any expressed interest in leasing or developing this resource. A national BLM-Forest Service programmatic EIS currently underway will address NFS lands that have potential for geothermal resources, and provide the basis for

[14] In-place coal reserve estimations for the proposed rule were made based on the acreage of lands with coal resource potential that is coincident with roadless areas.
[15] In-place coal reserve estimations for this alternative were made based on the acreage of lands in roadless areas in the Somerset and Grand Mesa coal fields where there is less than 3,500 feet of overburden.

future geothermal leasing availability analyses and decisions on NFS lands in Colorado and other states.

Because roading in IRAs would be prohibited under the 2001 rule, and roads are assumed to be necessary for the development of geothermal resources, these resources would not be developed under this alternative.

The proposed rule would have the same effect on potential geothermal resource development in roadless areas as the 2001 rule. Both alternatives prohibit roading in roadless areas for geothermal development, which would restrict geothermal development in the roadless areas.

Under the the land management plans alternative, responsible officials could allow development of geothermal resources in IRAs to the extent that land management plans would allow for such activities in IRAs. Specific geothermal assessment information is insufficient to quantify or even qualify the extent and location of possible development.

Compliance with Executive Order 13211 (Statement of Energy Effects)

Based on guidance for implanting Executive Order (E.O.) 13211 (actions concerning regulations that significantly affect energy supply, distribution and 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), the alternatives would not create significant adverse effects in a material way the productivity, competition, or prices in the energy sector for the reasons discussed below.

The difference in potential natural gas production between the proposed rule and the 2001 rule (i.e., conditions without the regulatory action) is positive, as is the difference between the land management plans alternative and the no action alternative. The only potential adverse impact would be a comparison of potential gas production under the proposed rule and the land management plans alternative; the estimated difference in potential gas production in this case is only 3.6 million mcf (29.8 million mcf gas [or billion cubic feet, bcfg] under the land management plans alternative minus 26.2 million mcf under the proposed rule; these annual production values are the same values used to estimate job and income impacts in the distributional effects section of this document) and is below the criteria of 25 million mcf under E.O. 13211. The difference in oil production is approximately 350 barrels, well below the criteria of 4,000.

Potential coal production is estimated to increase by 4 million tons under the proposed rule as well as the third alternative considered (management of IRAs under the land management plans alternative) compared to conditions without regulatory action (continuance of 2001 rule). No adverse outcomes are therefore anticipated in association with energy supply, distribution or use related to coal production.

The proposed rule is expected to result in an increase in potential opportunities for gas production, relative to conditions without regulatory action (i.e., continuance of regulatory constraints under the 2001 rule). When comparing the proposed rule to the third alternative

considered (i.e., management of IRAs in accordance with relevant land management plans), there is slight potential for a decrease in opportunities for gas production. However, this decrease (3.6 million mcf) is estimated to be only 0.3 percent of total gas production from Colorado wells in 2006 (1.21 billion mcf) (see Draft Environmental Impact Statement (EIS) for Proposed Rule for Roadless Area Conservation: National Forest Lands in Colorado) and is not anticipated to affect regional (or national) productivity, competition, or prices.

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 DEIS and the Regulatory Impact Assessment (RIA).

Forest Vegetation and Health

Forest health is the perceived condition of forests based on age, structure, composition, function, vigor, level of insect and disease, presence and absence of exotic organisms, and resilience to disturbance including wildland fire. The Forest Service defines forest health protection as a responsibility for minimizing the spread of invasive species and lessening damages caused by insects and diseases.

As noted in the "Vegetation and Forest Health" section of the DEIS (USDA Forest Service, 2008), roadless areas provide a diverse array of forest vegetation, ranging from warm, dry pinyon-juniper woodlands to cold, moist sub-alpine forests. Approximately 28 percent of the roadless areas consist of non-forest cover types, composed of grasslands and meadows, shrublands, areas devoid of vegetation such as exposed bedrock, and a minor amount of surface water. The remaining 72 percent is forest, dominated by various species of trees.

Forest health conditions in roadless areas in Colorado are highly variable, with some areas considered healthier than others. Recent outbreaks have been among the largest in history, although a spruce beetle outbreak in the 1940s and 1950s.affected hundreds of thousands of acres on the White River Plateau In addition, recent outbreaks have been more synchronized than in the past, affecting different forest types. Recent outbreaks are attributable to stand conditions with high portions of susceptible, mature trees and a warmer climate.

A report on the health of Colorado's forests describes how Colorado's NFs are experiencing an unprecedented mountain pine beetle epidemic and other major forest health challenges related to spruce beetle, subalpine fir decline, and sudden aspen decline; the report outlines strategies to address those issues. Aerial and field survey records and a Forest Service report led to two regional forester declarations of mountain pine beetle epidemics in northern Colorado lodgepole, limber pine, and Rocky Mountain bristlecone pine stands. The region subsequently completed a Bark Beetle Implementation Strategy, describing the need for forest treatments throughout those forest types in Colorado.

Approximately 14 percent (600,000 acres) of roadless areas in Colorado are considered high risk for insect and disease mortality. This estimate is based on cover types and conditions in IRA boundaries, although this percentage would not be expected to substantially differ for forest lands in proposed CRA boundaries. Stands of mature lodgepole pine represent the vast majority

of the high risk areas. Approximately 13 percent of the roadless areas are dominated by a lodgepole pine cover type.

Forest health treatment options vary by forest type, pest species, and other factors. Treatment methods may include: thinning, timber harvest (removal and sale of commercial products), reforestation (planting of non-host tree species), pesticide spraying, biological controls, trapping, pheromones, removing certain insect populations, or prescribed burning. Thinning to remove excessive forest fuels before using prescribed fire, or to treat diseased or insect-infested stands, is often economically feasible only if a road system is present. Management practices vary somewhat by elevation.

Starting in the late 1980s, the trend in forest management practices has generally shifted away from large clearcuts and similar even-aged stand management practices toward thinning, salvage, and uneven-aged management. These types of treatments often require multiple entries and adequate road access in order to accomplish management objectives. The trend has shifted to cutting smaller diameter and less commercially marketable tree species. This trend often requires road access in order to make the treatment economically feasible. These trends are expected to continue into the future. One notable exception to this trend has been the salvage harvests in lodgepole pine that result in large areas of dead and dying trees being clearcut.

Lower elevation mountain forests, primarily composed of ponderosa pine and douglas-fir, are generally considered outside their historical range of variation in terms of stand density. These forests are at risk of uncharacteristic, high-intensity fire and other forest health concerns. Management typically includes thinning of smaller trees and prescribed burning to reduce hazardous fuels, improve forest health, and restore ecological processes. Mastication is often used as a thinning method where there are no roads or no timber removal objective.
More moist forest ecosystems, primarily lodgepole pine and spruce-fir, generally have too much biomass to use mastication to achieve management objectives. The current mountain pine beetle epidemic exceeds the Forest Service's ability to control it. Management in these forest types is limited to reducing hazardous fuels and salvaging dead and dying trees to recover economic value. For example, the removal of large mature spruce trees within 2 years of being windthrown can prevent spruce beetle outbreaks.

For details about forest cover, recent trends in forest cover and health, treatment methods, and analysis of forest health for the proposed rule, see chapter 3 of the DEIS (USDA Forest Service, 2008).

Analysis of Alternatives

2001 Rule

Under the 2001 rule, cutting generally small-diameter trees would be allowed where needed to restore ecosystem composition and structure at risk of uncharacteristic wildfire, or within areas that have already been substantially altered. New road construction is not allowed for these purposes, and any tree-cutting activities must be accomplished from existing roads.

Treatment costs increase substantially and proportionally with distance of the project from the nearest road. Lands within one-quarter to one-half mile of existing roads would be the most likely to have trees cut and/or removed consistent with the above tree-cutting limitations. Thus, most IRAs would not be expected to be treated for forest health purposes.

The 2001 rule restricts tree-cutting on approximately 88 percent of the IRAs (all IRA acres except substantially altered areas). Based on 15-year projections, approximately 800 acres annually would have tree-cutting activities for fuel management and/or forest health purposes. Treating 800 acres annually for forest health purposes would cumulatively total 12,000 acres over a 15-year period, or 2 percent of the 600,000 acres at high risk in IRAs. That 2 percent of the high-risk acres treated over 15 years would constitute improvement in forest health conditions. The remaining 98 percent of the high risk acres in IRAs would continue to decline in health and would become less resilient to large-scale insect and disease outbreaks and mortality.

Annual timber harvest would be approximately 800 ccf (hundred cubic feet). This is approximately 23,600 ccf less than what would be expected under the land management plans alternative.

Roading and tree-cutting restrictions under this alternative would result in higher levels of standing and down dead trees remaining on site rather than being removed. This would indirectly cause higher accumulations of hazardous fuels in those untreated stands.

There would be no measurable effects on the potential to improve forest health as a result of the boundary differences in designated roadless areas across alternatives. The lower acreage projected to be treated for forest health under the 2001 rule compared to the proposed rule (such as in the substantially altered portions of IRAs that are not included in CRAs) is directly related to the general prohibition on roading throughout IRAs under the 2001 rule. By allowing tree-cutting but not roading in those substantially altered areas in IRAs, the 2001 rule would continue to constrain the feasibility to treat large portions of the substantially altered areas for forest health improvement purposes.

Effects to rangeland health under this alternative are similarly related to the potential for ground disturbance through management activities and vehicular travel. This alternative would result in the least amount of active vegetation management compared to the other alternatives. Depending on the intensity and extent of actual activities implemented in the future, effects to rangeland would be expected to include an increase in native herbaceous and shrubby plant species in areas where the forest canopy cover is opened, or in areas where roads are decommissioned or disturbed sites are rehabilitated. Effects to rangeland health would also likely include some localized detrimental impacts from ground-disturbing actions that promote the spread of invasive plant species. Rangeland health may also be impacted where new roads or other ground-disturbing activities increase soil erosion or disrupt natural surface or subsurface waterflow patterns.

Land Management Plans Alternative

This alternative prohibits tree cutting for forest health or fuel reduction purposes on approximately 17 percent of the IRA acres, the same as the proposed rule, based on the management direction in land management plans.

Based on 15-year projections, approximately 16,300 acres in IRAs would be treated annually by tree-cutting practices, for fuel management and/or forest health purposes. Over 15 years, this would result in a total of 244,500 acres, improving forest health on approximately 41 percent of the 600,000 acres at high risk for insect and disease outbreaks. Thus, the land management plans alternative would provide the highest likelihood of achieving forest management objectives in critical areas.

Annual timber harvest would be approximately 24,400 ccf.

Untreated areas in IRAs would continue to decline in forest health and would become less resilient to large-scale insect and disease outbreaks and mortality. They would continue to have accumulations of dead standing and down trees, which would indirectly add to hazardous fuels over time.

The effect on the opportunity to conduct forest health treatments related to differences in the IRA and CRA boundaries would be the same as described for the proposed rule. Substantially altered acres would be projected to receive an additional 2,400 to 3,000 acres of treatment each year for fuel reduction or forest health purposes, which is more than under the 2001 rule for those areas. And like the proposed rule, there would be no other differences in the opportunity to improve forest health based on differences in the boundaries of IRAs and CRAs.

This alternative has the highest potential for both beneficial and detrimental effects to rangeland vegetation. This is because this alternative allows for the most additional roading and tree-cutting activities in roadless areas. However, any project-level activities would be consistent with forest plan management area prescriptions in the IRAs. The effects to rangeland vegetation and health would be the same as described for the 2001 rule and the proposed rule, although over more roadless area acres. These effects include beneficial increases in abundance and possibly diversity of native range vegetation where forest canopies become more open. Detrimental effects would potentially include some short-term and localized increases in soil erosion, changes in surface water flow patterns, and prevalence of invasive plants.

Proposed Rule

Under the proposed rule, tree-cutting is allowed for treating hazardous fuels or insect and disease outbreaks in areas under CWPPs or in WUIs; however, roads are often necessary to make such treatments economically feasible. Under this alternative, temporary roads may be built for these purposes.

The proposed rule prohibits tree-cutting on approximately 17 percent of the CRAs, based on forest plan management area direction that is more restrictive than the Colorado Roadless Rule. This alternative allows tree-cutting to occur on the remaining 83 percent of the CRA acres, but only under specific circumstances related to forest health, wildfire hazard, and other purposes.

Approximately 7,600 acres is projected to be treated annually for fuel management or forest health purposes. Under the proposed rule, over 15 years, a total of 114,000 acres or 19 percent of the 600,000 acres at high risk of insect-disease outbreaks would be treated. Therefore, compared to the 2001 rule, the proposed rule would provide increased flexibility to achieve management

objectives in critical insect and disease outbreak areas. The remaining 81 percent of the high-risk acres would remain untreated and continue to decline in forest health and would become less resilient to large-scale insect and disease outbreaks and mortality. The remaining untreated areas would also eventually add to the amount of dead trees and hazardous fuel load. Compared to the land management plans alternative, the proposed rule is projected to treat fewer acres due to prohibitions on road building and cutting in areas outside CWPPs and WUIs.

As described for the 2001 rule, there would be no expectation that the boundary differences in CRAs under the proposed rule would have a measurable impact on the opportunities to conduct treatments on NFS lands for forest health purposes. The only difference is that in the substantially altered areas that are not included in CRAs under this alternative, an additional 2,400 to 3,000 acres would likely be treated each year for either fuel reduction or forest health purposes. Thus, more of those acres would be treated for forest health under the proposed rule compared to the 2001 rule. There would be no other differences in the opportunity to improve forest health based on differences in the boundaries of IRAs and CRAs.

Annual timber harvest would be approximately 1,700 ccf from CRAs only and 6,700 ccf from a combination of CRAs and substantially altered areas. This is approximately 16,800 ccf less than what would be expected under the land management plans alternative.

Effects to rangeland vegetation and health would be similar to those described for the 2001 rule, but covering more roadless area acreage affected by new roads or other ground-disturbing activities. The proposed rule has more acres of tree-cutting and roading projected than the 2001 rule, but less than the land management plans alternative.

Fire Ecology and Fuels

This section addresses potential effects of each alternative on hazardous fuels, wildfire behavior, and flexibility in managing fire and fuels, particularly in a WUI. A WUI refers to those areas where flammable wildland fuels are adjacent to homes and communities. This section is closely related to other vegetation and forest health topics which are addressed in the previous section of this report and separate sections of the DEIS. The Fuels and Fire section of the DEIS (USDA Forest Service, 2008) contains details about the material presented below and should be referred to for more information and references about fire ecology and fuels.

In April 1999, the General Accounting Office (GAO) published a report titled *Western National Forests: a Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats* (GAO 1999). In the report, the GAO asserts, “The most extensive and serious problem related to the health of national forests in the interior West is the over-accumulation of vegetation.” In response to this study, as well as other studies and multi-agency initiatives, a report titled *Managing Impacts of Wildfires on Communities and the Environment* was published by the US Department of Agriculture and US Department of the Interior in 2000, describing a National Fire Plan. The National Fire Plan addresses: firefighting resource availability, rehabilitation, hazardous fuels reduction, community assistance, and accountability. It established a long-term hazardous fuels reduction program to reduce the threat of catastrophic wildfire to people, communities, and

natural resources, while restoring forest and rangeland ecosystems to closely match their historical structure, function, and dynamics. As a result, hazardous fuel reduction treatments on NFS lands became a national priority. These treatments on NFS lands in Colorado have primarily involved a combination of prescribed fire and mechanical thinning, with or without wood product removal (harvest), with treatments focused on the high risk wildland urban interface areas.

The Healthy Forests Restoration Act (HFRA; Public Law 108-148) was passed to equip land managers and communities with additional tools to achieve long-term objectives in the National Fire Plan and a 10-year strategy. The HFRA defines WUIs and at-risk communities, encourages local communities to collaboratively develop CWPPs and encourages establishing local priorities for wildfire preparedness and hazardous fuels reduction work.

If a wildfire starts in a roadless area that overlaps or is close to a WUI, the management response would typically be emergency wildfire suppression to protect lives and property. Where the wildfire is not posing a threat to people, property, or resource values and would likely result in beneficial ecological effects, the management response may be wildfire use, where the wildfire is controlled and managed similarly to that of a prescribed fire. Presently, six of the eight NFs in Colorado have fire management plans that allow wildfire use: the Arapaho and Roosevelt; GMUG; Rio Grande; Routt; San Juan; and White River. The Pike and San Isabel NFs are currently evaluating areas suitable for wildfire use. Currently, the low density of roads and limited extent to which hazardous fuels have been treated in the roadless areas (IRAs or CRAs) are important considerations in selecting the appropriate management response to a wildfire that occurs in a roadless area.

At-risk communities 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. There are 1,712 at-risk communities in Colorado, based on the list published in the **Federal Register** notice (66 Fed. Reg. 753) titled *Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire*. According to HFRA, the WUI is defined as an area in or adjacent to an at-risk community that is identified in a CWPP. In the case of any area for which a CWPP is not in effect, the WUI is defined as an area within a certain distance of the at-risk-community boundary and/or meeting other risk conditions (for details, see Fire Ecology and Fuels section of the DEIS (USDA Forest Service, 2008a)). In practice, CWPPs often define WUIs that extend beyond the ½ mile to 1 ½ mile distance stated in HFRA. The Colorado Roadless Rule is based upon WUIs defined by such plans, but there are many communities in western Colorado that have not completed plans. To best approximate the extent of completed plans for this analysis, a perimeter 3-miles from the community center was circumscribed around all (1,712) at-risk communities. Of the 1,712 at-risk communities , approximately 23 percent (392-396 communities) are within 1.5 miles of a roadless area (CRA or IRA respectively), and approximately 35 percent (601 to 619) are within 3 miles of a roadless area.

Of the NFs in Colorado, the Arapaho and Roosevelt and Pike and San Isabel NFs contain the most roadless area acres within 1 to 1.5 miles of an at-risk community, followed by the GMUG NF. The Routt NF has the fewest roadless acres within 1 to 1.5 miles of an at-risk community.

Analysis of Alternatives

As noted in the Fire Ecology and Fuels section of the DEIS (USDA Forest Service, 2008), fuel reduction treatments on all NFS lands in Colorado average approximately 61,000 acres per year, based on fuel reduction treatments conducted from 2001 to 2007. About 50 percent were treated with prescribed fire only, and 50 percent included some tree-cutting (thinning) treatment. Of these total treated acres, approximately 4,340 to 5,830 acres per year (7 to 10 percent) were in roadless areas (CRA and IRA boundaries respectively). Of all the fuel reduction treatments in roadless areas over the past 7 years, approximately 68 percent in IRAs were in WUIs and 28 percent in CRAs were in WUIs. Most fuel reduction treatments on NFS lands occurred outside roadless areas or in the substantially altered areas in the IRAs where there are existing roads.

By reducing stand density and the accumulations of understory trees and other ladder fuels through thinning and prescribed burning, the Forest Service can reduce the probability of a large-scale high-intensity crown fire and its undesirable impacts, while improving firefighter and public safety during wildfire suppression efforts. If it is not feasible to selectively locate treatments, then a significantly larger percentage of the landscape may have to be treated to achieve the same degree of alteration in landscape fire behavior. Effectiveness and efficiency 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.

Most roadless areas are in condition class 2, which departs from historical conditions and poses a risk of losing key ecosystem components. Most roadless areas are also in fire regime groups III and IV. These fire regime groups are considered high priority to treat where they occur in WUIs. In those forest types, the objective is to protect communities and values at risk from the threat of a high-severity fire. 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.

2001 Rule

Although fuel reduction treatments including thinning in IRAs would be allowed to occur under the 2001 rule, it would be less likely to occur without the ability to construct new roads in the IRAs to make the treatments economically feasible. Only 800 acres annually (12,000 total acres over 15 years) are projected to be feasible or likely to occur for forest health and/or fuel reduction purposes in IRAs. Treating 12,000 acres of the 4.25 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. Annual fuel reduction treatments in IRAs would gradually reduce a small percentage of the existing fuel hazard over a long period of time, reducing threats to a portion of the at-risk communities in the vicinity of the IRAs. For

more discussion about the numbers and locations of at-risk communities and counties potentially affected by fuel treatments, see section “Distributional Effects: Local Governments.”

Treating hazardous fuels on approximately 800 acres annually would be a reduction from the current trend of treating about 5,800 acres per year in IRAs. This decline in fuel reduction treatments in IRAs is partly due to the fact that during most of the past 7 years, the 2001 rule was not in effect because of court orders. Also, the more easily accessible acres (near existing roads) have already been treated in the recent past, and treatments become increasingly more expensive and less feasible with increasing distances to existing roads. If the total NFS budget for hazardous fuel treatment remains flat, there would be a shift toward treating fewer acres in roadless areas and more acres outside roadless areas compared to the past 7-year trend. Approximately 1 percent of annual fuel treatments on NFS lands in Colorado would occur in roadless areas if the Agency continues to conduct treatments on 61,000 acres per year.

The 2001 rule would pose a higher risk of having large-scale insect and disease outbreaks and high-severity wildfires, compared to the other two alternatives. In addition, fuel treatments would likely be more expensive and less efficient to implement in IRAs because of the lack of established roads and inability to reconstruct or construct roads. Treatments would generally occur near existing roads, which limits the ability to more strategically locate treatment areas on the landscape to improve effectiveness. Prohibiting roading in the IRAs would reduce opportunities to cut trees to reduce hazardous fuels in IRAs.

Projections of future activity in IRAs include decommissioning approximately 12 miles of existing roads annually over the next 15 years (in addition to decommissioning any temporary roads that are built in IRAs in the future). This would further reduce road access for conducting fuel reduction treatment in the IRAs. It would also reduce the number of fuel breaks created by roads.

The lack of roads in IRAs under this alternative would decrease the effectiveness, efficiency, and timeliness of fire suppression responses should a wildfire occur in an IRA. As a result, wildfires in IRAs may become larger, more severe, and more hazardous for firefighters and the public. There would probably be fewer opportunities to apply wildland fire use in an IRA (described in affected environment), because of the lack of roads and limited acreage where hazardous fuels have been reduced.

The differences in the boundaries of IRAs in the 2001 rule, compared to the CRA boundaries under the proposed rule, would not result in a major impact on the opportunity to reduce fuel and wildfire hazards at the landscape scale. However, differences in roadless area boundaries among the alternatives do affect the total acres likely to be treated for reducing fuels and wildfire hazard. In the substantially altered acres in IRAs (excluded from CRAs), there would be very little opportunity for fuel reduction treatments under the 2001 rule, primarily because of the roading prohibition. Fuel reduction treatments would not be likely to occur in ski areas under any of the alternatives. Fuel reduction treatments would potentially occur in some of the unroaded areas that are outside the IRAs (included in CRAs under the proposed rule), to essentially the same degree they would be expected to occur under the other alternatives. All alternatives

provide opportunities to build roads and cut trees as needed in a WUI or under a CWPP, in those unroaded areas.

Land Management Plans Alternative

Under the land management plan alternative, forest health and fuel treatments are reasonably foreseeable on approximately 16,300 acres annually (244,000 total acres over 15 years) in IRAs over the next 15 years. When compared to the average of 61,000 acres annually treated on all NFS lands in Colorado, the 16,300 acres projected to occur in IRAs would be 27 percent of the total NFS acres treated annually. Treating 244,000 of the 4.25 million acres in IRAs would result in reducing the fuel hazard on about 6 percent of the total in IRA acreage.

Treating 16,300 acres per year under the land management plans alternative would be a large increase over the recent past trend of treating about 5,800 acres per year in IRAs. 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 7-year trend. Approximately 27 percent of annual fuel treatments on NFS lands in Colorado could occur in IRA areas if the Agency continues to conduct treatments on 61,000 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.

A total of 118 miles of new roads would be constructed and 14 miles reconstructed in the IRAs over the next 15 years under the land management plans alternative to facilitate hazardous fuels reduction and forest health treatments, or an average of approximately 8 miles of construction and 1 mile of reconstruction per year. The land management plans alternative would therefore pose the lowest risk of having high-severity wildfires compared to the other two alternatives. Effects of building more roads for fuel treatments would generally be the same as described for the proposed rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs. The land management plans alternative would provide a higher level of protection for at-risk communities and other values in the vicinity of IRAs compared to the other two alternatives.

Under the land management plans alternative, some permanent roads may be constructed in the IRAs for fuel reduction and forest health purposes. Maintaining more permanent roads in the IRAs would enhance the effectiveness and value of roads for fuels and wildfire management purposes over the long-term. The increased flexibility to build both permanent and temporary roads in IRAs would improve the Agency’s ability to conduct additional fuel reduction treatments and maintain lower wildfire hazards in WUIs in the long term, compared to the other two alternatives.

The land management plans alternative would improve the range of appropriate management responses to wildfires that occur in IRAs, including possible wildfire use, because of the increased amount of roads and fuel-treated areas that would occur over time in the IRAs. Other effects would also be the same as described for the proposed rule, although the benefits to wildfire management would be slightly greater and longer lasting under the land management plans alternative.

The projected decommissioning of existing roads in IRAs and temporary roads built in IRAs would negate some of the benefits of having roads in IRAs for managing fuels and wildfires. Reducing road density in IRAs through decommissioning would slightly reduce wildfire suppression effectiveness, as previously described for the 2001 rule.

The effects of roadless area boundary differences on the opportunity to reduce wildfire hazard in IRAs would not differ in the land management plans alternative from what was described for the proposed rule. Although the IRA boundaries under the land management plans alternative differ from the CRA boundaries under the proposed rule, both alternatives would provide nearly the same management flexibility to build roads and cut trees where needed in WUIs and in CWPP areas to reduce fuels and wildfire hazard near at-risk communities.

Proposed Rule

For the proposed rule, hazardous fuel reduction treatments, including tree-cutting and temporary road construction, may occur in CRAs if they are in CWPPs or WUIs. Forest health and/or fuel reduction treatments are projected to be reasonably foreseeable on approximately 7,600 acres annually (114,000 total acres over 15 years) in CRAs over the next 15 years. When compared to the 61,000 acres per year treated on average on all NFS lands in Colorado, the projected 7,600 acres that could be treated in CWPPs or WUIs in CRAs would amount to 12 percent of annual fuel treatments on all NFS lands. Treating 114,000 acres (3 percent of the 4.031 million acres in CRAs) would result in significantly more fuels and fire hazard reduction compared to the 2001 rule.

Treating 7,600 acres per year would yield an increasing trend of conducting hazardous fuel treatments in the CRAs, compared with the 4,300 acres of CRAs treated annually on average from 2001 to 2007. If the Agency treats 7,600 acres rather than 4,300 acres annually in designated roadless areas, there would likely be fewer acres treated for fuels outside the roadless areas, if the allocation of funds for fuel reductions on NFS lands remains flat. Approximately 12 percent of annual fuel treatments on NFS lands in Colorado would occur in roadless areas in CWPPs or WUIs if the Agency continues to conduct treatments on 61,000 acres per year. If fuel reduction funds were to increase, this alternative provides the opportunity to yield a measurable improvement in reducing wildfire hazard at a landscape scale.

A total of 88 miles of new roads would be constructed and 14 miles reconstructed in the CRAs over the next 15 years to facilitate hazardous fuels reduction and forest health treatments, or an average of approximately 6 miles of construction and 1 mile of reconstruction per year.

Fuel treatments would likely be less expensive and more efficient to implement in CRAs in the proposed rule, compared to IRAs in the 2001 rule, because of the ability to build new roads to facilitate treatments. 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. This alternative would pose a lower risk of having high-severity wildfires and result in increased protection for at-risk communities and

other values in proximity to the CRAs (see section “Distributional Effects: Local Governments” for details about at-risk communities and counties potentially affected).

While in existence and for a short time after, temporary roads would serve as fuel breaks, suppression firelines, anchor points, and safety zones for firefighters. They would temporarily improve accessibility for firefighting crews and other suppression resources, thereby improving efficiency and timeliness of wildfire suppression responses in CRAs.

The projected decommissioning of existing roads in CRAs and temporary roads built in CRAs would negate some of the benefits of having roads in CRAs for managing fuels and wildfires. Reducing road density in CRAs through decommissioning would slightly reduce wildfire suppression effectiveness, as previously described for the 2001 rule.

The differences in the boundaries of CRAs in the proposed rule, compared to the IRA boundaries under the 2001 rule, would not result in a major impact on the opportunity to reduce fuel and wildfire hazards at the landscape scale. However, differences in roadless area boundaries between these alternatives do affect the total acres likely to be treated for reducing fuels and wildfire hazard. In the substantially altered acres not included in the CRAs (that are included in IRAs), there would be more opportunity to conduct treatments to reduce fuels and fire hazard, as those areas would not be under any rule-related limitations. No other differences in roadless area boundaries would have an effect on opportunities to reduce wildfire hazard under the proposed rule. Fuel reduction treatments would be expected to occur in parts of the unroaded areas that are included in CRAs (not included in IRAs) under the proposed rule, the same as under the other alternatives.

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; (b) where needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or to conduct a natural resource restoration action under CERCLA, Section 311 of the Clean Water Act, or the Oil Pollution Act; 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. These roads will be temporary only in the proposed rule. Under alternatives 1 and 3, the roads built for these purposes would generally but not always 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 proposed rule, and even more so under the land management plans alternative, the greater increases in road miles projected to occur in roadless areas would better facilitate rapid responses to emergency health and safety situations that may arise in those areas. For example, areas with higher road densities have been found to improve management flexibility and firefighter safety in response to wildfires (as described in the Fire and Fuels section of the DEIS).

In addition, as the projected road miles increase under the proposed rule and the land management plans alternative 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 accidental injuries.

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 DEIS). These uses include roads, reservoirs, weather and climate monitoring stations, communication lines and sites (for cellphone, radio, television, microwave, or other transmissions), railroads, service buildings of all types, electric transmission and distribution lines, oil and gas pipelines, ditches and other water conveyance facilities (see Recreation and Ski Areas sections for specials uses associated with recreation). These authorized uses provide a variety of products to individuals and the general public and are part of the multiple-use management mission of the Forest Service. The number of land use authorizations in the roadless areas in Colorado is not known at this time because of incomplete GIS spatial (map) information for each authorization. However, personnel from each NF in Colorado provided projections for new roads that would likely be needed to support current or anticipated land use authorizations in roadless areas.

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

The Alaska National Interest Lands Conservation Act (ANILCA) requires the Agency to provide access to private properties on public lands based on the reasonable use and enjoyment of the property. There are currently some private properties that require road access authorizations through portions of roadless areas. Additionally, there are currently authorized third-party-owned facilities in roadless areas that require some type of access in parts of some roadless areas. Roads built to access privately owned facilities or properties are constructed to minimum standards, based on site-specific analysis and resource conditions, and the planned use of the property.

These roads are generally closed to public vehicle traffic. Proposed uses in the near future may include irrigation ditches, wells and other water systems, fences, access roads, powerlines, or other facilities.

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

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

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

Incidental tree removal occurs in roadless areas as needed to support special use authorizations for pipelines, utilities, water conveyance systems, and all other needs. Incidental tree-cutting would continue to be allowed in roadless areas under all alternatives.

2001 Rule

Under the 2001 rule, existing utilities and water conveyance systems authorized prior to January 12, 2001, may include new roads. Estimates made for this alternative project approximately 0.6 mile of roading annually for reconstructing, operating and maintaining existing utilities or water conveyances in IRAs. This includes road reconstruction for ditch maintenance activities. Future special use authorizations for utilities and water conveyance systems in IRAs are allowed but unlikely to occur, as this alternative does not allow new roads in IRAs for utility or water conveyance facilities that were not authorized prior to 2001. Future special use authorizations could be located where roads already exist in the IRAs if those existing roads would be expected to remain adequate for that use. This would limit future options for locations of land use facilities and transmission lines.

For oil and gas pipelines, estimates of pipeline miles are not available. Oil and gas pipelines would continue to be allowed in IRAs, and the 2001 rule does not make a distinction between where the oil and gas is being produced and the location of the oil and gas pipeline to be constructed.

Land Management Plans Alternative

For currently authorized and future utilities and water conveyance systems, estimates are for about 1.2 miles of roading annually in IRAs under the land management plans alternative. Estimates for all other special use authorizations are for about 0.8 miles of construction or reconstruction annually. Thus, projections for roading in roadless areas for special land use

authorizations are approximately the same under the land management plans alternative and the proposed rule. Estimates are not available for future projected pipeline miles.

Management direction for acreage in IRAs in Colorado is generally less restrictive than the 2001 rule or Colorado Roadless Rule in terms of roading for special use authorizations. Under the land management plans alternative, most land management plans would continue to allow new roads in IRAs in support of current as well as future special use authorizations. However, the forest plan for the Rio Grande NF is more restrictive on land use activities for most IRA acres compared to the 2001 rule or Colorado Roadless Rule. The guidance of four land management plans does not restrict roading in IRAs at all (see Appendix B for details). For the acres in IRAs where roading is prohibited or restricted (discouraged), it is less likely that new special use authorizations would be approved, unless those facilities can be constructed and maintained without new roads.

Under this alternative, if there is a sufficiently compelling need for a new road in support of a new utility, water conveyance or other land use authorization, a project-specific amendment to the applicable forest plan may be considered. A site-specific forest plan amendment could essentially waive a roading restriction in a portion of an IRA for construction, operation or maintenance of a specific facility.

Proposed Rule

This alternative differs with respect to the ability to build roads in roadless areas for utilities and water conveyances. The proposed rule is similar to the 2001 rule except it further allows road building for future utilities and water conveyance systems. However, the definition of utilities does not include water reservoirs or communications facilities (microwave, cellphone, radio, or television lines or facilities) in CRAs[16]. Estimates under this alternative project approximately 1.2 miles of roading would occur annually in CRAs for this purpose. This alternative provides greater flexibility and would be beneficial to the proponents for these new facilities because it does not prohibit their ability to propose new roads in CRAs for facility construction, operation, and maintenance. There might be economic disadvantages for communities or companies that see a need for roads in CRAs in order to expand water supply reservoirs or locate communications lines or towers in CRAs (same effect as under the 2001 rule).

For current special use authorizations in CRAs other than utilities and water conveyances, estimates are for 0.7 miles of roading annually in CRAs. No roads may be built in CRAs for future special use authorizations other than utilities and water conveyances; unless they are authorized before the Colorado Roadless Rule is promulgated. This would necessitate locating new facilities outside CRAs if they would require roaded access for construction, operation, and maintenance. This would limit location options and could cause economic consequences such as increased costs for the proponent by limiting those options.

Unique to this alternative, the construction of oil or gas pipelines through a CRA from a source or sources outside a CRA would be prohibited after the Colorado Roadless Rule is promulgated.

[16] Utilities are defined to be existing or future power lines; water conveyances are defined to be existing/future diversion structures, headgates, pipelines, ditches, canals, or tunnels.

Estimates are not available for projected future oil and gas pipeline miles. This prohibition might have an economic consequence for the proponent and for land owners or managers of the leased lands. Prohibitions for this category of pipeline may necessitate longer routes and larger pipelines to increase capacity for future activity.

Ski Areas

This section evaluates effects of the alternatives on developed ski area recreation opportunities and experiences. Developed ski areas are all those areas authorized under the Ski Area Permit Act of 1986 and have constructed facilities. For details about the evaluation of ski area impacts, see "Developed Ski Areas" section of the DEIS (USDA Forest Service, 2008).

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

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

Analysis of Alternatives

Restrictions on future roading and tree-cutting activities in roadless areas under the 2001 rule would limit opportunities for ski area development for those acres associated with ski areas that are in roadless areas that were (1) authorized in a permit prior to Jan 12, 2001, and/or (2) allocated in land management plans to ski area management but outside ski permit boundaries. This results in approximately 5,000 acres across 10 ski areas where development would be restricted under the 2001 rule, the largest percentages of acreage applying to Loveland, Arapahoe Basin, Vail, Copper Mountain, and Beaver Creek (with remaining acreage belonging to Snowmass, Buttermilk, Breckenridge, Aspen Mountain, and Durango Mountain Resort). For the ski areas in IRAs that were authorized prior to Jan 12, 2001, (3,200 acres across six ski areas), road building and tree-cutting may occur within their permit boundaries. Some people may perceive a conflict in having permitted ski areas available for development with a roadless area. However, ski area development may occur without roads. Under the 2001 rule, although there would be limitations on ski area expansion, backcountry skiing would continued to be enjoyed by those users who prefer roadless opportunities.

Under the proposed rule, the ski areas that are currently in IRAs would not be included in the CRAs. Roading and tree-cutting in those ski areas would therefore be allowed as prescribed in

the land management plans, ski area master plans, and/or project-level NEPA documents. This area would include the 3,200 acres permitted prior to Jan 12, 2001, as well as 5,000 acres permitted after that date and/or associated with land allocated to ski area management under land management plans but not yet permitted, for a total of 8,200 acres across 13 ski areas. More of these ski areas would therefore have the potential for further development and expansion, compared to the conditions under the 2001 rule. Any future ski area proposed projects beyond existing permit boundaries or forest plan allocations after the date of the Colorado Roadless Rule into CRAs would not be allowed if it required road building or tree cutting.

Additionally, under the proposed rule, authorization of roads in developed ski areas might facilitate the implementation of required ski area vegetation management plans to improve forest health, remove hazard trees, and manage fuels hazard associated with the current mountain pine beetle epidemic impacting lodge pole pine in developed ski areas. This potential increase in road construction and tree removal is not certain.

Under the land management plan alternative the potential to add roads, cut trees, and develop more ski facilities in the ski areas would be the same as under the proposed rule. If a currently undeveloped ski area is developed in the future under alternatives two or three, there would be a higher potential for semi-primitive non-motorized setting to shift to semi-primitive motorized or roaded natural setting. However, under the land management plan alternative, ski areas could potentially build roads in order to expand their permit boundary in any direction, without a rule-related roadless area constraint. Under either the proposed rule or the land management plans alternative, forest plan management direction may still constrain roading or tree-cutting activities related to ski area development or expansion.

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. Those who have grazing permits for allotments in roadless areas have been effectively managing their livestock in those areas over long time periods without the necessity of additional roads. They typically rely on pack and saddle stock to manage the livestock and maintain their range improvement structures. Range management personnel on the NFs in Colorado do not foresee a need for additional roads in roadless areas in support of livestock grazing management in those areas over the next 15 years under any alternative (see Lands – Special Use Authorizations in chapter 3 of DEIS).

Under any alternative, there would be a low likelihood that the projected new roads would significantly affect authorized livestock management use in the roadless areas. Recent tree-cutting activities such as for fuel reduction or forest health treatments have not typically resulted

in significant adverse impacts on permitted grazing management in those affected allotments. While the land management plans alternative would pose the highest potential for adverse impacts on livestock grazing management in roadless area allotments, there would be no substantial difference in risk to livestock operations under any of the alternatives. Under all alternatives the risk would be low for the potential tree-cutting activities to result in significant adverse impacts on livestock management in roadless areas.

Saleable Minerals

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

Locatable Minerals

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

Analysis of Roadless Area Characteristics

Scenic Quality

Roadless area characteristics and values typically include “natural-appearing landscapes with high scenic quality. High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. Quality scenery contributes directly to real estate values in neighboring communities and residential areas,” as noted in chapter 1 of the DEIS (USDA Forest Service, 2008). Scenic quality is based on two definable elements, landscape character and scenic integrity. Roadless areas inherently have high scenic quality because of the lack of human-induced disturbance.

The scenic quality of a forest is not static; it changes over time. To varying degrees, roads and tree cutting and removal activities in a roadless area can affect the scenic integrity of that landscape. The positive effects on scenic quality that can result from management activities that reduce insect and disease mortality in forest stands or the severity of a wildfire, may be offset by the negative effects of road construction and vegetative treatments. However, wildfire events, insect or disease infestations, avalanches, and other natural events are considered a part of that landscape's natural processes. Within the Forest Service's scenery management classification system, such natural disturbance events and resultant landscape changes (even if visually unappealing) are consistent with high or very high levels of scenic integrity.

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

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

Analysis of Alternatives

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

2001 Rule

The 2001 rule is anticipated to maintain the current high levels of scenic integrity in the IRAs. The scenic quality would remain substantially unaltered by future management activities (e.g., only 6 miles road construction per year projected), consistent with very high to high SIOs or retention to partial retention VQOs, especially in those IRAs acres that have not been substantially altered. However, many of the acres in the substantially altered areas in the IRAs would continue to reflect moderate to low scenic integrity levels, inconsistent with general roadless area characteristics and values.

It is anticipated that existing road density in IRAs would gradually be reduced over time, as more miles of road are projected to be decommissioned (12.8 miles per year) than constructed (6 miles per year). As a result, these actions could maintain or improve scenic quality. Retaining the

substantially altered areas and portions of developed ski areas inside the IRAs would potentially allow portions of the roadless areas to continue to depart from very high scenic integrity levels.

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

Land Management Plans Alternative

The land management plans alternative would retain fewer acres in the IRAs at the current high to very high scenic integrity levels, compared to the other alternatives. More parts of land in IRAs would gradually shift to a moderate to low scenic integrity level due to projected levels of roading, tree cutting and removal, and energy resource operations.

Management prescriptions that generally allow natural processes to dominate under the land management plans alternative (e.g. Backcountry, Special Interest Areas, Research Natural Areas) limit management activities and access, and areas with these prescriptions are likely to retain their high to very high scenic integrity. Areas with management prescriptions that generally permit roading and timber harvesting for a variety of purposes (e.g., general rorest, rangeland, wildlife habitat) are likely to experience reductions in scenic quality overall.

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

Proposed Rule

Continuing to limit human activities in roadless areas would help minimize adverse modifications to existing scenic quality in these areas under the proposed rule.

The proposed rule would retain the majority of the 4.03 million acres of CRAs at high to very high scenic integrity levels, with the scenic integrity level of some areas being lowered. The amount of projected roading, tree cutting and removal activities and energy resource operations would result in a higher potential than the 2001 rule for portions of roadless areas to shift to a moderate to low scenic integrity level. Potential effects would be moderated by prioritizing treatment of hazardous fuels around communities, complying with SIO and VQO guidelines from land management plans when projects are implemented, and emphasizing temporary roads that are closed to the public.

The areas of substantially altered landscapes would not be included in the CRAs so they would not detract from the expected scenic integrity level in the designated roadless areas. The unroaded areas included in CRAs would likely continue to add to the number of areas at high to very high scenic integrity levels compared to what could occur in those same areas under the land management plans alternative.

Wilderness

In 1964, Congress established a National Wilderness Preservation System, composed of federally owned areas designated by Congress as "wilderness areas" (16 U.S.C. 1131–1136, 78 Stat 890). A wilderness is recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain, and where motorized equipment and transport, development, and commercial enterprise are prohibited. In addition, a wilderness is said to generally appear to be affected by the forces of nature; have opportunities for primitive and unconfined recreation; are of sufficient size (typically greater than 5,000 acres) to be managed as wilderness; and contain other ecological, geological, scientific, educational, scenic, or historical values.

The Wilderness Act does not constrain projects proposed adjacent to wilderness boundaries because of the mere presence of wilderness. The effects from projects adjacent to wilderness areas should not be the sole reason for deferring or declining a project proposal.

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

There are a total of 35 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 457,000 acres in 13 IRAs have been recommended for wilderness in land management plans.

Analysis of Alternatives

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

2001 Rule

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

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

Land Management Plans Alternative

The risk of detracting from wilderness characteristics in adjacent wilderness areas would be highest under the land management plans alternative due to greater levels of roading, tree cutting, and road-related energy resource operations projected for IRAs. In particular, the projected activities in the North Fork Coal Mining Area would potentially impact the solitude and other wilderness experience opportunities in the adjacent West Elk wilderness.

By allowing more road construction and tree-cutting activities in IRAs, this alternative could cause the greatest reduction in the number of roadless acres that could support wilderness recommendations in the future.

Proposed Rule

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

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

Other Congressionally or Administratively Designated Areas and Trails

There are six congressionally designated areas in Colorado, established by the 1980 or 1993 Colorado Wilderness Acts, and the James Peak Wilderness and Protection Area Act of 2002 (P.L. 107-216). These areas include about 165,500 acres, 147,600 acres are in the 2001 rule IRA boundaries. Colorado has only one congressionally designated river, the Cache la Poudre River on the Arapaho-Roosevelt NF. There is a small part of the congressionally designated river in the Comanche Peak Adjacent Area and the Green Ridge East roadless areas (IRA and CRA). The designation protects 61 miles of river under Forest Service administration in the following classifications: 16 miles of wild classification and 45 miles as recreation classification. Congress has also enacted the National Trails System Act (P.L. 90-543) on October 2, 1978, which established a nationwide trail system, including the Continental Divide National Scenic Trail, part of which is in Colorado.

The congressionally designated areas are not included in IRAs being analyzed in this EIS. There would be no difference in management of these protected areas under any of the alternatives. In addition, none of the alternatives would directly impact any of these congressionally designated

areas, outside roadless areas. Similarly, none of the alternatives would directly impact the stretches of the wild and scenic river corridor classified as "wild" or "recreation," because the statute designating the river is equally or more restrictive compared to any of the alternatives in terms of roading and tree-cutting (i.e., the law does not allow activities that would degrade those values for which the river corridor was designated). Due to similar statutory precedence, none of the altenatives would alter the management or scenic values of the Continental Divide National Scenic Trail.

However, there could be indirect effects from projected activities that vary by alternative, on the characteristics or values of the adjacent designated areas noted above. Indirect impact would be minimal under the 2001 rule, greater under the proposed rule, and greatest under the land management plans alternative, based on the relative amounts of roading, tree-cutting and road-related energy development activities projected to occur in the adjacent roadless areas[17].

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

Soils, Water, and Air

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

Analysis of Alternatives: Soil

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

[17] Exceptions being that the Fossil Ridge Recreation Area, James Peak Protection Area and Bowen Gulch Protection Area allow some motorized and mechanized travel and some other activities. Thus, increases in noise and human activities in adjacent roadless areas would not be expected to significantly detract from the values for which those areas were designated.

Erosion hazard on most of the soils in the analysis area can be characterized as low to moderate, with the moderate rating being dominant. High erosion hazards are associated with soils on slopes greater than 40 percent. During project-level analysis, areas sensitive to surface erosion are identified and appropriate mitigation measures are used to reduce surface erosion and sediment production. Implementation of a well-prepared surface erosion and sediment control program in conjunction with road building and forestry activities can mitigate the potentially degrading impacts of surface erosion.

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

2001 Rule

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

There would be little risk of significant amounts of soil movement or loss of soil quality from increases in soil erosion or landslides. Roads would typically not be on steep slopes (over 40 percent) because some areas are more prone to landslides on steep slopes. The likelihood would be low that project road construction would occur on highly sensitive soils and result in a substantial increase in soil erosion. Maintaining the restrictions on new road construction in the substantially altered areas would further help to maintain desirable soil conditions in the roadless areas, even though tree-cutting activities would continue to occur along existing roads in those areas.

No major long-term impacts on soil resources would be anticipated to occur as a result of projected new development in ski areas. Unroaded areas outside IRAs would continue to incur the same soil effects that are currently occurring, and potential soil impacts may increase if roads are built in the future. The potential for post-fire erosion and other wildfire-related impacts on soil quality in roadless areas would remain high under this alternative.

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

Land Management Plans Alternative

The land management plans alternative would result in a noticeably higher risk of adversely affecting soil quality in roadless areas compared to the 2001 rule and the proposed rule due to additional acreage in IRAs projected to be used for roading, tree-cutting and removal activities, and energy resource development activities. The overall soil resource impacts would not substantially differ from the other alternatives, and long-term soil productivity in IRAs would be expected to be maintained at a satisfactory level. Soil impacts would be minimized for the reasons previously described for the other alternatives.

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

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

Soil quality impacts on the 309,000 acres of unroaded areas not included in IRAs under the land management plans alternative would be the same as described for the 2001 rule. Like the 2001 rule, there would be a higher potential for adverse soil quality impacts from future roading and other development activities in these unroaded areas.

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

Proposed Rule

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

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

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

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

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

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

The addition of 309,000 acres of unroaded areas into CRAs under this alternative would reduce the potential for road-related impacts on soil quality in those areas. The potential for wildfire-related impacts on soil quality in roadless areas would be lower under the proposed rule compared to the 2001 rule.

Analysis of Alternatives: Water

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

Despite the potential for water quality degradation from management activities in roadless areas, the streams and lakes in roadless areas in Colorado generally have good to excellent water quality, as previously described. This is partly because potential impacts from management activities on NFS lands are mitigated (avoided, reduced, or minimized) by following best management practices (BMPs) designed to control nonpoint sources of pollutants and meet Clean Water Act standards for water quality (FSM 2532). Water quality impacts are also mitigated through application of the Forest Service regional watershed conservation practices handbook (FSH 2509.25).

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

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

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

2001 Rule

The vegetation removals projected to occur in roadless areas from roading, tree-cutting, and other activities would not be of sufficient magnitude or extent to cause a measurable change in water yield. The potential for large-scale catastrophic wildfires in the roadless areas would be slightly higher under this alternative, and could therefore increase the risk of flash floods and increased sedimentation in water bodies. However, the difference in the potential for large wildfires occurring in one or more of the roadless areas does not substantially differ between alternatives.

The 2001 rule generally prohibits new roads and tree-cutting, and would therefore have the least risk of potential adverse effects on water quality. With the expected application of mitigation measures and BMPs to each project, as described earlier, the potential would be very low for exceeding water quality standards as a result of authorized activities in roadless areas.

Activities that could occur in the IRAs are unlikely to contribute to further impairment of streams currently listed on the State 303(d) list.

The projected decommissioning of roads would have beneficial effects on water quality because reduction of road density is one of the best watershed restoration treatments that can be used to improve watershed and stream health.

Maintaining the substantially altered areas in IRAs along with the general prohibition on new roads in these areas would further help to maintain desirable soil and water quality conditions in the roadless areas. On the 309,000 acres of unroaded area inside CRAs but outside IRAs, there would be no change in potential impacts on water quality from ongoing or future land use activities. New roads and other activities related to energy resource operations (oil, gas, and coal) allowed under this alternative in leased areas (prior to 2001) would continue to potentially affect water quality in several ways.

Because the 2001 rule projects the least amount of new roading and oil-, gas-, or coal-drilling activity in roadless areas, it would have the lowest risk of accidental spills or other water quality impacts compared to the other two alternatives.

Other allowable activities expected to continue in roadless areas that could potentially continue to affect water quality include: prescribed burning, some hard-rock mining, livestock grazing, camping, hiking, biking, off-highway motor vehicle uses, and many other ongoing land use activities. These activities would continue to contribute to localized impacts to water quality but would be effectively mitigated through the use of site-specific watershed conservation practices and BMPs. The extent and effect of activities would not be measurably different under any of the alternatives.

The 2001 rule would also pose a very low risk of adverse impacts on municipal water supplies, and poses a slightly increased risk of experiencing a large, high-severity wildfire in an IRA, because of the low amount of fuel reduction projected to occur in IRAs. This would result in a slightly elevated risk of water quality impacts on municipal water supplies from a high-severity wildfire, compared to the other two alternatives.

Land Management Plans Alternative

The land management plans alternative would have a slightly greater risk of adverse impacts on water quality in roadless areas compared to what was described for the 2001 rule and the proposed rule due to more new roads, tree-cutting and removal, and other ground disturbances allowed under this alternative. Even with a greater potential for adverse water quality impacts expected to occur in the roadless areas under the land management plans alternative, future roading and tree-cutting and removal activities in the roadless areas would not be expected to cause water quality standards to be exceeded (that is, would not be expected to increase the number of impaired stream miles) in roadless areas. The additional acres of tree-cutting projected under the land management plans alternative would not measurably alter the expected impacts on water quality.

The land management plans alternative has the greatest amount of projected energy development operations and therefore has the greatest potential risk of adverse effects on water quality from those activities. However, the risk of accidental chemical spills or increased sediment or chemical levels in roadless area streams would be the highest under this alternative.

The 309,000 acres of unroaded area that are not included in roadless areas under this alternative would have a slightly higher risk of experiencing adverse water quality impacts, as more roads would likely be built in those areas.

The land management plans alternative would pose the greater risk to municipal water supplies from authorized activities compared to the other two alternatives, because of the increase in projected ground-disturbing activities under this alternative. However, municipal water supplies in the water assessment areas would again continue to be adequately protected by use of conservation practices and mitigation measures. The risk of a large-scale high-intensity wildfire in a roadless area causing water quality impacts on a municipal water supply in a roadless area would be reduced under the land management plans alternative compared to either of the other two alternatives.

Proposed Rule

The proposed rule would have a slightly greater risk of adverse impacts on water quality in roadless areas compared to what was described for the 2001 rule due to greater projected levels of construction, vegetation removal, and ground disturbance. The potential for water quality impacts would be effectively mitigated through the site-specific application of watershed conservation measures and other BMPs.

The potential water quality impacts from new roads, tree-cutting and removal activities, and energy-development activities described for the 2001 rule would essentially be the same under the proposed rule. This is because under all the alternatives, the impacts would be localized and geographically scattered across millions of acres of roadless areas, so the impact on any one drainage or watershed in a given year would be small.

By not including substantially altered areas in the CRAs, there might be a slight increase in the potential for road-related water quality impacts on those lands. On the 309,000 acres of unroaded area that are included in CRAs under this alternative, there would be a slightly reduced risk of experiencing adverse water quality impacts compared to the 2001 rule.

There would be an increased risk of higher sediment and chemical contamination levels and/or accidental chemical spills in streams within the North Fork coal mining areas that are developed in CRAs, compared to the water quality conditions anticipated under the 2001 rule.

Municipal water supplies in the water assessment areas would continue to be adequately protected by use of watershed conservation practices, BMPs, and other mitigation measures, and impacts would be scattered across many different roadless area watersheds. In addition, the risk of a large-scale high-intensity wildfire in a roadless area resulting in water quality impacts on a municipal water supply assessment area in a roadless area would be decreased under the proposed rule compared to the 2001 rule. This is because under the proposed rule more acreage would be treated to abate wildfire hazards in roadless areas.

Analysis of Alternatives: Air

The Forest Service coordinates with the State of Colorado to help prevent air quality impacts on Forest Service administered lands, in accordance with Clean Air Act, the Wilderness Act, and the Organic Act. Of the airsheds that overlap parts of roadless areas in Colorado, no areas are currently designated as “non-attainment” for particulate matter.

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

All Alternatives

Differences in effects on air quality do not substantially differ among alternatives. Based on the projected land management activities that differ among alternatives, as described in the analysis framework, atmospheric emissions in roadless areas are not anticipated to directly, indirectly, or cumulatively increase to a level that would be likely to exceed State or Federal air quality standards. This estimate of potential impact is based on the estimated magnitude, extent, and duration of atmospheric emissions from those activities, as projected for each alternative.

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

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

Threatened, Endangered, and Sensitive Species

Details about information below about the occurrence of effects to threatened, endangered, proposed, candidate, and sensitive (TEPCS), as well as MIS in Idaho's roadless areas are provided in detail in chapter 3 of the DEIS (USDA Forest Service 2008) for the proposed rule.

Analysis of Alternatives: Botanical Resources

This section focuses on the effects to threatened, endangered, and sensitive (TES) plants. For details about the following discussion, see section threatened, endangered, and sensitive plants in chapter 3 of the DEIS for the proposed rule (USDA Forest Service, 2008).

Two such plant species are known to occur in CRAs: penland's eutrema (*Eutrema penlandii*) and Uinta Basin hookless cactus (*Sclerocactus glaucus*); according to the Colorado Natural Heritage Program (2008). Both are listed as threatened by the U.S. Fish and Wildlife Service. Based on projections of foreseeable activities in roadless areas under any alternative, there is no likely potential for oil, gas, or coal development, new roads, or tree-cutting activities in the penland's eutrema habitat that occurs in IRAs or CRAs.

Uinta Basin hookless cactus has been listed as a threatened species, in part because of the potential of energy development and mining actions adversely impacting this species according to the U.S. Fish and Wildlife Service; however, there is no anticipated threat to this cactus from oil and gas activities including associated road building in the roadless areas under any alternative.

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

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

Sixteen sensitive plant species that are known or likely to occur in IRAs or CRAs are considered endemic, because they occur only in Colorado. Endemic species may be at higher risk of extinction because of small population number and very limited geographic range, including Colorado tansyaster. A total of 5 of the 12 occurrences of tansyaster in roadless areas would not have roadless status under the proposed rule.

Projects may also be designed to have beneficial effects on sensitive plant populations. For example, projects implemented for forest health, fuel reduction, or other purposes where management activities may occur in roadless areas could be designed to correct poor road alignments or existing soil erosion impacts on sensitive plants, or to reduce the risk of a high-severity wildfire that might eliminate a sensitive plant population and its seed bank. Thus, some management actions in roadless areas could benefit sensitive plants over the long term, even if there are short-term adverse impacts. Of the 44 sensitive plant species known or likely to occur in roadless areas, five sensitive plant species (roughly 10 percent of the total sensitive plant species) grow in forest habitats that might benefit from tree-cutting to reduce the risk of severe stand-replacing wildfires. However, depending on where and how equipment is brought on-site for fuel reduction projects, there also could be increased risk of adverse impacts on sensitive plant species (for example, temporary road construction or skidder operations across shrublands or open areas).

Under all alternatives, management actions such as roading or tree-cutting and removal typically include mitigation measures that adjust locations of these activities to avoid populations of sensitive plants. However, the manual direction also provides discretion to the line officer making the project-level decision to allow adverse impacts to sensitive species, provided that the decision does not result in loss of species viability or create significant trends toward Federal listing of the species under the ESA.

2001 Rule

As mentioned in the affected environment section, there would be no projected likelihood of impacts on threatened or endangered plants in IRAs from roading, tree-cutting and removal activities, or energy resource development activities in IRAs (activities that differ by alternative).

The risk of adverse impacts from the spread of invasive plants is the lowest for the 2001 rule compared to other alternatives because of the higher level of restrictions on new roads and other activities in the IRAs.

Of the 116 IRAs where sensitive plants are known or likely to occur, 57 are projected to have activities that vary by alternative, and 12 of these areas would likely experience roading, tree-cutting, or energy development under the 2001 rule (i.e., approximately 21 percent of the 57 affected IRAs are projected to be likely to experience the above listed activities in some part of the IRA under provisions of the 2001 rule).

The overall risk of adverse impacts on sensitive plants from management activities in roadless areas would be considerably lower under the 2001 rule compared to the proposed rule and the land management plans alternative, because fewer management activities are projected to occur in the IRAs that support sensitive plants. However, an unusual exception exists in three roadless areas where there would be a higher risk to the lesser panicled sedge (*Carex diandra*) under the 2001 rule than under the proposed rule because more roading is projected to occur in those particular roadless areas under the 2001 rule (in the Black Mountain, Elkhorn, and Nipple Peak North Roadless Areas on the Routt NF).

In general, the limitations on roading and other activities under the proposed rule would result in less risk of adverse effects on sensitive plants from invasive plants compared to what would be expected under the proposed rule and the land management plans alternative.

Proposed Rule

The only difference in potential effects to T&E species under the proposed rule would be a higher risk of indirect effects from invasive plants that could spread from more distant activity areas in other parts of the CRAs or outside CRAs into the threatened plant habitat in the CRAs. This increase risk is due to additional circumstances under which roading and tree-cutting activities are allowed, compared to the 2001 rule.

The risk to sensitive plants would be considerably higher under the proposed rule than the 2001 rule. More than 90 percent of the roadless areas that have sensitive plants and vary by alternatives are projected to have roading, tree-cutting, or energy resource development activities in them under this alternative (see appendix C of the DEIS).

There would be relatively little difference in the risk to sensitive plants related to the roadless area boundary adjustments under the proposed rule.

Of the estimated 57 CRAs where projected activities vary by alternative, and where sensitive plants are known or likely to occur, approximately 54 CRAs (about 95 percent) would likely experience roading, tree-cutting and removal, or energy resource development in some portion of a CRA under the proposed rule. Thus, the risk of adverse impacts on sensitive plants would be higher under the proposed rule compared to the 2001 rule.

There would be a higher potential for adverse impacts from invasive plants under the proposed rule than the 2001 rule because more activities are projected over the next 15 years in the CRAs where sensitive plants are known or likely to occur.

The proposed rule would provide substantially more opportunity to improve forest health and reduce wildfire hazards compared to the 2001 rule, thereby reducing the potential of severe fire eliminating a sensitive plant population and its seed bank. As was mentioned for the 2001 rule,

only about 10 percent of the sensitive plant habitats in roadless areas grow in forests and similar habitats that would benefit from reducing the risk of a severe wildfire event. This means that 90 percent of the sensitive plant species in roadless areas are not in forest habitats that may experience reduced wildfire hazard.

Overall, the proposed rule may adversely affect individual sensitive plant populations but is not likely to result in a loss of viability for sensitive plant populations on any NF in Colorado or cause a trend toward Federal listing for the sensitive plant species analyzed in this document.

Land Management Plans Alternative

The land management plans alternative would result in a greater increase in the risk of invasive plants affecting threatened and endangered (T&E) plants, compared to the 2001 rule. This risk would be approximately the same as described for the proposed rule.

All the effects on sensitive plants under the land management plans alternative would be essentially the same as those described for the proposed rule. This is because under the land management plans alternative, 53 of 57 (93 percent) affected IRAs with sensitive plants are projected roading, tree-cutting, or energy resource development activities over the next 15 years.

The indirect effects from invasive plants would be expected to be similar to effects described for the proposed rule, because the level of activity in roadless areas where sensitive plants occur would be roughly the same under both alternatives.

The potential for beneficial effects on sensitive plants would be the same as described for the proposed rule and would affect only a small percentage of the habitats where sensitive plants are known or likely to occur. Most IRAs supporting sensitive plants would not be improved by reductions in wildfire hazard. More importantly, in the land management plans alternative, 93 percent of roadless areas that support sensitive plants would have projected activities in them over the next 15 years, which would increase the risk of adverse impacts on sensitive plant populations.

Overall, the land management plans alternative may adversely affect individual sensitive plant populations but is not likely to result in a loss of viability for sensitive plant populations on any NF in Colorado or cause a trend toward Federal listing for the sensitive plant species analyzed.

Analysis of Alternatives: Aquatic Habitat and Species

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

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

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

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

There are four T&E fish species (razorback sucker, bonytail chub, Colorado pike minnow, and humpback chub) that occur downstream of NFS lands in the Colorado River and some of its larger tributaries that could be indirectly affected by activities in the roadless areas. These residents of relatively large river systems have become increasingly rare, mostly due to dramatic changes in hydrology, water quality, and habitat conditions. Although these fish do not occur in rivers in Colorado, they could be affected by the combination of different activities that are likely to occur in the roadless areas that affect their habitat conditions.

There are aquatic habitats in many of the roadless areas in Colorado that have been identified as being ecologically important as well as "rare." Fens act as carbon sinks, are typically produced at the toes of slopes, and are often associated with high elevation glaciated valleys. Wetlands are also an important habitat for many species and have been reduced in Colorado by as much as 50 percent of their historic extent, through numerous management activities. In some areas in Colorado, conversion of riparian forest and shrub dominated ecosystems to unvegetated and grass dominated habitat has resulted in a loss of important habitat for a variety of plants and animals.

Management Indicator Species (MIS) are species identified in land management plans for each NF, as indicators of the effects of management activities on specific habitat types or features, as a means of compliance with the NFMA. There are 36 MIS animal species represented for the

NFs in Colorado excluding those selected for national grassland ecosystems: 11 mammals, 23 birds, 1 amphibian (toad), and 1 invertebrate (insect). All 36 MIS are likely to occur in one or more roadless area, and therefore are relevant to this analysis. Land management plans for the NFs in Colorado identify 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) as MIS.

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

2001 Rule

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

Land Management Plans Alternative

The general effects of the projected roading, tree-cutting and road-related oil, gas, and coal development activities under existing land management plans would have effects similar to those described for the proposed rule. However, the extent of those projected activities in IRAs would be greatest under this alternative. Thus, this alternative poses the greatest risk of impact to aquatic species and habitat.

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

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

Proposed Rule

The primary difference between this alternative and the 2001 rule is related to the amount of new roads allowed and projected to occur in the roadless areas, as well as in the differences in the CRA boundaries compared to IRA boundaries. In the substantially altered and other IRA acres outside the CRAs, there would be a greater potential for impacts to aquatic habitat and species

compared to the 2001 rule. However, this alternative includes unroaded acreage in CRAs that is outside IRAs, which would afford greater protection from potential impacts from new roads in those additional CRA acreages.

The risk of impacts to individual fish populations is predicted to be greater in the roadless areas where oil, gas, and coal development activities are projected to increase under the proposed rule and the land management plans alternative, such as those areas on the GMUG NF, as well as the San Juan and White River NFs.

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

Some of the IRA acres that are not included in CRAs under the proposed rule may have more new roads and associated management activities approved by responsible officials under the governing land management plans. The IRA acres and stream miles that are not included in CRAs are greatest on the GMUG NF administrative unit. Across all forest units, there would be 406 fewer stream miles in CRAs, compared to IRAs under the proposed rule.

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

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

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

The increase in predicted adverse impacts associated with the proposed rule, as well as the land management plans alternative would add to the existing cumulative impacts from all the other land use activities discussed. While these alternatives would not individually result in highly significant adverse impacts, they would contribute negatively to cumulative effects in these aquatic ecosystems in the roadless areas.

Analysis of Alternative: Wildlife

This section evaluates effects of the alternatives on terrestrial (land-based) animal habitats and species. For details about the discussion below, see the terrestrial habitat and species section in chapter 3 of the DEIS (USDA Forest Service, 2008).

The effects of roads, tree-cutting, and minerals/energy activity on animal habitats can be organized into the following categories: habitat availability and effectiveness; habitat fragmentation; invasive species; and human access and disturbance. These categories are not mutually exclusive as they represent many interrelated effects. Beneficial effects on terrestrial species from tree-cutting and associated activities are derived from projects where the primary objective considers creating or maintaining some specific habitat condition (e.g., age-class diversity, ecosystem condition improvement, reduced risk of large stand-replacing insect and disease outbreaks, and severe wildfire).

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

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

- A diversity of native and desired non-native plant and animal communities, due to the absence of disturbances caused by roads and accompanying activities.
- Conservation of native biodiversity by serving as a bulwark against the spread of non-native invasive species.
- Habitats for threatened, endangered, proposed, candidate, Forest Service sensitive species, and Colorado priority species (Colorado Division of Wildlife 2006), and for species dependent on large, undisturbed areas of land.
- Biological strongholds and refuges for many species, including terrestrial and aquatic plant and animal species.

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

There are ten T&E animal species known to occur in Colorado; six occur or are likely to occur on NFS land in one or more roadless areas. Critical habitat has been designated by the U.S. Fish and Wildlife Service for two of the potentially affected T&E species: Preble's meadow jumping mouse and Mexican spotted owl. Four roadless areas on the Arapaho and Roosevelt NFs and two roadless areas on the Pike and San Isabel NFs have critical habitat for the preble's mouse. Nine roadless areas on the Pike and San Isabel NFs have critical habitat for Mexican spotted owl.

There are 34 sensitive animal species that occur or are likely to occur in roadless areas. These consist of 19 birds, 11 mammals, 3 amphibians, and 1 invertebrate (insect) (see the terrestrial habitat and species section in chapter 3 of DEIS for list of species and habitat requirements). Inventories of sensitive species on NFS lands are incomplete, especially in roadless areas. However, based on available information, it appears that the following sensitive species or habitats (five birds and one mammal) are the most prevalent in terms of number of roadless areas

for which data occur: white-tailed ptarmigan, flammulated owl, boreal owl, northern goshawk, olive-sided flycatcher, and American marten.

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

Of the 53 important bird areas (IBAs) (defined by National Audubon Society) designated in Colorado, two are in roadless areas or their adjacent wilderness areas on the White River NF: Hanging Lake IBA (in Grizzly Creek IRA), and Alfred M. Bailey Bird Nesting Area IBA (in Eagles Nest Wilderness adjacent to the Maryland Creek Roadless Area). Potential threats to the Hanging Lake IBA are habitat disturbance from recreational rock and ice climbers. The management activities projected to occur in this roadless area do not differ among alternatives. The Alfred M. Bailey Bird Nesting Area IBA was so-designated because it is one of the most diverse mountain bird breeding sites in Colorado, with approximately 44 species of breeding birds identified. Audubon has identified potential threats to this IBA as habitat conversion of the surrounding forest by logging.

All Alternatives

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

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

Based on recent past trends for road building on NFS lands in Colorado, it is expected that most roads built in roadless areas would be temporary and closed to general public use, and they would be decommissioned after completion of the activity. Thus, the impact of these roads on terrestrial species and habitat would be relatively short-term. However, increases in roads could encourage more hiking, biking, and horseback riding, as well as unauthorized motorized use. This would increase impacts related to human disturbance to terrestrial species and habitat as described in the general effects discussion.

The effects from all alternatives may combine with effects from other activities or land uses in or adjacent to roadless areas to result in a cumulative effect. Considering the population growth rate of the State and the high demand for resources available in Colorado, some non-Federal lands will continue to experience impacts on natural resources from urbanization and development, resource demands (for example, minerals), and recreation. Some effects that result in lower habitat quality on non-Federal land may limit the potential effectiveness of habitat conservation and restoration on Federal lands. Development of non-Federal lands displaces mobile animals to adjacent NFS lands. The Mamm Peak CRA is an example where concentrated gas field development occurs on adjacent private and BLM lands in areas important for elk calving and

winter range. Consequently, the Mamm Peak CRA, which provides irreplaceable habitat, is of even higher importance to the survival of that elk population.

2001 Rule

The 2001 rule would provide the highest level of protection to T&E species, sensitive species, MIS, and migratory bird species, compared to the other two alternatives, due in large part to lower levels of permitted and projected activity in roadless areas. Areas with low road densities, less altered or modified forest vegetation, and lower levels of human activity and ground disturbance are generally better for wildlife species and habitat conditions. Limits on tree-cutting that could occur under the 2001 rule to "generally small-diameter trees" would help maintain the larger trees and canopy cover and would provide for more variability in forest structure and canopy cover overall. Potential detrimental effects would be less likely to involve measurable adverse impacts on any of the potentially affected species.

Open road density in IRAs would gradually be reduced. Under the 2001 rule, more roads would be decommissioned each year (12.8 miles) than would be constructed or reconstructed each year (6 miles) in the IRAs.

The 2001 rule does not allow roading in conjunction with tree-cutting to improve T&E or sensitive species habitats. Biologists on the NFs did not project any roading needs in roadless areas specifically to improve habitat for wildlife. By not allowing new road construction in conjunction with treatment actions to reduce wildfire hazard or large insect-disease outbreaks, this alternative would pose a higher risk of a more severe wildfire that could cause adverse impacts on habitats for some species.

It is estimated that the 2001 rule may affect individuals but is not likely to adversely affect populations of any of the T&E species identified as known or likely to occur in the roadless areas. It also would not be expected to adversely modify any designated critical habitat in the roadless areas (for the Mexican spotted owl or preble's meadow jumping mouse). The 2001 rule may adversely affect individual sensitive species but is not likely to result in a loss of viability or cause a trend toward Federal listing for the sensitive species populations on any of the NFs. There are not likely to be any significant changes in population trends for MIS because of the highly protective nature of the 2001 rule. The 2001 rule would also not likely affect the Forest Service's ability to adhere to requirements under the Migratory Bird Treaty Act of 1918 or the executive order for protection of migratory birds.

Land Management Plans Alternative

There is a high degree of variability between forests in terms of whether roading and tree-cutting activities are more or less restrictive under this alternative compared to the other two alternatives (see Appendix B of the DEIS for details about forest plan management and direction).The increased amount of roads in IRAs under the land management plans alternative would create disturbance and fragmentation that would negatively affect terrestrial species. There would also be a higher risk to terrestrial animal species on substantially altered acres under this alternative compared to the 2001 rule. Similar to the proposed rule, those substantially altered acres may not be prioritized for T&E and sensitive species habitat improvement efforts as more roads could be constructed and reconstructed in those areas.

Under the land management plans alternative, additional tree-cutting and product removal could be conducted for commercial timber removal purposes, depending on the forest plan direction for the given area. Removal of standing diseased and dead trees along with down logs would have negative impacts on primary cavity nesters and other species that depend on those habitat features. However, forest plan requirements for retention of snags and down logs would help mitigate some of these effects. Increases in harvesting activity of this magnitude in IRAs would result in direct losses of some individuals and may result in disturbance and displacement of some species.

The increased ability to treat acres for forest health and fuels management in this alternative would improve habitats for early seral species in some areas and in the short term and reduce the potential for a severe stand-replacing wildfire that could otherwise have adverse impacts on terrestrial animal habitat.

The detrimental effects on terrestrial animal habitat from an expected increase in invasive plants, animals, and pathogens would be essentially the same as was described for the proposed rule, but this risk would occur on more roadless area acres under the land management plans alternative.

The effects on terrestrial species in roadless areas that have projections of oil, gas, and coal-related activities and overlap roadless areas of high importance to wildlife would be similar to the effects described for the proposed rule. In many of those IRAs, the surrounding lands are also experiencing accelerated development, which likely elevates the biological importance and heightens the sensitivity of these roadless areas to fragmentation and disturbance effects.

The land management plans alternative would likely have similar effects to the proposed rule on lynx habitat connections, deer migration corridors, elk winter range, and other habitats of concern in those areas associated with ski areas.

The land management plans alternative may affect individual T&E species but is not likely to adversely affect populations of the T&E species associated with the IRAs. Additionally, the land management plans alternative would not likely result in adverse modification of designated critical habitat for the Mexican spotted owl or preble's meadow jumping mouse. Some or all of the listed T&E species and critical habitats could be at a substantially increased risk of negative effect or adverse habitat modification due to the projected increase in roads and tree-cutting activities on those forests with older plans and no specific roadless area management direction under the land management plans alternative.

Some sensitive species would be at higher risk where they occur in the roadless areas that have projected road building or tree-cutting activities. The land management plans alternative may adversely affect individuals but will not likely result in a loss of viability or cause a trend toward Federal listing for sensitive species populations on any of the NFs in Colorado.

Some MIS could be at a substantially increased risk of adverse habitat modification or species impact from the projected increase in roads and tree-cutting activities. There is a potential for change in population trends for MIS associated with this alternative depending upon the location, timing, intensity, and magnitude of activity. Some of these effects could potentially be avoided through design criteria and mitigation measures developed as a part of site-specific project analysis. Using that assumption, forests should be able to meet conservation objectives for MIS.

The status and protection of important bird areas in roadless areas differ with the land management plans alternative with respect to the Alfred M. Bailey Bird Nesting Area IBA which

is in the Eagles Nest Wilderness Area, adjacent to the Maryland Creek Roadless Area on the White River NF. Under the land management plans alternative, the Maryland Creek Roadless Area may experience some timber management because the area would be managed for general forest products. Overall, the land management plans alternative would not be likely to affect the Forest Service's ability to adhere to requirements under the Migratory Bird Treaty Act or the executive order for protection of migratory birds.

Proposed Rule

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

The same amount of road decommissioning of existing roads in roadless areas would occur under the proposed rule as in the other alternatives, which would have the same effect of improving terrestrial animal habitat conditions. While roads are being decommissioned, there may be disturbance impacts on terrestrial animal species and habitats in the area. Those effects would be of relatively short duration and of limited geographic extent at any given time.

The increase in the projected number of road miles in the proposed rule compared to the 2001 rule has the potential to cause a greater degree of habitat disturbance and fragmentation that could negatively affect wildlife. It is recognized that road location would influence effects significantly, and that potential adverse impacts would be addressed and mitigated to the extent feasible during project-level planning.

The reduction in roadless area acreage (i.e., substantially altered areas or other IRA acres) where road building is prohibited or restricted would diminish the habitat quality for a number of terrestrial species, compared to the 2001 rule. Many of the IRA acres not included in CRAs provide high wildlife value, as shown on the map in the map packet and in appendix F. The increases in roading projected to occur in IRA acreages that are not included in CRAs may further fragment terrestrial animal habitat for some species. Some of these effects from not including some IRA acres in CRAs would be offset by adding some unroaded acres into the CRAs that are currently not included in IRAs.

Potential increases in tree-cutting under the proposed rule, compared to the 2001 rule, would result in a greater adverse and beneficial effects on terrestrial animals and their habitats. Removal of standing diseased and dead trees along with some down logs could have negative impacts on species that require those habitat features, although forest plan requirements for retention of snags and down logs would help mitigate some of these effects. On the other hand, treatments to improve forest health and fuels management under the proposed rule could improve habitats for early seral species in some areas. Reducing the amount of forest stands susceptible to a large and severe wildfire would also have beneficial effects on terrestrial animals in those treated parts of CRAs. The removal of standing dead trees and the reduction of fuel loading associated with beetle-killed stands that are identified as particularly important to T&E or sensitive species populations could be beneficial to those species.

The expected increase in mechanized equipment, people, and vehicles would further increase potential transport of invasive species into roadless areas. Thus, there would be more potential for habitat degradation from invasive species, compared to what would occur under the 2001 rule.

Most roads under the proposed rule would be temporary and closed to public vehicular traffic, and they would be decommissioned after the intended road use is completed. However, there may be additional adverse impacts from unauthorized motorized travel in the CRAs.

CRA boundary adjustments that exclude land allocated in the land management plans alternative for ski area resort management result in removing three roadless areas from CRAs that are of high importance for terrestrial wildlife. There would be the potential for a higher level of development under the proposed rule and the land management plans alternative. The three CRAs of particular concern for terrestrial animal species are ard Creek and Mount Sniktau (Loveland Ski Area on the Arapaho and Roosevelt NFs); Game Creek (Vail Ski Area on the White River NF); and Porcupine Creek (Arapaho Basin ski area on the White River NF). However, mitigation measures would likely be applied during project planning to minimize the risk of adverse impacts (e.g., loss of landbridges, linkage areas), based on the lynx amendment EIS (predecisional document, still in progress) along with forest plan direction, laws, regulations, and policies for protection of T&E species and habitat.

As the CRAs and wilderness areas form a network across the landscape, the increase in roading and other activities in them could sever linkages and disrupt the network of interconnected habitats and populations. Although many parts of the CRAs would continue to be protected from further development and fragmentation, the proposed rule has a greater potential than the 2001 rule to create disruptions.

Based on the activities allowed and projected to occur in roadless areas under the proposed rule, individual T&E species may be affected but the alternative is not likely to adversely affect populations of T&E species. In addition, it also would not be expected to adversely modify the designated critical habitat in the roadless areas (for the Mexican spotted owl or preble's meadow jumping mouse). Furthermore, this alternative may beneficially affect T&E species and critical habitat by protecting large areas of lands and habitats in the State from extensive development that might otherwise occur without the level of protection in this alternative for roadless areas. Similarly, the proposed rule may adversely affect individual sensitive species but would not likely result in a loss of viability or cause a trend toward Federal listing for sensitive species populations on any of the NFs in Colorado.

Based on the effects described, there is a potential for change in population trends for MIS associated with this alternative depending upon the location, timing, intensity, and magnitude of activity. The loss of the substantially altered acres from roadless area protection may not be mitigated by the addition of unroaded acreage under this alternative. At this level of analysis, it cannot be determined if the function of acres lost is replaced in acres gained.

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

Biodiversity

Based on current literature (see the terrestrial habitat and species section in chapter 3 of the DEIS), 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 on threatened, endangered, and sensitive (TES) species and biodiversity could include:

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

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

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

- Protected large contiguous blocks of habitat providing habitat connectivity for a variety of species that need large connected landscapes.
- Protected large contiguous blocks of effective habitat providing for solitude and freedom from disturbance that is required by some species.
- Decreased risk associated with fragmentation and isolation from timber cutting, roading, and leasable minerals activities.
- Conservation and protection of biological strongholds and other important habitats for terrestrial animals, including TES species.
- Decreased risk associated with invasive species introductions and spread.
- Maintenance of native animal communities where non-native-species are currently rare, uncommon, or absent.

- Provision of increased assurances that biological diversity would be conserved, both in the area and the overall landscape in which it is found.
- Provision of important components of conservation strategies for protection and recovery of Federally listed proposed, threatened, and endangered species and NFS regional forester sensitive species.
- Maintenance or restoration of some level of natural disturbance processes at local and landscape levels, which are important controls for ecosystem composition, structure, and function.

The proposed rule would be less beneficial and potentially harmful (depending on the location of the activity) to biological diversity. The types of potential beneficial effects under the proposed rule would be similar to those listed above for the 2001 rule but would be realized to a lesser degree.

The land management plans alternative, because of fewer restrictions of land use activities in roadless areas, would probably pose a higher risk of affecting biological diversity, species habitats, and populations. However, these effects will not be uniform across forests or roadless areas. As previously described, some land management plans are more restrictive of land uses in roadless areas than other land management plans. For forests with plans that are less restrictive on activities in IRAs, effects from activities outside the IRA boundary would add to the potential adverse effects described for this alternative.

Invasive Plants

Invasive plants for purposes of this discussion include non-indigenous plant species that adversely affect the habitats they invade economically, environmentally, or ecologically. Invasive plants become established after seed or other plant parts have been imported to an area through roads, vehicular traffic, and/or other ground-disturbing activities, and where suitable environments exist. They often become detrimental to resource values, and the effects are often irreversible. Details regarding the background, analysis, and references for the discussion below can be found in the invasive plants section of the DEIS (USDA Forest Service, 2008).

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

Numerous natural mechanisms also spread invasive plants, including wildlife, wind, and flowing water. Birds and rodents ingest seed from invasive plants and disperse them in their feces. Big game animals carry seed or other propagates on their fur or hooves. Seed ingested by larger mammals is carried in the gut, and deposited in the feces, enabling germination in a new

location. After seed is imported into an area, invasive plants are often able to successfully establish in certain habitats even without ground disturbance, because of their aggressive nature and adaptability. Once new populations are established by wind, then wildlife or subsequent increases of human activity and ground disturbance have been proven to accelerate the spread.

To minimize spread of invasive plants in roadless areas and other NFS lands, the Forest Service follows direction in the Invasive Species Executive Order 13112**.** This E. O. directs Federal agencies to use relevant programs and authorities to (1) prevent the introduction of invasive plants; (2) detect and respond rapidly to and control invasive populations efficiently and safely; (3) accurately monitor invasive populations; (4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; and (5) promote public education on invasive plants. To further minimize the risk of invasive plant establishment and spread during road building, decommissioning, or other projects, BMPs for invasive plant prevention are typically followed.

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

Analysis of Alternatives

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

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

Rates of spread for invasive plants are variable according to species, habitat, and a variety of other factors. Spread-rate estimates as high as 14 percent have been documented. In this analysis, estimates of invasive plant spread are derived using a more conservative 5 percent annual spread rate. The amount of acres disturbed under each alternative is derived from the projected reasonably foreseeable activities outlined in the methodology, data, and assumptions section, as well as an assumption of 2.9 acres of disturbance per mile of roading. It is difficult to quantify the actual number of acres potentially affected by the establishment of invasive plants, but this

analysis assumes that one half of 1 percent of acres disturbed would actually be invaded. The results of these analyses should be used as relative indicators of risk, for the comparison of alternatives.

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

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

2001 Rule

Under the 2001 rule, roading is generally prohibited; therefore, ground disturbance resulting from new roads and vehicular access would remain quite low. Consequently, the potential spread of invasive plants in roadless areas under this alternative would remain low.

Based on reasonably foreseeable activities (800 acres of tree-cutting; 6 miles of road construction, and 4 acres of energy development), a total of 821 acres are projected to be disturbed annually. For comparison purposes, if one half of 1 percent of the 831 acres of IRA disturbed ground were invaded by non-native plants, the result would be approximately 4 acres invaded per year, spread out over the 4.25 million acres of IRAs. Indirect effects would result from the gradual steady encroachment of newly established invasive plant populations over the long term, if adequate resources are not available to address the issue. Assuming the compound effect of a 5 percent annual growth rate for untreated invasive plants, plus annual additions of another 4 acres per year, approximately 90 acres of invasive plants would be found in the affected area after 15 years under the 2001 rule.

Under the 2001 rule, tree-cutting activities, together with prescribed burning, would likely result in less ground disturbance and open forest canopies than under other alternatives.

In addition to the 831 acres projected to be disturbed annually, it is projected that about 12 miles of existing roads (about 35 acres) would be decommissioned annually under the 2001 rule. For road decommissioning, there would be a gradual reduction in the likelihood of imported seed via vehicular traffic in the long term. However, during the decommissioning and for a period of approximately 3 to 5 years, there is an elevated risk of invasive plant establishment and spread, if proper precautions are not followed. To minimize the risk of invasive plant establishment and spread during road decommissioning or other projects, BMPs for prevention would be followed, as previously discussed.

By maintaining current limitations on future roading under the 2001 rule, tree-cutting activities, and leaseable minerals development in roadless areas, the introduction or spread of invasive plants would remain limited to the current rate of invasive plant spread, which results from

natural mechanisms. As a result, invasive plant expansion due to vehicles and human activity, including planned management activities, would be minor under the 2001 rule. Population establishment and expansion as a result of existing activities would continue at current estimated rate of 5 percent annually.

Land Management Plans Alternative

The land management plans alternative would potentially have the highest amounts of foreseeable roading, tree-cutting, fuels management, and leaseable mineral activities in roadless areas. This would result in a somewhat higher risk scenario for invasive plant establishment, as compared to either of the other two alternatives. Although they would affect roughly the same number of roadless areas as the proposed rule, the projected activities possible under the land management plans alternative have a higher likelihood of occurrence and may involve more extensive areas of soil disturbance.

Based on reasonably foreseeable activities (16,300 acres of tree-cutting; 30 miles of road construction, and 43 acres of energy development), a total of 16,430 acres are projected to be disturbed annually. For comparison purposes, if one half of 1 percent of these acres of disturbed ground were invaded by non-native plants, the result would be approximately 82 acres invaded per year, spread out over the 4.25 million acres of IRAs. Assuming the compound effect of a 5 percent annual growth rate for untreated invasive plants, plus annual additions of another 82 acres per year, approximately 1,770 acres of invasive plants would be found in the affected area after 15 years.

As in the 2001 rule, a similar level of road decommissioning would occur under the land management plans alternative, with similar impacts on invasive plant species. The impacts of long-term use of roads as discussed in the 2001 rule would be the highest in the land management plans alternative because of the increased acres disturbed for road construction. Similarly, acres disturbed for vegetation management are also be the highest in the land management plans alternative, so impacts would be greater than the 2001 rule.

Potential increases in the introduction or spread of invasive plants would be minimized by standard or required mitigation measures as previously described for the 2001 rule. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would relatively low under the land management plans alternative.

Proposed Rule

Under the proposed rule, there would be an increase in the amount of roading, tree-cutting and removal activities, and leaseable mineral activities, and therefore, a potential increase in the introduction and spread of invasive plants. However, on more than 90 percent of the roadless areas these ground-disturbing activities are not projected to occur. Thus, overall, there would remain a relatively low risk of substantially increasing invasive plant infestations in the roadless areas.

Roadless areas most likely to see increased abundance of invasive plants are those in or near substantially altered areas, and on sites where invasive plants populations currently occur. These invasive plant infestations are likely to be spread primarily by roads and vehicular use in substantially altered areas. On the other hand, unroaded areas currently not included in IRAs but included in CRAs, more than 300,000 acres would experience a reduction in the potential for ground-disturbing activities and associated invasive plant infestations.

Based on reasonably foreseeable activities (7,600 acres of tree-cutting; 21 miles of road construction, and 37 acres of energy development), a total of 7,698 acres are projected to be disturbed annually. For comparison purposes, if one half of 1 percent of these acres of disturbed ground were invaded by non-native plants, the result would be approximately 38 acres invaded per year, spread out over the 4.031 million acres of CRAs. Assuming the compound effect of a 5 percent annual growth rate for untreated invasive plants, plus annual additions of another 38 acres per year, approximately 820 acres of invasive plants would be found in the affected area after 15 years.

As in the 2001 rule, a similar level of road decommissioning would occur under the proposed rule, with similar impacts on invasive plant species. The impacts of long-term use of roads discussed in the 2001 rule would be higher in the proposed rule because of the increased acres disturbed for road construction. Similarly, acres disturbed for vegetation management are also higher in the proposed rule, so impacts would be greater than the 2001 rule.

Potential increases in the introduction or spread of invasive plants would be minimized by standard or required mitigation measures as previously described for the 2001 rule. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would remain low under the proposed rule.

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 DEIS (USDA Forest Service, 2008), 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, semi-primitive motorized, and recreation classes of dispersed recreation in the ROS.

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.

Other than one mile of road projected for construction to facilitate campground access under the land management plan alternative, the effects of reasonably foreseeable activities on developed recreation opportunities in roadless areas do not substantially differ across alternatives. Under the land management plans alternative, there would potentially be additional opportunities for development of recreational sites or facilities in IRAs in accordance with forest plan direction.

Analysis of Alternatives

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

2001 Rule

Under the 2001 rule, no significant change in ROS setting would be expected in the vast majority of IRA acres. The ROS setting may change to a higher level of development in the few portions of IRAs where additional roads and energy resource development is projected to occur.

The 6 miles of roads that are projected to be constructed or reconstructed in IRAs under this alternative are most likely to be constructed or reconstructed in areas previously roaded, closest to the boundary of IRAs. The 6 miles of new road each year would be spread over many different IRAs and would not likely make a noticeable difference in the semi-primitive motorized or roaded natural setting or recreation opportunities in those roaded portions of IRAs. Approximately 12.8 miles per year of existing NFS roads would be projected to be decommissioned in IRAs. Reducing existing unnecessary roads in parts of IRAs would improve

the natural appearance of the affected landscape in those areas. Decommissioning more road miles than would be built in IRAs would help maintain the semi-primitive to primitive settings and recreational opportunities.

The constraints on tree-cutting and wood removal activities in IRAs under this alternative would also help retain the semi-primitive to primitive ROS settings in roadless areas where they exist in the majority of the IRA acreage. Projected levels of cutting (800 acres) would not measurably alter the existing ROS settings and recreation opportunities identified in those areas.

None of the projected activities under the 2001 rule would be expected to reduce the quality of hunting and fishing opportunities.

Land Management Plans Alternative

The higher likelihood of roading, tree-cutting, and energy development under the land management plan alternative would create the greatest potential for changes from semi-primitive recreation settings to settings that reflect a higher level of development and human activity. However, based on the forest plan restrictions on activities in the IRAs, together with topographic or economic constraints, projections are for 30 miles of roading and 16,300 acres of tree cutting each year, spread out over many different IRAs.

Most of the roading projected to occur in IRAs would be temporary, short term, and closed to public vehicle traffic while in use. However, about 15 miles of new roading each year is projected to be needed to support of energy resource operations and those new roads would likely remain on the road system for a longer period of time.

Tree cutting on 16,300 acres per year may change the natural appearance of some areas for a period of time until the trees and other vegetation regenerate. The type of cutting would depend on the existing forest plan prescriptions and visual quality requirements. Based on this level of cutting, a small percentage of the 4.25 million acres in IRAs would be affected over the15 year period. Dispersed recreation opportunities would not change as a result of tree cutting, but the feeling of remoteness and solitude may change for a period of time.

The land management plans alternative prohibits, limits, or discourages roading in IRAs on approximately 30 to 40 percent of the IRA acreage, implying that the primitive, semi-primitive non-motorized and semi-primitive motorized settings would likely remain unchanged in those areas.

Proposed Rule

The 21 miles of roads projected to be constructed or reconstructed in CRAs each year under the proposed rule would be expected to change some of the semi-primitive ROS settings in the CRAs toward roaded natural settings, depending on the timeframe that the road is in place. Temporary roads would be expected to be short-term and would not change the ROS setting. Roads built in CRAs to support energy resource development activities would be more likely to result in a longer term change in the recreation setting. In the parts of CRAs where new roads

along with tree-cutting and removal activities or energy resource development activities occur, there would be a higher potential for the ROS setting to change from semi-primitive motorized to a roaded natural setting. About half the total miles of roading in CRAs would be constructed in support of oil and gas operations and those roads would be long term, typically lasting from several decades or longer (see minerals and energy resources).

Based on the projected level of tree cutting (i.e., 7,600 acres per year), a small percentage of CRAs would be affected over the next 15 years. Dispersed recreation opportunities would not likely change as a result of tree cutting activities, but the feeling of remoteness and solitude may change in some parts of CRAs for a period of time.

Hunting and fishing opportunities likely would not change in areas where tree cutting and associated road construction occurs because of the dispersed nature of these activities and the large amount of NFS lands not altered by these activities.

The additional roadless acres added into the CRAs under this alternative would help maintain the semi-primitive setting and associated dispersed recreation opportunities in the total roadless acreage over time. The removal of substantially altered acres and developed ski areas from CRAs would help insure that roadless areas appear more natural, less developed and more consistent with the typical roadless area characteristics and values.

The restrictions on roading in roadless areas that would constrain the acres of NFS land where developed recreation facilities (resorts, ski areas, campgrounds) could occur under the proposed rule or the 2001 rule, would be eased under the land management plan alternative.

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 and the proposed rule 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 the

land management plans alternative, recreation use authorizations could include activities facilitated by new roads in IRAs.

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 affected environment section 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

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 levels of protection are afforded by the proposed rule and the 2001 rule respectively, as a result of activity projections; however, the risk of adverse effects from uncharacteristic wildfire is lowest under the land management plans alternative. In general, the effects on cultural resources are not significantly different among the three alternatives.

Non-timber Products

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

Climate Change/Global Warming

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

Neither of the "action" alternatives (proposed rule or the land management plans alternative) would be expected to cause a measurable change in the amount of carbon dioxide or other

greenhouse gas emissions compared to current conditions and trends in the roadless areas under the no-action alternative (the 2001 rule). The cumulative effects of climate change on resources in roadless areas are summarized in various specialist sections in the DEIS for the proposed rule (USDA Forest Service, 2008).

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

Cool-season plant species' ranges are predicted to move north and to higher elevations, and extinction of native vegetation may be accelerated; these changes in vegetation may further affect air quality. Climate change can also affect terrestrial and aquatic animal species and habitats (e.g., changes in snowpack, runoff, base stream flow; changes in hibernation and migration patterns; decreases in suitable habitat due to warmer temperatures). Climatic changes can combine with direct effects associated with the alternatives; these cumulative effects cannot be quantitatively described in this programmatic evaluation. However, the risk of cumulative effects would be somewhat lower under the 2001 rule because the total amount of ground-disturbing activity would be less than under the proposed rule and the land management plans alternative.

Agency Costs and Revenues

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

Treatment projects associated with fuel reductions and/or forest health 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 DEIS for details about treatment methods). Much of the road construction under the proposed rule is expected to be affiliated with biomass removal under service contracts with or without salvage rights, stewardship, or a timber sale where receipts can help offset the cost of treatment and temporary road construction. However, there may be projects where temporary road construction would be needed to gain access for mechanical mulching or mastication. Estimates of the number of miles of temporary road construction in roadless areas under each alternative are provided by the individual forest units (see chapter 3 of the final EIS).

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 $500 to $6,500 per mile depending on the road maintenance level and other factors (based on the Forest Service Region 2 cost guide, forest planning cost estimates, and a 2008 inflation rate). Road maintenance costs have been exceeding funding levels for at least the past several 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 roads on NFS lands have been decommissioned or closed. It is expected that the trend in closing and decommissioning more road miles than are constructed would continue. There will be a net reduction in road density in roadless areas as the Forest Service continues to decommission unauthorized roads or formerly authorized roads that are no longer needed.

Vegetation and 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 the same degree of alteration in landscape fire behavior. Effectiveness and efficiency depend in part on locations of access roads and natural fuelbreaks. In most roadless areas, the limited amount of roads, fuelbreaks, and fuel-treated areas makes them more difficult to treat and more vulnerable to high-severity fires.

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

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

Under the proposed rule, tree-cutting is allowed for treating hazardous fuels or insect and disease outbreaks in areas under CWPPs or in WUIs; however, roads are often necessary to make such treatments economically feasible. Under the proposed rule, temporary roads may be built for these purposes. Compared to the 2001 rule, the proposed rule would provide increased flexibility to achieve management objectives in critical insect and disease outbreak areas. Increased road miles would increase the Agency’s ability to strategically locate fuel treatment areas on the

landscape to improve effectiveness and possibly reduce the total amount of the landscape that requires treatment.

Under the proposed rule, treating 7,600 acres per year would yield an increasing trend of conducting hazardous fuel treatments in the CRAs, compared with the 4,300 acres of CRAs treated annually on average from 2001 to 2007. If the Agency treats 7,600 acres rather than 4,300 acres annually in designated roadless areas, there would likely be fewer acres treated for fuels outside the roadless areas, if 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 a measurable improvement in reducing wildfire hazard at a landscape scale.

Under the land management plans alternative, 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 7-year trend. Approximately 27 percent of annual fuel treatments on NFS lands in Colorado could occur in IRA areas if the Agency continues to conduct treatments on 61,000 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 effects of building more roads for fuel treatments would generally be the same as described for the proposed rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs. Under the land management plans alternative, some permanent roads may be constructed in the IRAs for fuel reduction and forest health purposes. Maintaining more permanent roads in the IRAs would enhance the effectiveness and value of roads for fuels and wildfire management purposes over the long-term. The increased flexibility to build both permanent and temporary roads in IRAs would improve the Agency's ability to conduct additional fuel reduction treatments and maintain lower wildfire hazards in WUIs in the long term, compared to the other two alternatives.

Invasive Plant Management and Control

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

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

Distributional Effects

Economic impact analysis requires resource outputs by alternative to estimate associated jobs and income. As discussed in respective sections in the DEIS (USDA Forest Service, 2008), 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 will vary by alternative, 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 for forest products is that program output levels would also remain constant under all alternatives, varying by only the forest locations from which the products were obtained. 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. However, a qualitative discussion of production output in the context of program-level production is provided in the section analysis of local resource concerns: timber.

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

Economic Impacts

Economic Profile

The Colorado economy is diverse, ranging from urban centers along the front range (the urban development from the Denver metro area north to Fort Collins and south to Pueblo) to rural communities in the mountains and plains. Known world-wide for skiing and beautiful scenery, Colorado enjoys a strong tourism industry. It also benefits from sizable cable and satellite, defense, technology, and mining industries (including energy). Roadless area management, as described in this document, directly affects only one of these sectors – mining (natural gas and coal) – but indirectly affects many others.

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

Table 19 offers the same economic variables for all model areas in Colorado. The front range metro area dominates the Colorado economy in all respects with over 80 percent of production, jobs, and labor income. Some roadless areas are in these thirteen counties (see appendix J). The rural roadless model area, with 30 counties, follows in economic importance. All but one county in this area contains roadless areas. The energy roadless area, with only 5 counties, trails only

slightly in the size of its economy and includes roadless areas in all counties. The eastern plains of Colorado complete the picture with about two percent of statewide totals. No roadless areas are in this model area.

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

Model Area	Output		Employment		Labor income	
	($ millions)	Percent	(jobs)	Percent	($ millions)	Percent
Energy Roadless	20,041.8	5%	148,457	5%	6,100.5	4%
Rural Roadless **Table 19. Comparison of the Energy Roadless model area with other roadless model areas (2006)**	32,551.7	8%	279,280	10%	10,657.4	7%
Front Range Metro	343,794.5	85%	2,366,618	82%	127,871.0	87%
Eastern Plains	9,502.1	2%	76,959	3%	2,423.7	2%
Colorado	405,890.1	100%	2,871,314	100%	147,052.8	100%

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

Table 20 focuses on the mining industry in each model area of Colorado. The energy roadless area has greater production than any other part of the State. This is notable given the large oil and gas fields north of Denver that have been producing for many years. Employment in the energy roadless area ranks second to the front range metro area, primarily because of Denver-based corporate headquarters for mining companies doing business in Colorado and other parts of the United States. For the same reason, income in the energy roadless area trails the front range metro area.

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

Model area	Output		Employment		Labor income	
	($ millions)	Percent	(jobs)	Percent	($ millions)	Percent
Energy Roadless	5,101.9	35%	7,027	29%	662.1	21%
Rural Roadless	4,383.4	30%	3,371	14%	331.7	11%
Front Range Metro	4,466.1	31%	12,694	52%	2,005.4	65%
Eastern Plains	690.6	5%	1,110	5%	106.0	3%
Colorado	14,641.9	100%	24,202	100%	3,105.2	100%

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

The energy roadless model area includes a variety of communities, ranging from small towns – such as Somerset – to the economic center of western Colorado – Grand Junction. In prior years, this area was primarily defined by retirees, tourism, and agriculture. With the recent energy

boom, however, the area has developed into the center of energy development in western Colorado. Table 21 provides a picture of economic indicators by industrial sector. The totals are strongly influenced by Grand Junction, a regional provider of goods and services.

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

Industry	Output ($ million)	Employment (jobs)	Labor income ($ millions)
Agriculture	472.6	5,472	87.4
Mining	5,101.9	7,027	662.1
Utilities	294.2	780	65.8
Construction	2,393.5	18,153	942.6
Manufacturing	1,822.3	6,561	294.6
Transportation & Warehousing	647.5	4,897	238.8
Trade	1,772.7	21,824	713.5
Finance, insurance, & real estate	1,723.5	9,799	378.7
Professional services	791.3	7,540	358.4
Administrative & waste services	415.2	6,370	189.1
Educational, health, & social services	1,141.4	15,642	603.4
Arts, entertainment, & recreation	119.3	2,559	42.3
Accommodation & food services	586.4	11,322	192.1
Other services	856.6	10,674	292.5
Government	1,903.3	19,836	1,039.2
Totals	20,041.8	148,457	6,100.5

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

In a recent study of the Colorado oil and gas industry (McDonald et al., 2007), this sector was estimated to provide over 2 percent of statewide employment and 3 percent of earnings. When compared with the travel industry, oil and gas provided 56 percent fewer jobs, but only 14 percent less income. As energy development continues in the State, especially on the western slope, these differences can be expected to narrow.

Natural gas development in the energy roadless area is booming. Prices and technologies have reached levels that allow economic recovery of the vast natural gas reserves in western Colorado. The energy boom has brought many new employees to the region. Some settle in the area as residents while others re-locate temporarily. The large influx of workers has put tremendous strain on housing stocks, goods, and services in virtually every community in these counties. These strains are not expected to dissipate quickly.

All coal mines are up the North Forest Valley of the Gunnison River near the towns of Paonia and Somerset. Most coal from Colorado is shipped by rail to the South and Midwest where it is used in electricity generation. The balance remains in Colorado where a third is used for

industrial purposes and two-thirds is used for electricity generation, along the front range (Colorado Coal Fact Sheet, 2006, 2007).

In 2006, coal from North Fork Valley mines accounted for 43 percent of all coal production in Colorado and 1.4 percent in the United States (Cappa et al, 2007). 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.

For more details about the coal, oil, and gas industry sectors, as well as economic conditions and trends, see the social and economic specialist report (USDA Forest Service, 2008b), prepared for the DEIS.

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. Gold, silver, timber, and forage were there for the taking. Communities sprung up – some lasting beyond the rush for instant riches. Today many of those communities still find their dependency and identity linked to mountain landscapes. While a few communities benefit from significant mining operations, more benefit from visitors who come to admire the landscapes for their beauty and their recreation opportunities (McDonald et al., 2007; Center for Business and Economic Forecasting, Inc., 2001; Dean Runyan Associates, Inc., 2006).

Some visitors come for brief periods, creating the Colorado tourism industry. Small-town appeal, big-town amenities, and beautiful landscapes have transformed some parts of western Colorado into clusters of national and international destinations. Vail, Telluride, Grand Lake, Crested Butte, and Steamboat Springs are a few of the communities that have become the signature of Colorado tourism. Others find more rural communities, such as Lake City, Ouray, Gould, and San Isabel to their liking.

High-country communities rich in amenities have always attracted new residents. In recent decades, however, the in-migration of full-time residents and proliferation of second homes with seasonal residents have reached significant proportions. Career shifters and retirees are deciding that life is better lived in mountain communities near public lands. Whether they come to stay seasonally or year-round, the economy of these towns has become highly dependent upon their presence and activities (Lloyd Levy Consulting, 2004).

Table 22 offers a picture of the economy for rural counties not part of the energy minerals areas discussed above. This table shows a strong presence of the "accommodation and food services" and "arts, entertainment, and recreation" sectors, common in tourism-based economies. There is also a strong "finance, insurance, and real estate" sector – another hallmark of tourism and second home based areas.

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

Industry	Output	Employment	Labor income

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

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

The juxtaposition of mountain communities and public lands has been a strong factor in their growth. It also comes with liabilities. Many mountain communities are become particularly susceptible to natural disturbances, such as mountain pine beetle infestations and drought.

A vibrant community is healthy in both its public and private sectors. Losses from wildfire in one or both sectors can cripple a community for months or years. The values at risk can include such things as citizen health, reliable water and power supplies, infrastructure (both public and private), business activity, and general quality of life. Community infrastructure is the most visible and quantifiable value at risk. Homes, schools, retail shops, office buildings, libraries, hospitals, and police stations are just a few examples of infrastructure at risk of wildfire loss.

The best source of community infrastructure values is found in assessor records of each county. Table 23 shows selected assessor variables by county where at-risk communities are within three miles of IRAs or CRAs. For a more detailed discussion about at-risk communities, WUIs, and the geographic relationship between at-risk communities and roadless areas, see the fire ecology and fuels section of this document.

Valuation for entire at-risk communities or for actual properties within the 3-mile radius was not available. Table 23 does not imply that all county assessed valuation is at risk, but rather provides a context for understanding potential vulnerabilities.

Table 23. Assessed valuation in counties with IRAs (2007)

County	Total assessed valuation	Incorporated municipalities		Unincor-porated areas	At-risk communities within 3 miles of a roadless area	County-wide avg single family residence
	Total ($ millions)	Number	Total valuation ($ millions)	Total valuation ($ millions)	Number	Total valuation ($ millions)
Archuleta	345.4	1	61.2	284.2	9	$20,168
Boulder	5,431.3	10	4,458.3	972.9	28	$32,033
Chaffee	314.8	3	127.5	187.3	42	$14,003
Clear Creek	340.7	5	42.7	298.0	17	$21,550
Conejos	44.4	5	9.6	34.8	7	$6,661
Costilla	110.8	2	3.4	107.4	1	$4,489
Custer	84.3	2	16.5	67.8	7	$12,526
Delta	277.4	6	132.5	144.9	1	$13,268
Dolores	40.8	2	13.0	27.7	1	$10,840
Douglas	4,414.5	6	1,568.2	2,846.3	19	$28,026
Eagle	3,116.5	7	1,610.3	1,506.2	8	$88,058
El Paso	6,219.6	8	4,949.6	1,270.0	8	$17,796
Fremont	406.3	6	149.8	256.5	8	$10,959
Garfield	2,801.3	6	529.7	2,271.6	5	$29,095
Gilpin	340.9	2	262.6	78.3	3	$17,244
Grand	777.1	6	267.3	509.9	4	$32,353
Gunnison	759.5	5	343.6	415.9	103	$36,296
Hinsdale	51.4	1	13.1	38.2	53	$19,010
Huerfano	96.6	2	31.4	65.2	4	$7,682
Jefferson	7,049.3	12	4,218.3	2,831.0	8	$22,512
La Plata	2,806.8	3	525.7	2,281.1	22	$30,858
Lake	85.2	1	23.1	62.0	10	$12,763
Larimer	3,894.2	8	2,923.4	970.7	80	$18,799
Las Animas	564.7	6	-	564.7	1	$5,417
Mesa	1,684.7	5	1,012.9	671.7	2	$16,910
Mineral	28.7	1	4.3	24.4	10	$11,419
Moffat	277.2	2	65.4	211.9	2	$11,153
Montezuma	416.5	3	93.9	322.6	1	$12,607
Montrose	498.0	4	305.4	192.7	2	$17,696
Ouray	188.9	2	70.0	118.9	7	$31,140
Park	398.6	2	19.0	379.6	76	$18,620
Pitkin	2,703.9	3	1,779.6	924.2	5	$263,056

Pueblo	1,092.0	3	624.5	467.4	4	$10,720
Rio Blanco	661.2	2	30.0	631.2	4	$11,389
Rio Grande	161.6	4	56.8	104.8	5	$11,074
Routt	1,013.2	4	683.0	330.2	2	$44,972
Saguache	52.0	5	9.0	43.0	13	$0
San Juan	52.9	1	30.2	22.7	2	$20,209
San Miguel	888.2	5	549.1	339.1	15	$109,589
Summit	1,537.8	6	849.4	688.4	7	$46,543
Teller	434.7	4	174.3	260.4	13	$17,911
TOTAL	52,152.3	170	28,378.8	23,773.4	619	--

Source: Colorado Department of Local Affairs, Division of Property Taxes; Colorado Department of Natural Resource.

The total valuation of municipal and unincorporated areas of each county gives further context to the situation. At-risk communities can be small, rural clusters of homes in unincorporated areas. For most counties outside the heavily urban front range of Colorado, total valuation outside of municipalities is substantially higher than valuation found in the towns. Because many of the at-risk communities are composed primarily of first and second homes, the county-wide average valuation for a single family residence is shown (2007 Annual Report, 2008). These values range from less than $4,500 in Costilla County – a southern part of the San Luis Valley – to over $263,000 in Pitkin County – location of Aspen, Colorado. This provides another metric for understanding the range and variety of infrastructure values in the potentially affected areas of Colorado.

When using a 3-mile radius to represent the wildland urban interface, the residents and properties of 41 counties with roadless acres could be affected by roadless area management. Over half of the 619 communities near roadless areas are in four counties: Hinsdale, Larimer, Park, and Huerfano. Twenty-seven counties have less than 10 communities each.

Economic Impacts

All economic impacts are shown in Tables 24. Results are expressed on an average annual basis over the 15-year analysis period. Only those impacts associated with roadless areas are included. Impacts are estimated based on the following production levels: 9.6 billion cubic feet gas/year (bcfg/year) and zero tons/year coal for the 2001 rule; 26.2 bcfg/year and 4 million tons/year coal for the proposed rule; 29.8 bcfg/year and 4 million tons/year coal for the land management plans alternative as outlined by the economic specialist report (USDA Forest Service, 2008b) and supporting documentation for that report.

Tables 24 shows the direct, indirect, and induced effects for output (production value), employment, and labor income by alternative. 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.

The land management plans alternative has the largest total effects on output, employment, and labor income. Compared with no action (The 2001 rule), output would increase by a factor of four ($149.5 to $621.7 million per year), employment by over a factor of five, and labor income by nearly a factor of six. The proposed rule has the next largest effects. Compared with no action, output would increase by just under a factor of four and employment and income would increase by over a factor of five. Oil and gas development would provide from about half of the labor income under the proposed rule and the land management plans alternative, and 100 percent under the 2001 rule. Oil and gas development would also provide nearly 60 percent of the employment and nearly three-fourths of the production value under the proposed rule and the land management plans alternative. Total employment contributed by the 2001 rule is estimated to be 297 jobs, while for the proposed rule it rises to 1,481 jobs and 1,592 for the land management plans alternative.

Table 24. Average annual economic impacts by alternative for energy mineral activity in the energy roadless model area, 2009-2023 (2006 dollars)

Oil & Gas Drilling	Output ($ millions/year)			Employment (jobs/year)			Labor Income ($ millions/year)		
Effects	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
Direct	35.8	101.6	115.0	53	150	170	4.4	12.5	14.1
Indirect	13.5	38.4	43.5	68	193	218	2.8	8.0	9.1
Induced	5.1	14.6	16.5	49	139	157	1.6	4.4	5.0
Totals	54.4	154.5	174.9	169	481	545	8.8	24.9	28.2
Oil & Gas Production	Output ($ millions)			Employment (jobs)			Labor Income ($ millions)		
Effects	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
Direct	59.1	160.8	182.9	18	49	55	3.2	8.7	9.9
Indirect	30.9	83.9	95.5	61	165	188	4.0	10.8	12.3
Induced	5.1	14.0	15.9	49	132	151	1.5	4.2	4.8
Totals	95.1	258.7	294.3	127	346	393	8.7	23.6	26.9
Coal Production	Output ($ millions)			Employment (jobs)			Labor Income ($ millions)		
Effects	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
Direct	0.0	97.6	97.6	0	264	264	0.0	32.2	32.2
Indirect	0.0	26.5	26.5	0	117	117	0.0	6.8	6.8
Induced	0.0	28.4	28.4	0	273	273	0.0	8.6	8.6
Totals	0.0	152.5	152.5	0	654	654	0.0	47.6	47.6
Total Energy Minerals	Output ($ millions)			Employment (jobs)			Labor Income ($ millions)		
Effects	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
Direct	94.9	360.0	395.5	71	462	489	7.6	53.4	56.2
Indirect	44.4	148.8	165.4	128	475	523	6.8	25.6	28.1
Induced	10.3	57.0	60.8	97	544	581	3.1	17.2	18.4
Totals	149.5	565.7	621.7	297	1481	1592	17.5	96.2	102.7

Excludes activity on substantially altered areas.

Local Governments

Mineral Lease Payments

Sizeable revenues accrue to State and local governments from the production of energy resources on Federal lands. These revenues are important contributions to the fiscal health of small and large governmental entities alike. Royalties of 12.5 percent are paid on production value from Federal mineral leases. Half of these revenues are paid to the states where production originated. In Colorado, these revenues are allocated to a variety of State funds, including the State Public School Fund, and to local jurisdictions where employees of mining companies reside.

State and local taxes are also levied on the extraction of Federal minerals. County assessors determine the taxable value of both production and equipment then apply local mill levies to calculate property taxes due. Property tax revenues by county originating only from energy mineral activity could not be obtained for this report.

The State of Colorado imposes a severance tax that applies to energy minerals, as well as other mineral production. These revenues are distributed among state funds and local jurisdictions in a way similar to Federal mineral lease payments.

Analysis of Alternatives

Federal mineral lease payments, property taxes, and severance taxes have been estimated using information provided by the Colorado Department of Local Affairs, Division of Property Taxation and the Colorado Department of Revenue (Anders, 2008; Colby, 2008; 2006 Annual Report, 2007; 2007 Annual Report, 2008; 2007 Annual Report—advanced tables, 2008). Payments are estimated for Delta, Garfield, Gunnison, Mesa, Montrose, and Pitkin counties (all of which can be considered small entities with the exception of Mesa) due to the presence of roadless areas where the likelihood of energy minerals activity is projected to change across alternatives[18].

Tables 25 through 27 show the estimated average annual State and local government revenues derived from energy mineral activity in roadless areas. For property taxes, only revenue based on production is estimated. Personal and other real property may vary by alternative, but estimates for these could not be made.

The proposed rule and the land management plans alternative have the largest State and local government revenue effects, totaling $24.5 and $26.8 million, respectively. Total revenues under no action (The 2001 rule) are $6.1 million. Mesa County garners the largest share of local government revenues, followed by Garfield, Gunnison, Pitkin, Delta, and Montrose. These counties, with the exception of Mesa, can be considered small government entities (i.e.,

[18] 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.

population less than 50,000).

Property tax revenues vary depending upon the level of oil and gas development, where oil and gas development is likely to occur, and whether coal reserves can be mined. Nearly all counties have higher property tax revenues under the land management plans alternative. Mesa County shows the largest increase over no action ($1.4 million); Delta shows the smallest ($0.1 million). The large increase for Gunnison County ($0.9 million) is associated with coal production, while all the rest is associated with oil and gas production. All counties show slightly lower property tax revenues for the proposed rule, except Montrose County. The Horsefly Canyon Colordo Roadless Area is entirely in Montrose County, has oil and gas potential, allows roads, but is only available under the proposed rule. The Montrose County share of total production in the proposed rule is estimated to yield about $33,0000 in property taxes per year.

The distribution of severance tax and Federal mineral lease payments to counties rises from the 2001 rule to the land management plans alternative, but the share each county receives remains constant. The largest share of payments goes to Mesa County. Because of state distribution formulas for severance taxes and Federal mineral lease payments, Colorado counties outside of the energy minerals model area would share nearly $1.0 million under the land management plans alternative, $0.9 million under the proposed rule, and $0.2 million under no action.

Table 25. The 2001 rule – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2009-2023 (thousands of 2007 dollars per year)

Description	Energy-Affected Counties						All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Montrose	Pitkin		
O&G Production Value	$584	$12,193	$9,421	$30,015	$0	$2,863	$0	$55,077
Coal Production Value	$0	$0	$0	$0	$0	$0	$0	$0
Property tax receipts (production only)	$20	$320	$283	$1,191	$0	$64	$0	$1,878
Severance tax receipts								$826
Federal Mineral Lease Payments								
Retained by U.S.								$3,442
Paid to Colorado								$3,442
State Distribution of Severance Tax & Federal Royalties								
Public School Fund								$1,721
Other State Funds								$1,993
To Local Governments	$29	$114	$1	$213	$5	$0	$193	$555
Total of Payments and Taxes Received	$49	$434	$284	$1,404	$5	$64	$193	$6,146

Excludes activity on substantially altered areas.

Table 26. The proposed rule – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2009-2023 (thousands of 2007 dollars)

Description	Energy-Affected Counties						All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Montrose	Pitkin		
O&G Production Value	$3,540	$40,485	$17,216	$50,691	$945	$36,867	$0	$149,744
Coal Production Value	$0	$0	$97,640	$0	$0	$0	$0	$97,640
Property tax receipts (production only)	$122	$1,061	$1,204	$2,011	$33	$822	$0	$5,254
Severance tax receipts								$3,766
Federal Mineral Lease Payments								
Retained by U.S.								$15,462
Paid to Colorado								$15,462
State Distribution of Severance Tax & Federal Royalties								
Public School Fund								$7,731
Other State Funds								$8,999
To Local Governments	$218	$464	$5	$881	$26	$0	$904	$2,498
Total of Payments and Taxes Received	$340	$1,525	$1,209	$2,892	$59	$822	$904	$24,481

Excludes activity on substantially altered areas.

Table 27. The land management plans alternative – Average annual Federal mineral lease production, payments, and related tax revenues from roadless areas, 2009-2023 (thousands of 2007 dollars)

Description	Energy-Affected Counties						All Other Counties	State Total
	Delta	Garfield	Gunnison	Mesa	Montrose	Pitkin		
O&G Production Value	$7,453	$41,420	$17,351	$64,886	$0	$39,248	$0	$170,358
Coal Production Value	$0	$0	$97,640	$0	$0	$0	$0	$97,640
Property tax receipts (production only)	$156	$1,086	$1,209	$2,574	$0	$875	$0	$6,000
Severance tax receipts								$4,075
Federal Mineral Lease Payments								
Retained by U.S.								$16,750
Paid to Colorado								$16,750
State Distribution of Severance Tax & Federal Royalties								
Public School Fund								$8,375
Other State Funds								$9,745
To Local Governments	$229	$507	$5	$960	$28	$0	$976	$2,705
Total of Payments and Taxes Received	$485	$1,593	$1,214	$3,534	$28	$875	$976	$26,825

Excludes activity on substantially altered areas.

Other Revenue Sharing

Historically, decisions on the management of NFS lands have affected forest revenues and subsequent payments to states and counties – often referred to as "25% payments" in reference to the share of receipts paid back to state and local governments. In 2000, the Secure Rural Schools and Community Self-Determination Act (SRSCSA) gave counties the opportunity to elect payments that would not vary and be independent of NFS receipts. All counties in Colorado elected to receive the SRSCSA, except Douglas, Gilpin, Jefferson, and San Miguel. Only San Miguel could experience a change in forest payments resulting energy mineral development activities in roadless areas. Only fees associated with Forest Service permits for oil, gas, and coal exploration and development would affect 25 percent payments to San Miguel County. Federal mineral lease royalties are collected by the Department of Interior and not subject to "25% fund" payments. Changes in the payment to the county are not expected to be sizeable under any alternative.

Counties with Federal lands also receive "Payments in Lieu of Taxes," or PILT. These payments are administered by the Department of Interior to help offset the loss of property tax revenues caused by Federal ownership. Using a system of formulas, payments are based on county population and acreage in Federal ownership less Federal payments from land use in the prior year. Federal mineral lease payments are included in the 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 the proposed rule and the land management plans alternative 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 estimated for the proposed rule and the land management plans alternative. For those counties already receiving the minimum PILT payment, no change would occur. There would be no change under the 2001 rule.

Fuels Treatments

A number of communities, many of which are small or in counties with small populations (pop<50,000), have become susceptible to natural disturbances, such as mountain pine beetle infestations, drought, and wildfire. The values at risk from disturbances can include such things as citizen health, reliable water and power supplies, infrastructure (both public and private), business activity, and general quality of life. Community infrastructure is the most visible and quantifiable value at risk. Homes, schools, retail shops, office buildings, libraries, hospitals, and police stations are just a few examples of infrastructure at risk of wildfire loss.

A national concern for community losses from wildfire prompted Congress to pass the Healthy Forests Restoration Act of 2003 (HFRA). In the act, an area known as the Wildland Urban Interface (WUI) was defined. This land is defined as an area within or adjacent to an at-risk

community that is identified in recommendations to the Secretary in a community wildfire protection plan (CWPP). In the case of any area for which a CWPP is not in effect, the WUI is defined as an area within a certain distance of the at-risk community boundary and/or meeting other risk conditions (for details, see social and economics section of the DEIS (USDA Forest Service, 2008a). In practice, CWPPs often define WUIs that extend well beyond the modest ½ mile to 1 ½ mile distance stated in HFRA. The Colorado Roadless Rule is based upon WUIs defined by such plans, but there are many communities in western Colorado that have not completed them. To best approximate the extent of completed plans for this analysis, a perimeter 3-miles from the community center was circumscribed around all communities identified to be at risk (see the forest vegetation and health section of the DEIS for additional details). The Colorado State Forest Service provided a list and location of 1,712 at-risk communities throughout the State.

Table 28 indicates that the number of at-risk communities within 3 miles of CRAs, where cutting, in association with WUI treatments is very likely, increases from 82 at-risk communities under the 2001 rule to 183 at-risk communities under the proposed rule. When looking only at counties with small populations (pop<50,000), the number of at-risk communities increases from 11 in five counties under the 2001 rule to 97 at-risk communities across 18 counties under the proposed rule, thereby suggesting an increase in opportunities for reducing the risk of damages from wildfire under the proposed rule. Opportunities for at-risk communities within small population counties increase most dramatically for La Plata and Park counties, followed by Archuleta and Lake.

In contrast, opportunities decrease under the proposed rule relative to the land management plans alternative where the number of at-risk communities decreases from 250 to 183, or from 154 at-risk communities in 20 counties to 97 i at-risk communities in 18 counties, when looking at counties with small populations only. It should be noted that this analysis makes no conclusions about the magnitude or extent of WUI treatments projected for at-risk communities or counties; it simply identifies those at-risk communities that are within 3 miles of CRAs where WUI treatments are very likely. Opportunities for at-risk communities in small population counties decrease to the greatest extent for Chaffee and Park counties.

Table 28 – Opportunities for WUI treatments, by county: number of 'communities at risk' near CRAs where likelihood of tree-cutting is high

COUNTY	Pop Small? (b)	Number of at-risk communities where likelihood is high (a)		
		Alt 1	Alt 2	Alt 3
Archuleta	✓		5	5
Boulder		20	20	20
Chaffee	✓	1	5	34
Clear Creek	✓		1	1
Custer	✓		4	5
Dolores	✓		1	1
Douglas		13	19	19
El Paso			3	8
Fremont	✓		3	3
Gunnison	✓			1

Hinsdale	✓		3	3
Huerfano	✓			1
Jefferson		5	7	7
La Plata	✓		21	21
Lake	✓	3	8	8
Larimer		33	33	38
Mineral	✓		2	2
Montezuma	✓		1	1
Park	✓	5	34	57
Pueblo			4	4
Rio Blanco	✓	1	1	1
Routt	✓		1	1
Saguache	✓		3	3
San Juan	✓		2	2
Summit	✓	1	1	1
Teller	✓		1	3
TOTAL for 'Small' Counties (b)	✓	**11 (5 Counties)**	**97 (18 County\ies)**	**154 (20 Counties)**
TOTAL for all Counties		**82 (9 Counties)**	**183 (24 Counties)**	**250 (26 Counties)**

(a) At-risk communities must be within 3 miles of a CRA where tree cutting associated with WUI treatments is 'very likely' or 'already planned' according to Forest Unit survey responses (see USDA Forest Service, 2008c).

(b) **County Population < 50,000.**

A number of at-risk communities are within 3 miles of multiple CRAs, implying that at-risk communities may experience incremental increases or decreases in the likelihood of WUI treatments when comparing alternatives. Table 29 indicates that the likelihood of tree-cutting is projected to increase for 118 at-risk communities under the proposed rule, when compared to conditions under the 2001 rule (i.e., opportunities for WUI treatments increases for these entities); 90 of these at-risk communities are in 16 counties where populations are small. Opportunities for at-risk communities in small population counties increase most dramatically for La Plata and Park counties, followed by Archuleta and Lake, when comparing the proposed rule with the 2001 rule. In contrast, the number of at-risk communities where the likelihood of cutting in association with WUI treatments decreases by 94 at-risk communities under the proposed rule, relative to the land management plans alternative; 76 of these at-risk communities are in six counties where populations are small. Opportunities for at-risk communities in small counties decrease to the greatest extent for Chaffee and Park counties.

Table 29 – Changes in opportunities for WUI treatments, by county: number of 'communities at risk' near CRAs where likelihood of tree-cutting is projected to increase.

COUNTY	Pop. Small? (b)	Number of at-risk-communities where likelihood increases (a)		
		Alt2 vs 1	Alt 3 vs 1	Alt 3 vs 2
Archuleta	✓	5	5	
Boulder				
Chaffee	✓	4	34	33
Clear Creek	✓	1	1	
Custer	✓	4	5	3

Dolores	✓	1	1	
Douglas		16	16	
El Paso		3	8	5
Fremont	✓	3	3	
Gunnison	✓		1	1
Hinsdale	✓	3	3	
Huerfano	✓		1	1
Jefferson		5	7	2
La Plata	✓	21	21	
Lake	✓	5	6	4
Larimer			11	11
Mineral	✓	2	2	
Montezuma	✓	1	1	
Park	✓	33	57	32
Pueblo		4	4	
Rio Blanco	✓			
Routt	✓	1	1	
Saguache	✓	3	3	
San Juan	✓	2	2	
Summit	✓			
Teller	✓	1	3	2
TOTAL for Small Counties (b)	✓	**90 (16 Countys)**	**150 (18 Countys)**	**76 (6 Countys)**
TOTAL for all Counties		**118 (20 Countys)**	**196 (23 Countys)**	**94 (9 Countys)**

(a) A at-risk community is assumed to experience an increase in likelihood if the probability of tree-cutting in association with WUI changes from "unlikely/somewhat likely" to "very likely/plans underway" in at least one CRA within 3 miles of a given at-risk community (for details about likelihood ratings, see USDA Forest Service, 2008c).

(b) **County population < 50,000.**

Summary of Results of Regulatory Impact Analysis

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

The State's petition also requested that the rulemaking process use the most updated roadless boundaries and that all existing congressionally designated areas (e.g., wilderness) be removed from roadless areas for all alternatives. In addition, the CRAs under the proposed rule exclude ski areas and current IRAs 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, IRAs under the 2001 rule and the land management plans alternative IRAs are approximately 4.25 million acres, while roadless areas under the proposed rule (CRAs) cover

approximately 4.03 million acres. The IRAs described in the original environmental analysis for the 2001 rule covered approximately 4.43 million acres.

Local Resource Challenges

Local resource challenges include protecting communities, property, and resources from risk of wildfire; protecting forests from the adverse effects of insects and disease; and providing access for commodity production, special uses, and other desirable services (Tables E.1 and E.2).

Projected levels of treatment, involving timber cutting, are greatest under the land management plans alternative (16,300 acres per year; 244,500 acres over 15 years) followed by the proposed rule (7,600 acres per year; 144,000 acres over 15 years) and the 2001 rule (800 acres per year; 12,000 acres over 15 years). Timber harvest volumes associated with treatments are estimated to be 800 hundred cubic feet (ccf), 6,700 ccf (1,700 ccf on CRAs only), and 24,400 ccf per year for the 2001 rule, existing plans, and the proposed rule respectively and would account for 3 percent, 26 percent, and 94 percent of average annual harvests from the seven affected forest units over the period 10/1/2000 to 9/30/2005. All volume for the 2001 rule is attributable to treatments on the GMUG NF, while approximately 90 percent of the volume under the proposed rule is distributed evenly across the Pike San Isabel (PSI), GMUG, and Rio Grande NFs. Volume under the land management plans alternative is projected to be distributed across six forest units, with the PSI NF accounting for 58 percent. When considering the assumption that agency or program budgets will remain flat, average total volume sold from NFS land may well remain unchanged under all alternatives. Overall, the volume differences across alternatives are not anticipated to result in significant impacts to the wood products and Forest Service sectors.

Approximately 14 percent (600,000 acres) of roadless areas in Colorado are considered high risk for insect and disease mortality. The percent of high risk insect and disease roadless areas that are projected to be treated under each alternative over a 15-year period are approximately 2 percent under the 2001 rule, 19 percent under the proposed rule, and 41 percent under the land management plans alternative, assuming projected all projected tree-cutting acreage is directed toward reducing insect and disease risk.

Other potential changes to forest or rangeland vegetation in the roadless areas include short-term, localized changes in vegetation composition, structure, and function related to increases in roads and tree-cutting activities. Long term, more widespread improvements in forest and rangeland health would be more pronounced under the land management plans alternative, and least pronounced under the 2001 rule, with the proposed rule somewhere in between. There would be no expectation that the boundary differences in CRAs under the proposed rule would have a measurable impact on the opportunities to conduct treatments with the exception that a total of 2,400 to 3,000 acres out of the total acres treated, are projected to occur in substantially altered areas (these treatments are also projected under the land management plans alternative).

Fuel reduction treatments on all NFS lands in Colorado average approximately 61,000 acres per year, based on fuel reduction treatments conducted from 2001 to 2007. The 2001 rule provides the lowest probability of conducting hazardous fuel and forest health treatments in roadless areas, and least likelihood of reducing wildfire threats to communities within and adjacent to roadless areas. Approximately 1 percent of annual fuel treatments on NFS lands in Colorado

would occur in roadless areas if the Agency continues to conduct treatments on 61,000 acres per year. Treating 12,000 acres (<1 percent) of the 4.25 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 in the vicinity (3 miles) of an IRA.

The proposed rule and the land management plans alternative provide flexibility to prioritize where hazardous fuel and forest health treatments would occur in roadless areas, and the associated ability to reduce the high-severity wildfire threats to communities and municipal watersheds that lie near the roadless areas. For the proposed rule, hazardous fuel reduction treatments, including tree-cutting and temporary road construction, may occur in CRAs if they are in CWPP areas or WUIs. Approximately 12 percent of annual treatments on all NFS land in Colorado could occur in CWPP or WUI areas in CRAs if all projected tree-cutting acreage is directed towards fuel reductions. Treating 114,000 acres (3 percent of the 4.031 million acres in CRAs) offers more opportunity for improving fuels and fire management effectiveness and could result in significantly more fuels and fire hazard reduction compared to the 2001 rule. The proposed rule would result in increased protection for at-risk communities and other values in proximity to the CRAs. The land management plans alternative offers the greatest opportunity to reduce wildfire threats to values at risk. When compared to the average of 61,000 acres annually treated on all NFS lands in Colorado, the 16,300 acres projected to occur in IRAs could represent 27 percent of the total NFS acres treated annually. Treating 244,000 of the 4.25 million acres in IRAs would result in reducing the fuel hazard on about 6 percent of the total in IRA acreage, offering the greatest opportunity to improve fuels management effectiveness.

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, roading would be allowed in IRAs on oil and gas leases that were issued (became effective) before January 12, 2001; foreseeable development and production would be limited to 68,400 leased acres on 18 IRAs on the GMUG, San Juan, and White River Forests (i.e., areas in the Piceance Basin). Under the proposed rule, roading would be allowed on oil and gas leases that allow surface occupancy and are issued before the proposed Colorado Roadless Rule becomes effective. Forseeable production could occur on about 129,200 acres of leased acres on 19 CRAs on the same forests. Under the land management plans alternative, roading would be allowed on existing and future oil and gas leases where roads are allowed under lease terms and stipulations. Foreseeable production under the land management plans alternative could occur on 219,417 leased acres on 21 IRAs. Based on these conditions, the land management plans alternative would have the most roads, oil and gas wells, and related infrastructure in roadless areas, and therefore opportunity for oil and gas development and foreseeable production (projected 731 wells over a 15 year period with access to 1,023.6 billion cubic feet of gas bcfg), and the 2001 rule would have the least (252 wells over 15 years with access to 418.6 bcfg). The proposed rule would have slightly fewer road miles, wells, and lower production compared to the land management plans alternative, but slightly more opportunity and foreseeable production (674 wells over 15 years with access to 1005.6 bcfg) than the 2001 rule.

Under the 2001 rule, roading in IRAs would be allowed on coal leases issued prior to January 12, 2001, and prohibited on coal leases issued after that date; foreseeable production opportunities would be limited to 3,700 acres of road-accessible coal reserves (135 million tons) in the West

Elk IRA in the GMUG NF. Under the proposed rule, roading would be approved pursuant to existing and future coal leases and coal exploration licenses in CRAs in the North Fork mining area on the GMU NF; foreseeable production opportunities would be limited to 29,000 acres of road-accessible coal reserves (1 billion tons). Under the land management plans alternative, roading could be approved on existing and future coal leases and exploration licenses in IRAs; reasonably foreseeable production opportunities would exist on 31,000 acres of coal reserves (1.1 billion tons) on the GMUG NF. Consideration could also be given to non-quantified reserves on 46,000 acres in coalfields on the San Juan, PSI, White River, and Routt NFs.

The land management plans alternative would have the highest potential for geothermal resource development in roadless areas because most land management plans do not prohibit roading in the roadless areas for such development. Geothermal development would not occur in roadless areas under the 2001 rule or the proposed rule 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 is underway to address the potential for geothermal resources on NFS land in Colorado.

The Forest Service will continue to respond, under all alternatives, to all potential public health and safety situations in roadless areas. Under the 2001 rule, the lower number of road miles projected to occur in roadless areas would continue to limit the responsiveness and timeliness to emergency health and safety situations. Under the proposed rule, and even more so under the land management plans alternative, the increases in road miles projected to occur in roadless areas would better facilitate rapid responses to emergency health and safety situations.

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 DEIS (Dep. of Energy, BLM) regarding designated energy corridors on Federal lands does not indicate that corridor designations would go through IRAs or CRAs.

Future special use authorizations for utilities and water conveyance systems in IRAs are allowed but unlikely to occur under the 2001 rule due to roading prohibitions in association with utility or water conveyance facilities that were not authorized prior to 2001. Approximately 0.6 miles of road construction per year are projected in association with existing authorizations under the 2001 rule. The proposed rule allows road building for future utilities and water conveyance systems. However, the definition of utilities does not include water reservoirs or communications facilities; permissions do not apply to uses other than utilities and water conveyance. Estimates under this alternative project approximately 1.2 miles of roading would occur annually in CRAs for future authorizations. Approximately 0.7 road miles per year are projected for existing authorizations. The construction of oil or gas pipelines through a CRA from a source or sources outside a CRA would be prohibited under the proposed rule; this may affect efforts to increase capacity in the future. Under the land management plans alternative, most forests would allow new roads in IRAs in support of current as well as future special use authorizations. Projections for roading in roadless areas for special land use authorizations are approximately the same under the land management plans alternative and the proposed rule. Estimates are not available for future projected pipeline miles.

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 authorized in a permit prior to Jan 12, 2001. As a result, development may occur on 3,200 acres in IRAs across six ski areas. Under the proposed rule, the ski areas that are currently in IRAs would not be included in the CRAs. This would allow road construction and tree-cutting on a total of 8,200 acres in CRAs across 13 ski areas. Under the land management plans alternative the potential to construct roads and cut trees in IRAs in ski areas would be the same as under the proposed rule. Authorization of roads in developed ski areas might facilitate the implementation of required ski area vegetation management plans to improve forest health, remove hazard trees and manage fuels.

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

Roadless Characteristics

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

Roadless area characteristics and values typically include “natural-appearing landscapes with high scenic quality. The roadless areas in Colorado currently have a high degree of scenic integrity. The 2001 rule would retain the greatest number of roadless area acres at high to very high scenic integrity levels; scenic quality would remain largely unaltered. Many substantially altered area acres would continue to reflect moderate to low scenic integrity levels, inconsistent with general roadless area characteristics and values. The proposed rule would retain the majority of the 4.03 million acres of CRAs at high to very high scenic integrity levels. 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 level. Substantially altered landscapes would not be included in the CRAs and would therefore not detract from scenic integrity in designated roadless areas. The new unroaded areas included in CRAs would likely add to the number of areas protected at high to very high scenic integrity levels compared to the land management plans alternative. The land management plans alternative would retain fewer acres in the IRAs at the current high to very high scenic integrity levels, compared to the other alternatives. More portions of IRAs would gradually shift to a moderate to low scenic integrity level due to the levels of projected activity. Potential effects would be moderated under all alternatives through project-level compliance with scenic integrity and visual quality objectives specified in the land management plans alternative.

There are a total of 35 designated wilderness areas in Colorado comprising 3,200,000 acres. Approximately 457,000 acres in 13 IRAs have been recommended for wilderness in land management plans. None of the three alternatives, including the proposed rule, will have a direct effect on designated wilderness, because these areas are outside of IRAs or CRAs. The effects to areas recommended as wilderness in land management plans, likewise, do not differ across alternatives, because land management plans generally prohibit road construction and tree-

cutting and removal activities in those areas. The 2001 rule generally prohibits tree-cutting and road building in IRAs and would therefore be least likely to result in effects that detract from wilderness characteristics in the adjacent wilderness areas. The restrictions on activities in IRAs under the 2001 rule provide a greater opportunity to maintain future options for recommending roadless acres as wilderness. The activity prohibitions under the proposed rule would minimize the potential risk of detracting from wilderness characteristics or experience in adjacent wilderness areas, but projected activity levels, including coal mining, could increase risks compared to the 2001 rule. Projections of increased activity could also reduce the number of roadless acres that might support future wilderness recommendations. The risk of detracting from wilderness characteristics in adjacent wilderness areas would be highest under the land management plan alternative. This alternative could also potentially create the greatest reduction in the number of roadless acres that would be capable of supporting wilderness recommendations.

There are six congressionally designated areas in Colorado, of which 147,600 acres are in the 2001 rule IRA boundaries. There are portions of a congressionally designated river (Cache la Poudre river), as well as trails belonging to the National Trails System, in roadless areas. None of the alternatives would directly impact any of these congressionally designated areas, and none of the alternatives would directly impact the stretches of the wild and scenic river corridor classified as “wild” or “recreation,” because the statute designating the river is equally or more restrictive. Due to similar statutory precedence, none of the altenatives would alter the management or scenic values of the Continental Divide National Scenic Trail. However, there could be indirect effects from projected activity levels under the various alternatives on the characteristics and values of adjacent designated areas. Road construction and tree-cutting are not projected to occur on research natural areas (RNAs) or special interest areas (SIAs) under any alternative. Some land management plans allow roads or facilities to be built in RNAs or SIAs, although the values for which the area was established would need to be maintained.

Soil disturbance from road construction and other ground-disturbing activities can affect the soil resource by increasing erosion, compaction, and other soil quality conditions. The potential for adverse impacts on the soil resource in roadless areas would differ slightly among the alternatives based on different levels of projected roading, tree removal, and energy resource development activities. The 2001 rule would have the least potential for adverse impacts and the land management plans alternative would have the greatest potential for adverse soil impacts. However, the differences among alternatives would be insignificant because effects from those projected activities would be mitigated through the use of site-specific analysis, watershed conservation practices, and other BMPs, including post-project rehabilitation of disturbed soil. Impacts would also be limited in geographic extent and would be distributed over many different roadless areas. Thus, the actual effects on soil quality would be minor and of short duration.

The relative differences in potential water quality impacts in roadless areas under any of the alternatives would be negligible. The 2001 rule would have the least risk of adverse effects on water quality, and the proposed rule would have a slightly higher risk, followed by the land management plans alternative with the greatest risk of adverse impacts in the roadless areas. However, these differences are insignificant because the 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. Potential water quality impacts from authorized activities in roadless areas would be effectively mitigated by site-specific watershed conservation practices, BMPs, and regulatory permit requirements. Future activities under the alternatives are not expected to cause exceedences of water quality standards or contribute to the list of impaired water bodies.

There is no major difference in the effects on air quality among the alternatives. One minor difference is related to potential smoke-related impacts from wildfires, which would be more likely to occur in roadless areas under the 2001 rule, and least likely to occur under the land management plans alternative.

Threatened and endangered 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. Two T&E plant species and 44 sensitive plant species are known or likely to occur in roadless areas in Colorado. The alternatives do not substantially differ in their estimated effect on T&E plant species, because no additional roading, tree-cutting, or energy development activities are projected to occur in the parts of roadless areas that support T&E plants. The only difference among alternatives in the risk to T&E plants is related to the higher risk under the proposed rule and the land management plans alternative, compared to the 2001 rule that invasive plants would spread into T&E plant communities.

There are 116 IRAs where sensitive plant species are known to occur. Activity projections differ across alternatives on 57 of the 116 IRAs, and 12 of these areas are projected to experience road construction, tree-cutting, or energy-related activities under the 2001 rule. In contrast, activities are expected to occur on 54 and 53 of the 57 IRAs under the proposed rule and the land management plans alternative respectively; this difference is unlikely to result in measurable differences in effects across these two alternatives. The risk of impact on sensitive plants would be higher under the proposed rule and the land management plans alternative compared to the 2001 rule primarily because of (a) the higher likelihood of increases in invasive plants spreading into sensitive plant communities, and (b) the higher likelihood of inadvertent mistakes that may be made during project implementation. These differences in risk are correlated with the differences in the amount of projected activities in roadless areas that support sensitive plants.

One T&E fish species, five sensitive fish species, six MIS, one aquatic mammal MIS (American beaver), and an array of benthic invertebrate MIS are known or likely to occur in roadless areas in Colorado. There are also aquatic habitats in many roadless areas that have been identified as being ecologically important as well as “rare” (e.g., fens, other wetlands). Considering the overall effects of each alternative, regardless of the differences on each forest, the 2001 rule would pose the least risk of adverse impact, and would generally have the least potential for adverse effects on protecting aquatic species and habitat compared to the more intensively managed lands outside roadless areas. The proposed rule would have more potential for adverse impacts to aquatic species due to projected activities, with the greatest potential for adverse effects under the land management plans alternative. Activities projected under the proposed rule would not likely result in measurable declines in overall population trends on any NF for any of

the aquatic T&E species, sensitive species, or MIS. A beneficial effect of the proposed rule and the land management plans alternative would be associated with the increased amount of fuel reduction treatment acres in IRAs, which could reduce wildfire severity in the IRAs and CRAs, resulting in beneficial effects on aquatic habitat and species.

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

For terrestrial wildlife, six T&E species, 34 sensitive species, and 36 MIS are known or likely to occur in roadless areas in Colorado. The 2001 rule would afford terrestrial species and habitats the most protection because it is most restrictive for activities in the roadless areas that could be detrimental to T&E, sensitive, MIS, and migratory bird species. By comparison, the proposed rule offers a lower level of protection in roadless areas than the 2001 rule due to activity permissions in areas with important terrestrial species and habitats. The land management plans alternative correspondingly would have the highest potential for adverse impacts to terrestrial species and habitat. Detrimental effects from an expected increase in invasive plants, animals, and pathogens would be of greater risk under the proposed rule and the land management plans alternative respectively. Given the temporary status of most roads projected for roadless areas, the impact of these roads would be relatively short-term. However, increases in roads could encourage recreational use as well as unauthorized motorized use that could increase potential impacts. The increased ability to treat acres for forest health and fuels under the proposed rule and the land management plans alternative could improve habitats for early seral species in some areas and reduce the potential for a severe stand-replacing wildfire that could adversely impact terrestrial habitat. In general, for all alternatives, activities may affect individual animals but are not likely to adversely affect populations or critical habitat of T&E species, nor result in the loss of viability or cause a trend toward Federal listing for sensitive species. There is increasing potential for change in population trends for MIS under the proposed rule and the land management plans alternative respectively, depending upon the location, timing, intensity, and magnitude of activity. But, as with plants and aquatic species, potential adverse effects to terrestrial species are expected to be either avoided or minimized through compliance with standards and guidelines in land management plans and other applicable laws, regulations, and policy.

The value of roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude in lands outside of roadless areas. Potential benefits of conserving roadless areas include protected large contiguous blocks of habitat and biological strongholds as well as providing habitat connectivity. These types of benefits would be similar for the proposed rule and the 2001 rule but would be realized to a lesser degree under the proposed rule. The land management plans alternative, because of fewer restrictions, would probably pose a higher risk of affecting biological diversity.

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 (estimated 4 acres invaded per year). The risk of increasing invasive plant occurrences would remain relatively low under the proposed rule (38 acres invaded per year, with the greatest relative risk (82 acres invaded per year) under the land management plans alternative. Overall, the potential magnitude and geographic extent of ground disturbance and spread of invasive plants in roadless areas would still be relatively low under the land management plans alternative.

The 2001 rule would retain the greatest proportion of roadless area acres in a primitive or semi-primitive setting, at the lowest level of human development. Smaller proportions of the IRAs would show evidence of motorized vehicle use or be in a roaded natural setting. None of the projected activities under the 2001 rule would be expected to reduce the quality of hunting and fishing opportunities. The proposed rule would retain the majority of the CRA acres in a semi-primitive setting, although there would be more CRA acres with roads and energy operations. The higher levels of human activity and development would shift some areas from offering semi-primitive opportunities to more roaded natural setting. Excluding the substantially altered areas and developed ski areas in CRAs would allow the CRAs to appear more consistent with semi-primitive and unroaded characteristics expected in roadless areas. The inclusion of unroaded areas in CRAs would further protect and provide for dispersed recreation in generally unroaded and semi-primitive settings. Hunting and fishing opportunities likely would not change under the proposed rule because of the dispersed nature of projected road and tree-cutting activity and the large amount of NFS lands not altered by these activities. The land management plans alternative would result in higher levels of human activity and development in IRAs that are not consistent with typical roadless area characteristics. The effects of the IRA boundaries would be the same as described for the 2001 rule; however, more of the IRAs that offer semi-primitive settings would shift toward roaded natural settings as more roading, tree-cutting, and energy resource development occurs in the IRAs.

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

Neither the proposed rule nor the land management plans alternative would be expected to cause a measurable change in the amount of carbon dioxide or other greenhouse gas emissions compared to current conditions and trends in the roadless areas under the no-action alternative (the 2001 rule). The cumulative effects of climate change, in combination with the direct effects associated with the alternatives, on roadless area conditions (e.g., drought, wildfire, insects/disease) and resources (e.g., water yield, air quality, TES species and habitat) cannot be quantitatively described in this programmatic evaluation. However, the risk of cumulative effects would be somewhat lower under the 2001 rule because the total amount of ground-disturbing activity would be less than under alternatives the proposed rule or the land management plans alternative.

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

Agency Costs

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

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

Under the 2001 rule, fuel treatments would likely be more expensive and less efficient to implement in IRAs because of the lack of established roads and inability to reconstruct or construct roads. Compared to the 2001 rule, the proposed rule would provide increased flexibility to achieve management objectives in critical insect and disease outbreak areas. Increased road miles would also increase the Agency's ability to strategically locate fuel treatment areas on the landscape to improve effectiveness and possibly reduce the total amount of the landscape that requires treatment. Under the proposed rule, treating 7,600 acres per year implies that more hazardous fuel treatments would occur in CRAs, compared with the 4,300 acres of CRAs treated annually on average from 2001 to 2007, if budgets remain flat. Correspondingly, fewer treatments would occur outside roadless areas. Under the land management plans alternative, there would be a shift to treating even more acres (up to 16,300 acres per year) in roadless areas and fewer acres outside roadless areas compared to the past 7-year trend. The effects of building more roads for fuel treatments would generally be the same as described for the proposed rule, including increased efficiency, effectiveness, and timeliness in wildfire suppression response as well as hazardous fuel reduction in WUIs.

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

Distributional Effects

Many 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 only resource outputs with measurable and quantifiable differences between alternatives are oil and gas, and coal. Jobs and income contributed by these output levels are estimated for a five county "energy roadless model" area (Delta, Garfield, Mesa, Montrose, Rio Blanco counties). Changes in output of goods or services associated with timber harvest, livestock, recreation/special use permits, and other resource sectors are not projected to be significant across alternatives.

The provisions for enhanced energy mineral development under the proposed rule and the land management plans alternative are likely to result in sizeable increases of average annual production, employment, and labor income contributed by energy sectors over the next 15-years. Total value of annual output from the oil, gas, and coal sectors is estimated to be similar for the proposed rule and the land management plans alternative ($565.7 and $621.7 million per year respectively) and signicantly higher than output under the 2001 rule ($149.5 million). Total jobs contributed under the 2001 rule are estimated to be 297 jobs, increasing to 1,481 under the proposed rule and 1,592 under the land management plans alternative. Respective annual labor income is estimated to be $17.5 million, $96.2 million, and $102.7 million (2006 dollars). The total annual output, employment, and labor income associated with the entire mining sector in the five-county energy model area is estimated to be approximately $5.1 billion, 5,472 jobs, and $87.4 million for 2006.

A pattern similar to economic impacts emerges for average annual State and local government revenues (i.e., revenue sharing) from energy mineral leases. Compared with $6.1 million per year total payments and taxes received by the State and counties under the 2001 rule, payments are estimated to be approximately four times larger for the proposed rule ($24.5 million/year) and the land management plans alternative ($26.8 million/year). Other Federal payments to State and local governments, such as those from the NF (25 percent) fund and payments in lieu of taxes, are expected to either not change or be more than offset by revenues from Federal mineral lease payments.

The distribution of projected fuel treatments and corresponding protection of values at risk from wildfire in communities near roadless areas varies by alternative. Values at risk can include citizen health, reliable water and power supplies, infrastructure (e.g., buildings, both public and private), business activity, and general quality of life. An estimated 619 at-risk communities are within 3 miles of IRAs, and 82 of those at-risk communities are adjacent to IRAs where tree-cutting in the wildland urban interface (WUI) may provide opportunities for fuel reductions and protecting values at risk under the 2001 rule. Under the proposed rule, the number of at-risk communities that may experience these types of benefits increases to 183. Under the land management plans alternative, tree-cutting in IRAs may provide opportunities for similar protection for an estimated 250 at-risk communities. These results simply identify potential opportunities and are not intended to be projections of the actual extent or magnitude of WUI treatments.

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