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CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

Document Structure

The Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

Chapter 1. Purpose and Need for Action: The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2. Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.

Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Index: The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Forest Supervisor's Office.

Background

Federal coal reserves are currently being mined by Mountain Coal Company (MCC) from their West Elk Mine. MCC presently operates a longwall system of underground mining, which is permitted with the Colorado Division of Reclamation, Mining and Safety (DRMS) for a production rate of 8.2 million tons of coal per year. The West Elk Mine was opened in 1981 and presently produces coal from several existing federal coal leases. The coal mined at the West Elk Mine, as well as from other mines in the North Fork Valley, is a high British Thermal Unit (BTU), low sulfur, low ash, and low mercury coal. The coal meets the Clean Air Act standards for compliant and super-compliant coal. Its use in industry helps meet standards of the Clean Air Act. As such, there is a demand for coal from the West Elk Mine and other mines in the North Fork Valley by electric power generation industries.

In the past 5 years, operations at the West Elk Mine have extracted coal from the B coal seam. Recently, the West Elk Mine incorporated other leased federal coal reserves to their State-approved mine permit, and operations will be moving into unmined reserves in the E coal seam in the next few years. In addition, MCC leased additional E Seam reserves to the southeast of existing operations, which are a logical extension of existing operations with an effective date of March 1, 2007.

Based on experience mining other coal reserves at the West Elk Mine, it is anticipated that

underground mining operations will encounter quantities of naturally-occurring methane gas that left unmitigated, will create hazardous working conditions in the underground mine. In order to continue operations to recover leased federal coal reserves, the excess methane must be evacuated from the underground workings to reduce the explosion hazard and maintain gas levels at safe operating conditions. The Mine Safety and Health Administration (MSHA) has requirements that underground coal mines maintain methane concentrations that are one percent or less. The method demonstrated to be most effective in evacuating methane gas from the underground workings is to install vertical methane drainage wells (MDW) from the land surface into the mine workings. In some places, MDWs drilled at and angle (i.e. 'directionally drilled') are also effective. Therefore, the mine has proposed a project to install MDWs into the E Seam mining operations.

Since 2001, the GMUG and the Forest Service Rocky Mountain Regional Office have analyzed and approved several methane drainage projects to continue operations at the West Elk Mine (see section Other Analyses Completed in the Project Area). These project decisions approved about 70 methane drainage well locations and over 20 miles of road construction. Some of these activities have occurred in the West Elk Inventoried Roadless Area (West Elk IRA). Operations and contemporaneous reclamation have been on-going since these approvals were given. Implementation of these previous decisions resulted in field data from the B Seam which may be extrapolated for the E Seam which will assist in this analysis.

In addition, as part of beginning to mine the E seam reserves, the mine plan also calls for an additional ventilation shaft and escapeway (called the Deer Creek shaft) to support the mine ventilation system, and provide for underground worker safety. The access for this shaft has been approved under a previous NEPA decision (2006) for geotechnical work and has already been constructed. Actual construction and operation of the shaft are included in the proposed action.

This environmental impact statement considers the effects of installing MDWs and a ventilation shaft and escapeway to facilitate continued operations to recover leased federal coal reserves.

Purpose of and Need for Action

The Forest Service has identified the need to authorize, via its concurrence role in the state coal mine permitting process, Mountain Coal Company (MCC), operator of the West Elk underground coal mine, to construct, operate, and reclaim up to 137 methane drainage well sites that would support 168 individual MDWs, one ventilation/ escapeway facility, and approximately 23.8 miles of associated roads. The operations are needed for the West Elk Mine to comply with Mine Safety and Health Administration (MSHA) requirements for methane gas management to ensure worker safety. The operations would enable safe recovery of leased federal coal reserves in compliance with lease terms and requirements for efficient recovery of federal coal[1].

[1] Standard terms of a federal coal lease include the following rights and responsibilities conveyed to the Lessee by the coal lease (C-1362):

1) Right to construct such works, buildings plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted (Section 2).
2) Lessee shall carry on all operations in accordance with approved method and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, property and prevention of waste damage or degradation to any land, air water, cultural, biological, visual, and other resources, including the mineral deposits and formations of mineral deposits not leased, and to other land uses or users (Section 7).
3) Lessee shall…maintain a safe working environment in accordance with standard industry practices (Section 8).

Figure 1. Project Location Map

The purpose of the agency's action is to protect public health and safety, to prevent loss of leased federal coal resources, and to facilitate safe and efficient production of compliant and super compliant coal reserves.

This project would contribute to meeting the need for energy resources developed and produced in an environmentally sound manner. The project responds to the goals and objectives outlined in the Amended GMUG Land and Resource Management Plan (GMUG Forest Plan, USDA FS 1991) which calls for encouraging environmentally sound energy and minerals development. By providing for coal leasing and development in this area, the GMUG Forest Plan and Bureau of Land Management's (BLM) Uncompahgre Basin Resource Management Plan (Uncompahgre RMP, USDI BLM 1989) acknowledged that the area could at some future time support surface facilities necessary to support coal production.

The GMUG Forest Plan also identified providing livestock forage, managing big game winter range and protecting riparian habitat as the desired future conditions of the area. The proposed action is designed to be consistent with moving the area towards those desired conditions. The Uncompahgre RMP supports coal leasing and development in the area with respect to management of mineral resources.

Proposed Action in Brief

The Forest Service proposes issue its concurrence to DRMS mine permitting action that would to authorize MCC to conduct surface operations associated with accessing, drilling, constructing, operating, and reclaiming 168 methane drainage wells on 137 drilling locations, and one ventilation/ escapeway shaft on the National Forest System (NFS) lands described below. Five of the drilling locations would also serve as staging areas. An additional six staging areas may be used, two of are currently reclaimed areas. The proposed action includes authorize construction and use of about 23.8 miles of roads (19 miles of new and 4.8 miles existing) necessary for these operations, which includes a 0.6 re-routing of an existing life of mine access road to address issues related to geologic hazards, sedimentation control and maintenance. Operations related to these authorizations are expected to begin in summer 2007. The proposed action includes granting relief from the lease stipulation on federal coal lease C-1362 that restricts activities between December 1 and April 30 for the protection of big game winter range to facilitate construction of the Deer Creek shaft. Specific details of operations to be conducted under the proposed action are described in Chapter 2.

Location of Proposed Action

The Deer Creek ventilation shaft/escapeway is located in NE¼ Section 32, Township 13 South, Range 90 West, 6th Principal Meridian, in Gunnison County, Colorado (approximately 1,800 feet southeast of Minnesota Reservoir) on federal coal lease C-1362. The proposed E seam methane drainage well development is located in Sections 26-29 and 32-35, Township 13 South, Range 90 West and in Sections 1-5, and 9-11, Township 14 South, Range 90 West, 6th Principal Meridian, in Gunnison County, Colorado (approximately 7 to 10 miles east and northeast of Paonia, Colorado) on federal coal leases C-1362, COC-56447 and COC-67232 (**Figure 3**).

Summary Description of Proposed Actions in Inventoried Roadless Areas

Portions of the Proposed Action would occur on the federal coal leases[2] that are in the West Elk IRA. Approximately 3.2 miles of road construction (including a 0.6 mile re-route) is proposed on these leases within the IRA. The road construction is necessary for access to 35 sites for methane drainage wells. Seventeen of these sites would be located in the IRA.

[2] Specific information about the individual federal coal leases involved in the project is described in the section, Federal Coal Leases.

Roads associated with accessing methane drainage wells may be constructed or reconstructed in the West Elk IRA under two of the exceptions stated in the Roadless Area Conservation Rule of 2001 (RACR), those being:

- Exception No. 1 – protection of public health and safety in the cases of imminent threat that without intervention would cause loss of life or property, and
- Exception No. 7 – roads are needed for the continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001.

Additional details regarding the use of these exceptions are given in Chapter 2.

In compliance with the RACR, conditions attached to the Forest Service concurrence to the state permitting action would be consistent with provisions at 36 CFR 294.12 (b) (7) which requires road construction and reconstruction on mineral leases to "be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulations, and laws." Also consistent with that provision of RACR, the Forest Service will require the operator to decommission all roads by obliteration when no longer needed for the purposes of the leases. Roads proposed in the IRA would be for project and administrative use only, and would not be available for public use.

Authorizing Actions

The Forest Service manages mineral resources in accordance with the Mining and Minerals Policy Act of 1970, which states, in part, that it is the "continuing policy of the federal government in the national interest to foster and encourage private enterprise in the development of economically sound and stable domestic mining minerals and mineral reclamation industries, … (and) the orderly and economic development of domestic mineral resources…" Further, the Federal Land Policy and Management Act of 1976 (FLPMA) states that public lands are to be managed in a manner that recognizes the Nation's need for domestic sources of minerals. Under regulations of the Mining and Mineral Policy Act of 1970 and the Federal Land Policy Management Act of 1976, the responsible federal agencies must ensure the following:

- Adverse environmental impacts on public land surface resources are minimized to the extent practical;
- Measures must be included to provide for reclamation, where practicable; and,
- The proposed operation will comply with other federal and state laws and regulations.

Forest Service Manual

The Forest Service administers its mineral program to (Forest Service Manual 2800 ZERO Code – WO Amendment 2800-91-1 Page 3):

- Encourage and facilitate the orderly exploration, development, and production of mineral and energy resources within the NFS in order to maintain a viable, healthy minerals industry and to promote self-sufficiency in those mineral and energy resources necessary for economic growth and national defense;
- Ensure that exploration, development and production of mineral resources are conducted in an environmentally sound manner and that these activities are considered fully in the planning and management of other NFS resources; and,
- Ensure that lands disturbed by mineral and energy activities are reclaimed for other productive uses.

The Forest Service considers mineral exploration and development to be a part of its management program (GMUG Forest Plan, Page II-61). It cooperates with the U.S. Department of the Interior, through its agent, the BLM, in administering lawful development

of leasable minerals (which includes coal resources). While the Forest Service is mainly involved with surface resource management, the agency recognizes that mineral development is ordinarily in the public interest and can be compatible with the purposes for which the NFS lands are managed.

Federal Coal Leases

With specific regard to coal resources, management of federal coal resources are governed by the Mineral Leasing Act of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976. These laws give the Forest Service's consent authority to the BLM for leasing NFS lands for coal resource development. The leases involved in this project were issued, and are managed by the BLM and Forest Service, according to the authorities granted in these laws, and implementing regulations at 43 CFR 3400.

The Deer Creek Shaft and E Seam Methane Drainage Wells project involves three federal coal leases. Details of each lease are given below:

Lease C-1362

- 1967 issue date;
- Modified with a 160-acre extension in October 2001;
- 4,996 acres total (including modification), with 1,260 acres in the West Elk IRA (including modification);
- Lease issued with protections for non-mineral resources (i.e. stipulations) for big game winter range, moderate and steep slopes, geologic hazards, riparian areas, subsidence monitoring, water resources and the Standard Notice for Lands Under the Jurisdiction of the USDA; and
- The modification was issued with a lease notice regarding the RACR of 2001.

Lease COC-56447

- 1995 issue date;
- Modified with 160-acre extension in October 2001;
- 2,919 acres total (including modification), all within the West Elk IRA;
- Lease issued with protections for non-mineral resources (i.e. stipulations) for big game winter range, moderate and steep slopes, geologic hazards, riparian areas, subsidence monitoring, water resources, and the Standard Notice for Lands Under the Jurisdiction of the USDA; and
- The modification was issued with a lease notice regarding the RACR of 2001.

Lease COC-67232

- 2007 issue date[3];
- 1,517 acres, 620 within the West Elk IRA; and
- Lease to be issued with protections for non-mineral resources (i.e. stipulations) for wildlife or their habitats (lynx, big game, threatened and endangered species, raptors, breeding birds) riparian areas, geologic hazards and erosion potential, steep slopes, water sources and existing facilities, Standard Notice for Lands Under the Jurisdiction of the USDA, and a lease notice pertaining to IRAs.

Surface uses on federal coal leases are also governed by the Surface Mining Control and Reclamation Act of 1977 (SMCRA), which establishes requirements for planning, permitting, and monitoring compliance with specific operations, and reclamation requirements for surface disturbance associated with surface and underground coal mining operations. In Colorado, the Colorado DRMS

[3] Lease COC-67232 was offered for sale in January 2007. At the time of DEIS preparation, BLM had accepted the bid and was in process of finalizing the lease paperwork. The Forest Service had issued consent to this lease in March 2006, and had prescribed the protections for non-coal resources.

enforces specific performance standards and permit requirements under the State program during the period of mine operation, reclamation, and an extended reclamation liability period, and has primary authority in environmental emergencies. The DRMS operates under an Office of Surface Mining (OSM)-approved permanent program for administering coal mining operations in the State of Colorado. The performance standards for drilling, surface disturbance, road construction, mitigation and monitoring, and reclamation administered by DRMS are part of the Colorado Surface Coal Mining Reclamation Act (CRS 34-33-101) and attendant regulations, which are based on requirements in Title 30 CFR Chapter VII, Parts 816 and 817. The implementing Federal and State regulations give the Federal land management agency, or surface managing agency (FLMA or SMA, in this case the Forest Service) responsibility to determine the post-mining use of the land, protection of non-mineral resources, require appropriate conditions to regulate surface use and reclamation, and review and concur with coal mining permit applications and revisions (30CFR 740.4(e)). Colorado's approved federal coal program procedures include at all points in the mine permitting process, a role for the federal land management agency to review an applicant's submittal to ensure that it provides for post-mining land use consistent with the land use plan and has adequate protections for Federal resources (30 CFR Part 906, Appendix A). The FLMA/SMA's review and concurrence role includes the responsibility to ensure that it contains the necessary information for compliance with the coal lease, NEPA, and other applicable federal laws.

The proposed project lies within the approved DRMS permit area for the West Elk Mine, and in an area in which it is reasonably foreseeable will be added to the permit area. The DRMS is responsible for ongoing permit compliance, including inspection and enforcement requirements, during the mine's operation. OSM retains oversight responsibility for state compliance and enforcement activities.

Federal coal leaseholders in Colorado must hold a State-approved mining permit before mining and reclamation operations on Federal lands in the state. The State regulations provide for revisions to be made to the existing permits. The DRMS provides opportunity for public review of and input on the permit application package and any revisions and reviews applications to assure that they comply with applicable permitting requirements and that the coal mining operation will meet the approved state permanent program performance standards. If it does comply, DRMS issues the applicant a permit or approves a revision to conduct coal mining operations. Based on the proposed projects, MCC will submit a request for a permit revision to their existing approved mining permit to the DRMS for review and approval. DRMS will consider any public input, this environmental analysis, the Forest Service Responsible Official's Record of Decision, and other relevant criteria in their decision as to whether or not to approve the permit revision.

Roadless Area Conservation Rule of 2001 (RACR)

On September 19, 2006, Judge Elizabeth D. Laporte of the United States District Court of the Northern District of California set aside the 2005 State Petitions Rule and reinstated the 2001 RACR. In a clarification, Judge Laporte stated, "As the Court previously ordered, federal defendants are enjoined from taking any further action contrary to the Roadless Rule without first remedying the legal violations identified in the Court's opinion of September 20, 2006. Such further actions by the Forest Service include, but are not limited to, approving or authorizing any management activities in inventoried roadless areas that would be prohibited by the 2001 Roadless Rule (including the Tongass Amendment), and issuing or awarding leases or contracts for projects in inventoried roadless areas that would be prohibited by the 2001 Roadless

Rule, including the Tongass Amendment. The effective date of this injunction is September 20, 2006."

She further clarified on November 29, 2006 that 1) the RACR would apply to any and all mineral leases in IRAs on NFS lands (not affected by the Tongass Amendment) that were issued after January 12, 2001, 2) the Forest Service was enjoined from approving or allowing any surface use of a mineral lease issued after January 12, 2001 that had not already commenced on the ground and which would violate the RACR, and 3) the order did not apply to roads that had already been constructed or reconstructed on lease parcels pursuant to approved surface use plans of operation, or to leases that carried a 'no surface occupancy' condition prohibiting road construction that would be in violation RACR.

The Forest Service management of IRAs is currently guided by Interim Directive No. 1920-2006-1. This interim directive guides where decision authority lies dependent upon the individual forest unit situation with respect to forest plan revision, completion of a forest-scale Roads Analysis Procedure, whether a project involves road construction in an IRA, and if the project requires an EIS. The GMUG has a Forest-Scale Roads Analysis Procedure completed, however does not have a revised Forest Plan. Under the terms of the Directive, the decision authority for this project lies with the Forest Supervisor. However, because this project requires an EIS and includes proposed road construction in an IRA, the Purpose of and Need for the Proposed Action must be approved by the Regional Forester. On January 18, 2007 the Regional Forester for the Rocky Mountain Region approved the Purpose of and Need for the Proposed Action.

Based on these legal requirements, consideration must be given to MCC's request for mine-related operations in an IRA, and whether such activities can be conducted in a manner consistent with the RACR. Chapter 2, Proposed Action contains a discussion of project activities consistent with the RACR, and Chapter 3 displays the effects on activities in IRA.

Energy Policy Act of 2005

The Energy Policy Act has sections specifically related to federal coal reserves, however this legislation is directed at performing inventories on coal reserves, and does not contain specific direction related to project-level coal program decisions.

Special Use Authorizations

The Forest Service is authorized to issue Special Use Permits for the commercial use or occupancy of roads, trails, areas, and fences and other improvements (36CFR Ch II 261.1a and 261.10).

Forest Plan

The GMUG Forest Plan and the BLM Uncompahgre Basin RMP, made provisions for coal leasing subject to the application of the coal unsuitability criteria established in 43 CFR 3461. The GMUG Forest Plan also provided for applicable stipulations to be utilized for protection of specific surface resources as addressed in Section III, General Direction, pages 63-69. The coal leases involved with this project were duly leased with application of the Unsuitability Criteria.

The GMUG Forest Plan guides natural resource management activities and establishes management standards and guidelines. The following multiple use management area prescriptions are designated for the lands bounded by the project area:

5A – Emphasis on big game winter range in non-forest areas. Semi-primitive motorized and non-motorized and roaded natural recreation opportunities. Vegetation treatments will enhance plant and animal diversity (favoring wildlife habitat).

6B – Emphasis on management for livestock grazing. Range condition is maintained through use of forage improvement practices, livestock management, and regulation of other resource activities.

9A – Emphasis is on the management of all the components of aquatic/riparian ecosystems to provide healthy, self-perpetuating plant communities, acceptable water quality standards, habitat for viable populations of fish and wildlife, and stable stream channels and still water body shorelines. Mineral activities may occur but must minimize disturbance to riparian areas and initiate timely and effective rehabilitation of disturbed areas and restore them to a state of productivity comparable to that before disturbance.

Environmental Management System (USDA-FS 2005 Planning Rule)

The USDA-FS in the 2005 Planning Rule and associated directives required each forest unit to develop an Environmental Management System (EMS) to oversee land management plan activities. In accordance with this rule, the GMUG instituted an EMS on June 1, 2006. The purpose of the EMS is to establish, document, implement, maintain, and continually improve the environmental performance associated with the activities, products and services of the GMUG. The EMS conforms to the International Standards Organization (ISO) 140001 standards.

The GMUG EMS Guide is found on the GMUG EMS Internet Web Site (at http://www.fs.fed.us/r2/gmug/policy/environmental_mgmt_sys/index.shtml as of February 2007). This Guide describes roles and responsibilities of Forest Service managers, employees and those who do work on the agency's behalf (e.g. contractors, permittees, and volunteers) to plan and implement environmental safe guards. Specifically, companies or individuals conducting work on the agency behalf are required to be made aware of, or where necessary to understand their roles and responsibilities in following GMUG EMS requirements, including:

1) The environmental policy;
2) Activities that have been determined by the Forest to have a significant environmental impact if not properly controlled. These activities are referred to as significant environmental aspects;
3) Operational controls designed to avoid or minimize effects associated with significant environmental aspects;
4) Notification and response requirements in the case of an emergency; and
5) Consequences of not conforming to operational controls and associated authorizing documents.

The GMUG's EMS identifies that surface uses related to developing leasable minerals are a significant environmental aspect, and are therefore subject to specific monitoring requirements. These requirements will be reviewed with companies or individuals working on the GMUG's behalf at a pre-work meeting by a Forest Service Representative. Documentation that requirements of EMS have been conveyed will be retained by the Forest Service Representative in the project file.

Decision Framework

Given the purpose and need, the Forest Service Responsible Official (GMUG Forest Supervisor) will review the proposed action, any other alternatives, and the environmental consequences in order to decide the following:

- Where surface use for the ventilation shaft/escapeway, access roads, and methane drainage wells is acceptable on NFS lands, consistent with lease terms and conditions, and the legal framework;
- The conditions under which NFS lands can be used, and how non-mineral resources must be protected;
- Whether relief from lease stipulations for 2007-2008 season for Big Game Winter Range during shaft construction should be approved.

The Forest Service Responsible Official will determine if the activity is consistent with the GMUG Forest Plan and identify the post-mining land use.

Public Involvement

The Notice of Intent (NOI) to prepare an environmental impact statement (EIS) was published in the *Federal Register* on September 18, 2006. The NOI asked for public comment on the proposal from September 18 through November 2, 2006. In addition, as part of the public involvement process, the agency published legal notices in the *Delta County Independent* and *Grand Junction Daily Sentinel* as papers of record and sent approximately 35 scoping letters to required agencies, Tribes, and interested parties list. The NOI was posted on the GMUG's public planning webpage, and the project was included on the GMUG's Quarterly Schedule of Proposed Actions. GMUG personnel briefed the North Fork Coal Working Group at its quarterly meetings on October 10, 2006 and January 16, 2007. An additional article was published in the *Delta County Independent* on November 1, 2006 written by an unknown source.

Five comments were received during initial scoping. Using the comments from internal scoping, the public, other agencies, and associations and the interdisciplinary team, a list of issues was developed.

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…."

Significant Issues

The Forest Service identified the following issues which will be analyzed in detail in the EIS. In most cases, a design criteria has been developed to minimize impacts (**Table 2-2**), one was used to develop another alternatives (Inventoried Roadless Areas), and the remainders were addressed through impact analysis in Chapter 3.

Socioeconomic

Loss of coal mining at the West Elk Mine would be a loss of revenue to the local economy. Local impact on social and economic conditions may be measured in terms of revenue generated and jobs maintained.

Wildlife

The addition of roads and pads may fragment or destroy habitat for threatened, endangered, sensitive and management indicator species.

Noise and ground disturbing activity may disrupt an area that is important area for big game winter range and migration routes.

Granting relief from the timing restriction for the construction of the ventilation shaft and escapeway could affect big game on their winter range.

Soils and Geologic Hazards

Construction activities in areas with geologic hazards and fine textured soils may cause slope instability and increased erosion potential.

Vegetation

The addition of roads and pads may fragment or destroy habitat for threatened, endangered or sensitive plants.

Surface disturbance of riparian vegetation and associated habitats may increase sedimentation and erosion in surface waters.

The addition of roads and pads will remove vegetative cover necessary for forage and ground cover.

Ground disturbing activities may increase the potential for noxious weeds.

Cultural Resources

Ground disturbing construction activities may disturb cultural sites.

Land Uses, Including Recreation

Road construction, activities, and disturbance may affect existing land uses, visual quality, and recreational opportunities.

Inventoried Roadless Areas

Road construction in IRA may reduce the roadless character.

Roads and Facilities

Portions of existing roads may be used to access the project area and may receive increased traffic and wear-and-tear for the life of the mine.

Roads should be designed to accommodate purpose and weight of vehicles that will need to use the roads.

Visual Resources

Visual Resources will be impacted by well pads and access roads which will disrupt line, form and color patterns. Use of design criteria measures such as following contours and using irregular-shaped pads and rapid reclamation will minimize visual disturbance.

Livestock Management

Conflicts with livestock managers may occur in the vicinity of the existing corrals from road use.

Livestock AUMs may be temporarily reduced because of the reduction in forage due to construction activities and vegetation disturbance.

Livestock may concentrate along new roads causing additional disturbance.

Livestock may have reduced water availability due to subsidence of existing ponds.

Livestock may attempt to drink from MDW reserve pits if not fenced.

Air Quality

Fugitive dust emissions from construction activities/road use and venting of hydrocarbon gasses/vehicle emissions may affect air quality of Class I airsheds.

Methane emissions from wells would increase greenhouse gas emissions.

Water Quality

Construction and ground disturbing activities may cause a decline in water quality.

Safety/Emergency Response

Mining operations are dangerous to well-being of the workers and the public using the area.

Cumulative Impacts

Many surface disturbing activities have been conducted in the vicinity of the project area including previous MDW projects, livestock grazing/management, recreational activities, and irrigation projects which all contribute to issues such as erosion, sedimentation/siltation.

Reasonably foreseeable action may affect resources analyzed.

Non-Significant Issues

Non-significant issues and reasons regarding their categorization as non-significant include:

- Wilderness character may be affected in the West Elk Wilderness due to activity in the adjacent roadless area. The area of the proposed action includes previously roaded areas of West Elk Inventoried Roadless Area. The West Elk Wilderness Area lies from one to three miles south and southeast of the project area. Therefore, there will be no effects to the West Elk Wilderness.
- Wilderness access may be curtailed by construction activities. Primary use of non-public project area access roads may reduce conflicts with recreational users.
- Global warming - methane is a greenhouse gas.

Other Analysis Completed in the Vicinity of the Project Area

1) Box Canyon Federal Coal Lease EA and DN, 1995.

2) Raven Gulch Coal Exploration License Environmental Assessment (EA) and Decision Notice/Finding of No Significant Impact (DN/FONSI), 1998.

3) Coal Lease Modifications for Federal Coal Leases C-1362 and COC-56447 EA and DN, 2001.

4) Coal Methane Drainage Project NEPA analyses and related decisions: Decision Memos from 2001; Panel 15 Methane Drainage Wells EA and DN/FONSI, 2001; Panels 16 to 24 EA and DN/FONSI, 2002; Sylvester Road Temporary Road Construction and Box Canyon Methane Drainage Wells EA and DN/FONSI, 2003.

5) West Flatiron Federal Coal Lease EA and DN/FONSI, 2003.

6) North Fork Coal EIS and Record of Decision, 2000.

7) Mountain Coal Company Geotechnical Boreholes Decision Memo, 2006

8) E-seam Development Methane Drainage Wells, Decision Memo, July 2005

9) Box Canyon Methane Drainage Wells Decision Memo, Dec. 2005

10) Dry Fork Coal Lease Final EIS, 2005 and Record of Decision, 2006.

11) Sylvester Gulch/Long Draw Supplemental EA and DN/FONSI, 2006.

12) Mountain Coal Company, Mining and Reclamation Plan for the West Elk Mine, including various consultants' reports on subsidence, vegetation, riparian resources, ground water, and Annual Hydrologic Reports on water monitoring.

13) USGS and Colorado Geological Survey reports on the local area.

CHAPTER 2
ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter describes and compares the alternatives considered for the Deer Creek Shaft and E Seam Methane Drainage Wells Projects. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

Alternatives Considered in Detail

In addition to the No Action Alternative (Alternative 1) and the Proposed Action (Alternative 2), the Forest Service considered several alternatives in response to issues raised by the interdisciplinary team, national policy changes, and input from other agencies, associations, and the public, however only the No Action and Proposed Action were carried for detailed analysis.

Alternative 1 - No Action

Under the No Action alternative, current management plans, existing approvals related to coal mining, and non-coal related activities would continue to occur or guide management of the project area. **Figure 2** displays activities that would continue under No Action. The proposed E Seam methane drainage well project and shaft construction would not be approved. Mining-related surface disturbance would not occur, or would be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, subsidence and related effects, etc. Surface activities related to development of the E Seam methane drainage within the West Elk IRA would not occur. Methane generated during mining operations would be handled through the existing mine ventilation system. The ineffectiveness of handling methane solely through the ventilation system would likely cause underground coal mining operations in the E seam to slow significantly or diminish entirely over time. This could result in a reduced capacity for MCC to meet its coal contractual obligations, create unsafe working conditions, and render the coal reserves uneconomical to recover. Further, there would be a decreased ability to recover currently leased federal coal reserves.

Alternative 2- The Proposed Action

The Forest Service proposes to authorize MCC to conduct surface operations associated with accessing, drilling, constructing, operating, and reclaiming 168 MDWs on 137 drilling locations, and one ventilation/escapeway shaft, and associated road construction or reconstruction. A portion of these activities is proposed in the West Elk IRA. Operations related to these authorizations are expected to begin summer 2007 and continue for about 12 years (**Figure 3**). Five of the drilling locations would also serve as staging areas. An additional six staging areas may be used, two of are currently reclaimed areas.

The proposed action includes granting relief from the lease stipulation on federal coal lease C-1362 that restricts activities between December 1 and April 30 for the protection of big game winter range to facilitate construction of the Deer Creek shaft.

The Forest Service would issue a SUA for these uses of NFS lands. The SUA would be consistent with the terms of the federal coal leases on which operations are proposed, and would include conditions identified in the environmental analysis and final Forest Service decision on the project.

Development of the Proposed Action

The proposed action was developed through several coordination meetings between the

Figure 2. No Action Alternative

Figure 3. Proposed Action

Forest Service Interdisciplinary Team (IDT) and MCC. Field trips with resource specialists were helpful in designing the project to minimize surface disturbance, and determining best management practices and design criteria to reduce environmental impacts that will be incorporated as part of the Proposed Action alternative. The Design Criteria of the proposed Action are shown on Table 2-2. Initial proposals by MCC included the shaft area only and evolved to include the C-1362 lease. After further consideration by the Forest Service, probable developments on the COC-67232 lease were included by the Forest Service.

Between scoping and issuance of the draft EIS, the Proposed Action was refined to address concerns and issues related to road access needs and identifying optimal locations for drilling sites to avoid areas with slope stability issues, riparian areas, and other areas with resource concerns. The IDT worked with MCC in a series of office meetings and field trips to realign segments of new road construction to reduce the amount of road construction by approximately 30 percent. Additionally, one-quarter (¼) mile of road construction off the C-1362 lease, but in the IRA, to access methane drainage wells on the lease was eliminated due to close examination by the FS.

The IDT and MCC also worked to place drilling locations so that multiple MDWs could be co-located on one well site as much as possible. Other refinements to the proposed action related to including operations in the West Elk IRA. The IDT initially considered evaluating operations in the IRA under separate alternatives based on lease issuance date, then considered evaluating operations within Lease COC-67232 that were within the IRA as a separate alternative. After reviewing the purpose and need for the project and the allowable exemptions to the RACR, it was ultimately determined that methane drainage operations related to developing E Seam reserves on the portions of all leases involved in the project that underlie the IRA could be included in the proposed action.

Additional recommendations were made by Colorado Division of Wildlife in a project meeting with regard to post-project road use, resulting in reclamation by obliteration of an existing full size road which was duplicative in purpose to another existing full size road.

Specific activities involved in the Proposed Action are given below:

Deer Creek Shaft Includes:

- Constructing a ventilation shaft to create an airshaft 20 to 28 foot diameter by 400 feet deep (**Figure 4**).
- Constructing an emergency escapeway 4 feet in diameter and 400 feet deep. Constructing an enclosure (20 foot by 30 foot steel-sided shed) for the emergency escapeway and electrical generation equipment for emergency escape hoist.
- Shaft and escapeway would use a previously approved and constructed pad and access road southeast of Minnesota Creek Reservoir (**Figure 3**).
- Performing Operations and Maintenance.
- Performing interim reclamation on pad and light-use (low-volume) road once shaft and emergency structures are constructed.
- Sealing airshaft and escapeway with concrete/steel structure 10 feet below ground surface and performing final surface reclamations when no longer needed at end of life of mine (mine life estimated at 13-15 years).

Additionally, due to unknown timing of mining operations, the Proposed Action includes analysis of the most surface disturbing method of shaft construction (conventional methods).

Disturbed area for the shaft is estimated to be 4 acres. Sub-soil stockpile is anticipated to be piled directly east of shafts. The only facilities visible on the surface associated with the ventilation shaft will be the collar and exhaust equipment.

Figure 4. Typical Shaft Construction

Anticipated noise and vibration issues include large frequent blasts, hoisting machinery, muck handling, ventilation fans, and large diesel powered generators.

E Seam Methane Drainage Wells (MDW) Includes:

- Drilling and casing of up to 168 MDWs located on up to 137 drill locations over 12 years on NFS lands. Five of the drilling locations would also serve as staging areas. An additional six staging areas may be used, two of are currently reclaimed areas.
- Constructing approximately 19 miles of new access road, over 12 years (approximately 2 miles of which involves upgrading existing ATV trails on NFS lands);
- Using and performing maintenance (upgrading) on approximately 4.8 miles of existing National Forest System Roads (NFSR);
- Installing passive and/or active degassing equipment;
- Operating and maintaining wells for ventilation of mine while recovering E Seam reserves;
- Interim reclaiming of mud pits, seeding and mulching outslopes and cut-slopes;
- Plugging drill holes and performing final reclamation on pads when drill holes (estimated life of each MDW is three years; construction and reclamation would span 12 years); and
- Decommissioning by obliterating new access roads and decommissioning existing roads to desired service level.

Access and Road Construction

Relative to road construction, the Proposed Action would authorize construction and use of about 23.8 miles of new roads necessary for these operations. About 19 of the 23.8 miles would be new road construction, and about 4.8 miles of upgrades to existing roads. The proposed action includes a 0.6-mile re-routing of an existing life of mine administrative access road to address issues related to geologic

Table 2-1
Raisebore/Blindbore Vs. Conventional Shaft Construction

	Raisebore/Blindbore	Conventional
Construction Time	6 months	18 months
Construction Season	Summer/Fall	Year-round
Winter Range Restriction Relief Needed?	No	Yes
Surface Disturbance Acres	1	4

hazards, sedimentation control and maintenance issues. The Proposed Action also includes authorizing use of approximately 5 miles of existing National Forest System Roads (NFSRs).

Proposal and analysis include approximately 3.2 miles of new roads (including the 0.6 mile re-route) associated with constructing or providing access to about 35 drill sites (17 individual drill sites are proposed in roadless) in the West Elk IRA. The Purpose of and Need for these locations have been approved by the Regional Forester as they fit exceptions to RACR (see Proposed Activities in IRA section below).

Access to and from the E Seam MDW drilling area and the Deer creek shaft would use a combination of County, existing NFSRs, existing life of mine administrative access roads serving the coal leases, and newly constructed administrative access roads as follows (**Figure 3**):

- Daily project traffic (with the exception of oversize vehicles) is required to access from the north via the Sylvester Gulch Road (approved as a temporary road in the 2002 *Coal Methane Drainage Project Panels 16-24 Environmental Assessment and DN/FONSI May 2002*, and modified to a life of mine (to 2030) road in the *2006 Supplement to Coal Methane Drainage Project Panels 16-24 Environmental Assessment for Sylvester Gulch Road Construction and Long Draw Saddle Extension Upgrade)*. Project traffic on the Minnesota Creek Road was an issue that has arisen from Delta County and the town of Paonia in previous analysis. The Sylvester Gulch Road is currently under construction.
- Oversize vehicles such as the drill rig and semi trucks would access from the west via Minnesota Creek Road in Delta County, Gunnison County Road 710, and NFSRs 710, 711. . . . .
- All project traffic would also use the existing life of mine administrative access roads known as the West Flatiron Road, Long Draw Saddle (and Extension), and NFSRs 710, 711, 711.2A and 711. 2B.
- About twenty-four miles of road construction or reconstruction between existing roads and new drill pads would occur. Approximately 3.2 of these miles are in the West Elk IRA. Approximate new road access disturbance is up to 69 acres (approximately 11.2 acres in the West Elk IRA;-7.4 acres associated with Lease COC-1362, 3.6 acres associated with Dry Fork Lease and 0.2 acres on Lease COC 56447) over 12 years. These roads would be for project and administrative use only, and would not be available for public use. These mileages would be decommissioned by obliteration after project use.
- An existing life of mine (i.e. to 2030) administrative access road in the SE1/4 Section 27, T 13S, R 90W would be re-routed to mitigate existing resource and maintenance problems due to geologic hazards, sedimentation and slope steepness. The existing administrative access road would be decommissioned by obliteration upon construction of the re-route. The existing access route and proposed re-route are both in the West Elk IRA. The re-route is about 0.6 miles, and would decrease the mileage of the existing route by 0.6 miles. The re-route would be decommissioned by obliteration at the end of mine life (about 2030). The re-route would be for on-lease activity and administrative use only, and would not be available for public use.
- Per decisions issued in 2002 and 2006 Long Draw Saddle life of mine road will be decommissioned to an ATV trail. However, this route will follow the existing route near “Bomb Rock”, not have a spur constructed to complete the trail.

The development of a road network in the project area poses a challenge because it is difficult to estimate project needs due to topographical and geological influences. Therefore, road placement is an estimate and would be refined in the field with appropriate design standards and mitigation measures on a site-specific basis. Additionally, well and pad placement would be based on need as established by the conditions in the mine as well as surface conditions and will be designed site-specifically as the project progresses. It is estimated that a lower number of wells would actually be needed than are proposed at this time.

Relief from Lease Stipulation

Conventional ventilation shaft construction[4] time is estimated at 16 to 18 months and would be constructed prior to underground mine operations reaching the shaft location. MCC is requesting relief from Winter Range Restrictions on lease C-1362 (December 1, 2007-April 30, 2008) to allow these emergency structures to be installed in a timely manner if conventional shaft construction is planned. If mine operation timing permits, a less disruptive shaft construction method may be used which would result in lower surface disturbance, less spoils, and would not require relief from the big game winter range lease stipulations.

While currently not anticipated, site-specific relief from lease stipulations relating geohazards, moderate or steep slopes, or riparian areas could arise during project implementation. The scale of stipulations mapping may not identify all surface features where the stipulation applies. This could require additional IDT review and analysis.

Proposed Activities in Inventoried Roadless Area

Operations are proposed on two active federal coal leases, and one federal coal lease effective date March 1, 2007. Portions of these are in the West Elk IRA. Approximately 3.2 miles of road construction is proposed on these leases in the West Elk IRA. The road construction is necessary for access to 35 sites for methane drainage wells. Seventeen of these sites would be located in the IRA. Roads proposed in the IRA would be for project and administrative use only, and would not be available for public use. A break down of activities proposed in IRA per lease is as follows:

C-1362

- Proposed on IRA portion of lease (including the 160-acre extension): 10 methane drainage well drill sites with 2.2 miles of road construction.
- Proposed on 160-acre modification: Two methane drainage well drill sites with one-tenth mile of road construction.
- Ventilation shaft/escapeway proposed on this lease is not in an IRA.

COC-56447

- Proposed on lease: approximately 240 feet road construction in IRA.

COC-67232

- Proposed on IRA portion of lease: 14 MDWs on 7 locations, and approximately 1 mile of road construction.

Road construction activities associated with methane drainage wells proposed in the West Elk IRA may be constructed or reconstructed because they are exempt from the prohibitions of the RACR under Exception No. 1 – protection of public health and safety in the cases of imminent threat that without intervention would cause loss of life or property. The road construction associated with the wells on the portion of lease C-1362 (that

[4] Conventional construction (top down) consists of all construction activities on the surface. All materials produced from the shaft sinking must temporarily be stored on the construction pad, including mine water discharge. Conventional sink/line construction is completed by excavating down to bedrock to install a concrete collar as the foundation for a hoist. The shaft is then sunk using drilling and blasting where all excess rock is removed and brought to the surface for temporary storage. A concrete shaft lining would be placed as the drilling and blasting proceeds.

which was leased in 1967), and the road construction on lease COC-56447 (leased in 1995) are also exempt from prohibitions of the RACR under Exception No. 7 – continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001.

The rationale for applying the exemptions from the RACR is as follows:

Exception No. 1 – protection of public health and safety in the cases of imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause loss of life or property.

- High levels of methane gas in the mine create unsafe working conditions for miners and must be reduced to acceptable levels under MSHA rules.
- High levels of methane gas in the mine can lead to loss of federal property if the leased, mineable coal is destroyed through explosive or thermal events and cannot be mined.
- The only way to reduce methane to safe and acceptable levels is to install the methane drainage wells, which require temporary roads.
- Exception applies to all proposed road construction associated with methane drainage wells on all IRA lands included in the federal coal leases on which operations are proposed.

Exception No. 7 – continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001

- The roads to access methane drainage wells are needed for coal mining operations and continuation of leases on lands that were under lease as of January 12, 2001.
- Exception applies to proposed road construction associated with methane drainage wells on all IRA lands included in the federal coal leases C-1362 and COC-56447 on which operations are proposed (except for a 160-acre lease modification which extended lease C-1362 on Oct. 2001).

The need for proposing operations on the federal coal leases that overlap with the IRA is based upon the configuration of the mining operations, meeting MSHA approval for the mine ventilation plan (which includes having adequate methane drainage facilities), functionality of the mine ventilation system, and limitations on using directional drilling because of overburden thickness.

General mining operations for recovering the E Seam reserves at the West Elk Mine include developing longwall panels in oriented in a southeast to northwesterly direction. Mining these panels would occur from southeast to northwest. The configuration of the mine plan in federal coal reserves is reviewed by the BLM to ensure that maximum economic recovery of the coal resource occurs. Thus, the projected mine plan is configured to ensure that all recoverable reserves are included.

Based on experience mining B Seam reserves at other parts of the West Elk Mine, MDWs work most efficiently when placed on the "headgate" side of the longwall panel where fresh air is brought into the active workings by the ventilation system. If MDWs are not placed in this manner, then the ventilation system 'fights' with them and makes them less efficient, which leads to reduced capacity to regulate the amount of methane in the workings leading to safety concerns and operational downtime. For the E Seam reserves, to maximize efficiency, the MDWs are placed on the north side of the planned longwall panels where the headgate for each panel will lie. The alignment of the longwall panels and need to place MDWs near the headgate side requires that these facilities be placed in the IRA.

Spacing requirements for MDWs of 750 feet are currently directed by MSHA based on anticipated mine conditions as submitted in a Mine Ventilation Plan provided by MCC, as is the need for additional ventilation at the beginning of a longwall panel which is also the limit of recoverable E Seam coal reserves. The

development and implementation of a mine ventilation plan requires several steps as outlined below:

Conceptual mine plans are developed to recover the mineable coal deposit.

Ventilation layouts are then applied to the mine plans and are used to help distinguish the most feasible plan to meet the following criteria:

- Provide for the health and safety of all miners;
- Comply with the Federal Coal Mine Safety Standards (30 CFR Part 75). The Department of Labor is charged with enforcing these laws/standards. MSHA represents the Department of Labor in the field by physically inspecting each mine; and
- Provide ventilation for the safe production of coal in today's competitive market place.

Ventilation engineering firms develop computer models of the mine ventilation system based on exiting mine ventilation to project ventilation needs for proposed future mining.

The projected ventilation plan is taken to MSHA for preliminary discussion. Several meetings with MSHA usually result in a plan ready for submittal.

MSHA reviews the submitted plan and can either reject it or approve it. Once MSHA approves a plan the contents of that plan become part of the "Standards" (30 CFR Part 75) that MSHA enforces as the mining takes place.

The approved ventilation plan changes as the mining advances and each change has to be submitted to MSHA for review and approval before it can be implemented.

Given the prior experience with effective methane drainage at the West Elk Mine, it is anticipated that a MDW would be needed every 750 feet along each longwall panel in order to meet MSHA approval requirements for the mine ventilation plan. Based on the mine plan configuration with panels extending under portions of the IRA, ventilation plan requirements convey the need to place MDWs and access roads to them in the IRA.

The proposed action has been designed to use directional drilling to the maximum extent possible. However, this is limited by the thickness of overburden (or amount of rock) overlying the E seam. This limited thickness of overburden precludes the ability to drill exclusively from outside the IRA boundaries and hit the MDW targets needed in the ventilation plan. Although use of directional drilling opportunities has been used as much as possible, in places the overburden is not thick enough for directional drilling either from outside the IRA to be practical or possible, therefore some of the operations and hence road construction, would be placed in the IRA.

Reclamation

A plan for reclamation would be submitted through the DRMS permitting process and reviewed by the Forest Service. These plans would be consistent with State requirements, identified post-mining land uses consistent with Forest Plan direction, and incorporate any specific reclamation goals identified in this analysis. Goals of the plan, consistent with DRMS and FS standards include slope stabilization and naturalization; sedimentation and siltation control to protect water quality of near-by surface waters; and meeting requirements to restore roadless character; return soil productivity as much as possible; and restore vegetative vigor, health, species composition and diversity to support post-mining land uses and Forest Plan goals.

Reclamation of MDW sites and roads would be contemporaneous with construction when facilities are no longer needed for mine operations in that panel except for life of mine roads.

Design Criteria

The Forest Service also developed the following design criteria measures (**Table 2-2**) to be used as part of the action alternative.

Table 2-2 Design Criteria	
Topic	**Design Criteria for the Proposed Action**
TRANSPORTATION SYSTEM	
Existing Roads	Existing roads would be left in a condition equal to or better than that observed on MCC's entry into the area or to the satisfaction of the USFS representative. At the completion of mining operations MCC will blade and crown all roads; shape and repair shoulders; clean all culverts and drainage ditches; and perform all other road maintenance work necessary to insure satisfactory functioning of the road drainage system. FS Roads 710, 711, Horse Gulch Road (711.2b) and Sylvester Gulch Roads would be used to access area. Access to the area would primarily be on the Sylvester Gulch Road. Periodically large vehicles may need to mobilize via the county portion Minnesota Creek Road, however use will be minimized. Roads will be kept clear of slides, fallen timber, and overhanging brush which obstructs visibility.* Gravel or other selected surfacing material will not be bladed off of roads. Two segments of existing full-size road upgrades (totaling approximately ½ mile) in Poison Gulch connecting to Elijah Park will remain open to allow public hunting access as recommended by Colorado Division of Wildlife to Elijah Park. Existing "loop" road in T 13S, R 90W Section 33 and T 14S, R 90W Section 4 will be decommissioned by obliteration at the end of the project, but existing spurs in T 14S, R 90W, W1/2 Section 4 connecting Deer Creek Road to private will remain open to allow public hunting and private access without duplication of routes as recommended by Colorado Division of Wildlife. MCC must provide specific improvement and use parameters using the AASHTO design criteria (Guideline for geometric design of very low volume roads (2001 edition) and Design guide for pavement structures (1993 edition)) or as approved by Forest Engineer, to be designed by a Colorado Registered Professional Civil Engineer, and submitted for USFS approval for each road segment. The Engineer's recommendations must be approved and implemented before any project related traffic may use that part of the NFSR system. During the course of the project the Forest Service will provide oversight of road improvement activities and continued monitoring of road conditions resulting from project related traffic. For roadway section with 6 inches OR LESS of new structural surfacing section or existing surfacing sections with any aggregate segregation or contamination by intruding fine materials, no rutting, pumping or plastic deformation of the roadway surface will be allowed. Rutting, plastic deformation, or pumping of the surface will result in the proponent's operations, on that road, ceasing immediately and remaining shutdown until repairs and improvements are made to prevent additional damage to the structural section. For surfacing sections with GREATER THAN 6 inches of new structural surfacing section any rutting, pumping or plastic deformation in excess of structural section thickness (T) divided by 3 (T/3) will not be allowed and will result in proponent's operations, on that road, ceasing immediately and remaining shutdown until repairs and improvements are made to prevent additional rutting. This T/3 limitation applies to any forest road utilized by the proponent, even if it is not part of the project area or transportation plan. Once shutdown, operations will not resume until approved repairs or improvements are made to resolve the problem.

Table 2-2
Design Criteria

Topic	Design Criteria for the Proposed Action
	resume until approved repairs or improvements are made to resolve the problem. These limitations apply to any NFSR even if it is not included in the project area or transportation plan. Previously approved ATV trails upgraded for project use would remain open following project completion and would be decommissioned to ATV trails.
New roads	Light-use or low-volume roads (designed to applicable design standards based on American Association of State Highway and Transportation Officials (AASHTO) "Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT<400) Low Volume Road Standards) and pads will be graveled. Surfacing access roads, including open channel crossings of minor tributaries should utilize gravel or crushed rock on the running surface of the road to reduce ongoing erosion of the channels by vehicle traffic. New roads will be laid out on top of ridges (or the top one-third of hillside) to avoid wet areas and improve road stability. Stream crossings will be minimized in number and engineered to protect streams from sedimentation and erosion and will additionally be laid out at right angles to flow.* Outslope access roads to promote removal of water from the road surface. Surface drainage structures shall be constructed at appropriate intervals to divert water from roadway surface. . . . . Relief ditches at regular intervals to direct drainage off of the road grade and into vegetated areas. Ditches would be allowed to vegetate or include large rocks or stones to slow the velocity of drainage and allow sediment to settle out. Where drainage ditches are installed to direct runoff away from the road, water bars or hay bale dikes would be installed perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out sediment on steeper grades. Road construction plans would identify specific locations of drainage features and BMPs for approval by the FS prior to construction. Road design packages will be submitted to the FS for approval prior to any construction activity. Project access roads will be gated and closed year-round to the general public. Personnel with access will be monitored to insure such access is not abused; i.e., no access during non-working hours for purposes unrelated to the project such as hunting or off-roading. All access roads constructed for the sole use of this project will be decommissioned by obliteration when no longer needed for the project and reclaimed.
Roads in Inventoried Roadless	Any approved road construction or reconstruction in Roadless that are excepted by RACR must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulation, and laws. Roads constructed or reconstructed must be obliterated when no longer needed for the purposes of the lease or upon termination of expiration of the lease, whichever is sooner.
Staging Areas	Staging areas will be used in a manner to minimize damage to vegetation. Any surface disturbances to these sites would be re-graded and seeded.

Table 2-2 Design Criteria	
Topic	**Design Criteria for the Proposed Action**
Maintenance	Roads will be maintained with water bars and appropriate sedimentation controls. Water bar placement and design will be approved by the authorized FS Officer. All use and maintenance of existing NFSRs will be authorized by and be consistent with a FS Road Use Permit. A performance bond will be required per the terms of the road use permit.
WATER RESOURCES	
Ground Water	Any aquifers encountered in the shaft will be sealed by a grout curtain wall extending 20 feet above and below aquifer. Each drill or borehole, well, or other exposed underground opening sealed, or otherwise managed to prevent acid or other toxic drainage from entering ground or surface waters and minimize disturbance to the prevailing hydrologic balance.
Surface Water	Lease stipulations limit occupancy in riparian areas, wetlands and floodplains. Surface use in wetlands, floodplains or riparian areas will be avoided unless specially authorized.* Streams will not be paralleled by roads other than that needed for crossings.* Wetland areas would be avoided wherever possible and BMPs would be implemented for all activities to occur adjacent to or within these aquatic features.
Water Quality	Material from slides or other sources on roads will not be deposited in streams or other locations where it will wash into streams.* Disturbances to the prevailing hydrologic balance of the affected land and of the surrounding area and to the quantity or quality of water in surface and groundwater systems both during and after the mining operation and during reclamation shall be minimized by measures, including, but not limited to: • compliance with applicable Colorado water laws and regulations governing injury to existing water rights; • compliance with applicable federal and Colorado water quality laws and regulations, including statewide water quality standards and site-specific classifications and standards adopted by the Water Quality Control Commission; • compliance with applicable federal and Colorado dredge and fill requirements; and • removing temporary or large siltation structures from drainways after disturbed areas are revegetated and stabilized, if required by the Reclamation Plan.
Drilling Water	Drilling water (< 10 acre-feet per year for shaft and MDW) will be obtained from MCC's non-tributary water in the mine or Minnesota Creek. This quantity of water is within the GMUG's blanket consultation with USFWS for depletion associated with the Upper Colorado River System. Water will be pumped from portable tanks using a high-pressure hose or transported to the site with mobile water carriers.
Water Influence Zone (WIZ)	Within WIZ, an adequate vegetative buffer or filter strip would be maintained to filter runoff from the road before it reaches the creek, wherever possible. All disturbed areas within 100 feet of a WIZ would be protected with silt fence or other sediment trapping materials specified by the FS.
Drill Holes as Water	MCC does not anticipate encountering any significant aquifers during drilling.

Table 2-2
Design Criteria

Topic	Design Criteria for the Proposed Action
Monitoring Wells	However, if it is decided by the Forest Service that groundwater monitoring is required by the state permit, drill holes may be used as monitoring wells.
WILDLIFE	
Threatened, Endangered and Sensitive Faunal Species	Appropriate populations or habitats will be surveyed on a site-specific basis prior to any ground disturbing activities and appropriate avoidance, buffering or other restrictions will be applied if threatened or endangered faunal species or their habitats are present.* Water depletions of the Colorado River System as they pertain to the four endangered fishes (associated with MDW drilling and shaft construction) have previously been consulted upon with the US Fish and Wildlife Service in a programmatic biological opinion. Avoid or minimize impacts to lynx habitat.[1] Restrict use to designated routes where over-snow access is required to protect lynx. [1] Minimize snow compaction during MDW monitoring to protect lynx. Use remote monitoring of sites if possible. [1] Restore suitable lynx habitat during reclamation activities. Reclaim and obliterate project roads at project completion. Close project-created roads to public access in lynx habitat. [1] Pre-disturbance surveys would be completed within the potentially impacted delineated wetland and two intermittent lakes, as specified by the Forest Service, to ensure that northern leopard populations are not adversely impacted. In the event that breeding northern leopard frog populations are documented within the surveyed wetlands, disturbances to these wetland areas would be postponed until early June and the completion of the breeding season (CDOW 2003).
Deer & Elk Winter Range	Irregular-shaped pads will be used to maximize edge-effect habitat. Minimize disturbance and access during crucial winter months to avoid stressing animals. Exploration, drilling and development will not occur between December 1 and April 30, unless specifically approved.* Habitat management and creation, if part of the Reclamation Plan, shall be directed toward encouraging the diversity of both game and non-game species, and shall provide protection, rehabilitation or improvement of wildlife habitat. To avoid collisions with game, MCC is encouraged to consider shift changes outside of dawn/dusk.
Raptors (including Goshawks)	Surveys will be conducted in appropriate habitats prior to construction activities. If nests are discovered, they will be appropriately buffered depending on species and/or will have timing restrictions placed on activities. In the event that a northern goshawk nest is identified during pre-disturbance surveys, nests would be protected by implementing a no-disturbance buffer of ¼ mile radius around the active nest site between the dates of March 1 and July 31.
Breeding/Migratory Birds	MCC will walk all areas to be disturbed during the breeding/nesting seasons to determine if there are nests (especially ground nests) present. If nests are occupied operations may be modified to avoid disturbance to the nesting birds.

Table 2-2
Design Criteria

Topic	Design Criteria for the Proposed Action
VEGETATION RESOURCES	
Threatened, Endangered and Sensitive Plant Species	Appropriate populations or habitats will be surveyed on a site-specific basis prior to any ground disturbing activities and appropriate avoidance and buffering or other restrictions will be applied if threatened or endangered plant species are present.*
Brush Removal/Tree Removal	Payment will be made to the Forest Service for any merchantable trees removed.
Fire Prevention	All equipment, including welding trucks, would be equipped with fire extinguishers and other fire fighting equipment as required by the Forest Service. Operating or using any internal or external combustion engine without a spark arresting device properly installed, maintained, and in effective working order, meeting either: (1) Department of Agriculture, Forest Service Standard 5100-1a (as amended); or (2) Appropriate Society of Automotive Engineers (SAE) recommended practice J335(b) and J350(a). 36 CFR 261.52(j) (Order # R2-2007-01)
Noxious weeds	Power-wash all construction equipment and vehicles prior to the start of construction. Any construction or operational vehicles traveling between the Project Area and outside areas would be power-washed on a weekly basis. Weed control would be conducted through an Approved Pesticide Use and Weed Control Plan approved by the Authorized Officer. Weed and reclamation monitoring would be continued on an annual basis (or as frequently as the Authorized Officer determines) throughout the life of the project. During sensitive plant surveys, any occurrence of Rocky Mountain thistle should be flagged and mapped to avoid inadvertent herbicide application during weed treatments. Species identification information should also be provided to the weed control agent to further decrease the likelihood of species misidentification.
VISUALS	
Visuals	Long-term surface facilities (such as the shaft) would be painted a standard environmental color selected by the Forest Service to better blend the facilities with their surroundings and thereby reduce visual impacts. Contours will be followed during construction, to the extent possible, so visual line and form is undisturbed. Vegetation removal will be minimized to prevent disruption of color. Irregular shaped pads will be used to minimize visual disturbance.
GEOLOGY, SOILS, MINERALS	
Topsoil	Where it is necessary to remove overburden in order to mine the construction material, topsoil shall be removed and segregated from other soil. If such topsoil is not replaced within a time short enough to avoid deterioration of the topsoil, vegetative cover or other means shall be employed so that the topsoil is protected from erosion, remains free of any contamination by toxic or acid-forming material, and is in a usable condition for reclamation. Where practicable, woody vegetation present at the site shall be removed from or appropriately incorporated into the existing topsoil prior to excavation within the affected areas. Topsoil stockpiles shall be stored in places and configurations to minimize erosion

Table 2-2
Design Criteria

Topic	Design Criteria for the Proposed Action
	and located in areas where disturbance by ongoing mining operations will be minimized. Such stockpile areas must be included in the affected areas and subject to all reclamation requirements. Immediate seeding of topsoil stockpiles for the purpose of stabilization may be required. Once stockpiled, the topsoil shall be handled as little as possible until replacement on the regraded, disturbed area. The Operator shall take measures necessary to assure the stability of replaced topsoil on graded slopes such as roughing in final grading to eliminate slippage zones that may develop between the deposited topsoil and heavy textured spoil surfaces. When growing media is replaced, it shall be done in as even a manner as possible. Fertilizer or other soil amendments shall be added, if required in the Reclamation Plan.
Subsoil	Minimize footprint of stockpile to limit disturbance. Use for regrading and contouring.
Erosion & Sediment Control	Erosion will be minimized through interim reclamation including, but not limited to, contouring, seeding and mulching. Sediment control measures such as, but not limited to, silt fence, straw mulch, site containment and sediment control ponds will be utilized as needed. Construction on steep slopes would be fully designed and engineered according to Forest Service standards and design criteria and should include an erosion control and maintenance plan.
Geologic Hazard	Leases contain stipulations restricting occupancy in areas of geologic hazards: Avoid areas with high geologic hazards to prevent mass slope failure in Section 32, T13S, R90W, 6th P.M. unless specifically approved by authorized officer.* Controlled Surface Occupancy Stipulation. Areas with moderate geological hazards will require analysis and mitigation plans detailing construction and mitigation techniques to ensure stability of facilities in portions of Sections 27-29 and 32-34, T13S, R90W, 6th P.M. and Sections 3-4, 9-10, T14S, R90W, 6th P.M. unless specifically approved by authorized officer.* No Surface Occupancy Stipulation- No operating on slopes greater than or equal to 60% or areas surrounded by slopes greater than or equal to 60% to prevent erosion, mass failure and loss of productivity in portions of Sections 27-29 and 32-34, T13S, R90W, 6th P.M. and Sections 3-4, 9-10 T14S, R90W, 6th P.M. unless specifically approved by authorized officer.* Controlled Surface Use Stipulation Surface use on slopes 40-60% will be subject to analysis and mitigation plans detailing construction and mitigation techniques to minimize potential for soil loss, mass land movement, revegetation failure and unacceptable visual impairment except as otherwise approved by authorized officer. This may apply to lands in portions of Sections 27-29, 32-34 T13S, R90W, 6th P.M. and Sections 3-4, 9-10, T14S, R90W, 6th P.M.*
Incidental Coal Recovery	Any coal recovered incidental to project will be taken back to the mine site or disposed of in the mud pits.

Table 2-2
Design Criteria

Topic	Design Criteria for the Proposed Action
AIR QUALITY	
Surface Air Quality	Road watering and/or treatment with dust suppressant on the access road during the short-term construction and development activities will minimize vehicle-related fugitive dust emissions. To the extent feasible, project workers would car pool to and from surrounding cities and towns to minimize vehicle-related emissions and fugitive dust emissions.
RECREATION	
Recreation	To avoid near-miss accidents between hunters and drillers, MCC will be encouraged to avoid operations on Minnesota Creek Road from the Thursday before the second hunting season opener (mid-October) to the Wednesday after the second hunting season opener.
CULTURAL RESOURCES	
Cultural Surveys/ Paleontological Resources	Prior to the construction process, an intensive cultural resources survey would be completed by the Proponent, at their expense, on all areas proposed for surface disturbance if it has not already been inventoried per requirements of the Standard Notice for Lands Under Jurisdiction of the USDA attached to the leases. During project implementation, in the event of an inadvertent discovery of any other cultural resources not covered under NAGPRA (above), work should cease and an archaeologist should be notified to investigate the resource. Any cultural resources located will be brought to the immediate attention of the Forest Service and BLM and will be left intact until directed to proceed by the agencies. All data and materials recovered will remain under the jurisdiction of the U.S. Government
CONSTRUCTION ACTIVITIES	
Interim reclamation	Interim reclamation will be done through seeding of ungraveled areas. Stabilization of steep cut slopes that will remain unreclaimed over a winter or longer will be stabilized through placement of native boulders. Armor well pad fill slopes with excavated rock and/or slash vegetation (brush, branches, and other slash vegetation) to reduce the velocity of rain drops and subsequent erosion. All areas not necessary for the continued operation of the wells would be reclaimed following well plugging. All cut slopes would be aggressively re-vegetated (hydro-mulch seeded and fertilized, if necessary) following the completion of construction to help stabilize these disturbed sites. Post-construction seeding applications would continue until determined successful by the Forest Service.
Onsite Inspections	Prior to any construction, onsite inspections with appropriate regulatory agencies will be held to discuss site-specific concerns.
DRILLING & COMPLETION OF MDWS	
Mud Pits	When the mud pits are sufficiently dry they will be filled with stored sub-soil material and compacted to minimize any settling.

Table 2-2
Design Criteria

Topic	Design Criteria for the Proposed Action
Water use	Drilling water will be reused as available.
Operations & Maintenance Activities	
Emergency Shaft	Hoist and generator will be tested weekly per MSHA requirements to assure functionality. A 1,000 gallon propane tank for generator will be buried in pad. The generator for shaft will be muffled to reduce noise during the testing periods.
Site Security	A 6-foot high, locked, chain-link fence topped with barbed wire will surround shaft escapeway to preclude wildlife and public. Solar powered lighting of shaft and emergency escapeway will be used to avoid installation of a powerline.
De-gas installation	Degassing trailer will be enclosed with a fence with a locking gate to preclude public, livestock, and wildlife entry. Equipment will be inspected by MSHA prior to installation.
Monitoring of MDWs	Twice daily initial inspections of active de-gas installation then decreasing to weekly.
RECLAMATION ACTIVITIES	
Closure	Shaft and emergency escapeway would be capped with concrete and steel structure below ground surface and backfill material would be used to cover the caps. Caps would consist of 6 inch layer of concrete poured onto a steel screen supported by a steel beam frame installed 10 feet below the ground surface. Concrete collars would be removed and the area re-graded to approximate original contour and re-vegetated.
Revegetation	Subsurface ripping would be used to reduce compaction prior to replacement of the topsoil and seeding. Successful revegetation (measured by 75% cover of adjacent undisturbed ground after 2 growing seasons in upland areas and 80% ground cover in riparian areas) of disturbed ground with native vegetation. Surface will be left roughened (“pocking”) as part of the seed bed preparation. Revegetation of all reclaimed areas would include reapplication of seed (and a Forest Service recommended fertilizer if necessary) and periodic watering by the operator if revegetation is unsuccessful within two growing seasons after construction is completed. Varying seed mixes may be used for revegetation, one that is designed for wildlife, and one that is designed for livestock to support the post-mining land uses.
Reclamation Plan	A Reclamation Plan (reviewed by the Forest Service), submitted as part of a DRMS mine permit revision, prior to any construction activities, will include, but not limited to, methods, seeding species and seeding rates.
COMPLIANCE REQUIREMENTS	
SMA Requirements	Operator shall comply with applicable requirements of surface management agency (30 CFR 815.15) or approved State program.
Plugging Requirements	Bottom 50-feet of the continuously cored hole would be plugged with cementatious grout to prevent water from entering the mine following Deer Creek Shaft Construction.

Table 2-2 Design Criteria	
Topic	**Design Criteria for the Proposed Action**
	When no longer needed for its intended use each drilled hole or borehole, wells, or other exposed underground opening shall be capped, sealed, backfilled, or otherwise properly managed, as required by the Division and consistent with 30 CFR 75.1711. Permanent closure measures shall be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters. Exploration holes, drill holes or boreholes, wells or other exposed underground openings not completed to aquifers shall be sealed by replacing cuttings or other suitable media in the hole and placing a suitable plug 10 feet below the ground surface to support a cement plug or other media to within 3 feet of the ground surface. The hole will be marked. A surface plug shall be placed in accordance with 4.07.3(1) and the hole shall be marked.

*Federal Coal Lease Stipulation

[1]Canada Lynx Conservation Assessment and Strategy

Developments Associated with Project Proposal

Constructing an estimated 0.7 miles of road on private land and drilling and casing of up to 19 MDWs at up to 17 sites on private land.

The effects of these activities are considered in the effects analyses in Chapter 3. Without the development on the FS, it is unlikely that these developments would occur.

Other Permits/Plans Required or May Be Required

- NPDES Permit;
- SPCC Permit;
- 404 Permit-Proposed crossing of jurisdictional drainages to follow the permit conditions identified by the Army Corps of Engineers in the 404 permit;
- Special Use Authorization issued by the Forest Service (required);
- Road Use Permit issued by the Forest Service (required). MCC has an existing road use permit, however additional mileage may need to be added and performance bond may need adjustment;
- Approved Pesticide Use and Weed Control Plan; and
- Mine permit revision through DRMS.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of compliance with Mine Safety and Health Administration requirements for methane gas management, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

Flaring of Methane Gas

Flaring of methane gas may cause mine explosions due to fluctuations in the levels of methane. This is an undesired condition and is not approved by MSHA.

Capture/Use of Methane and Leasing of Coal Mine Methane

Capturing the coal mine methane rather than allowing it to vent was brought forward as an alternative. The natural gas that occurs in the coal seams and adjacent strata that will be encountered during production of the E seam coal reserves in the project area is considered a federal resource that is managed by BLM. Lands in the project area were identified in the GMUG's 1993 Oil and Gas Leasing EIS as having high potential for oil and gas to occur, and made available and authorized for oil and gas leasing. Gas lease nominations have been made for the project area, however none of the parcels has been offered for lease. Absent an oil and gas lease, the methane encountered as a byproduct of the mining cannot be captured and put to beneficial use. Further, the BLM has identified that mineral resources occurring the area within the boundaries of the Somerset coalfield under 3,500 feet of overburden will be managed for recovery of coal reserves. The project area falls within these boundaries. Should the gas lease nominations come up for sale, they could be purchased and the coal mine methane could then be captured, however infrastructure (including pipelines, compression facilities, etc) would have to be installed in order to transport gas from the collection points. This alternative was not considered in detail because it does not meet the purpose and need.

Methane Drainage Wells only on Currently Leased Coal Areas

Public comment requested that the project be limited to areas within existing federal coal leases. It was mentioned that a decision to allow the methane drainage wells in currently unleased areas would serve to improve the prospects of leasing and developing unleased federal land. This alternative was not considered in detail because, with the sale of the Dry Fork Lease effective date March 1, 2007, all lands in the project area have been leased.

Use Horizontal Boreholes or Longhole Horizontal Boreholes

Mine Ventilation Plans including design of ventilation system are approved by MSHA from submittals and measurements made by MCC. Based on preliminary plans these types of boreholes alone are inadequate for proper ventilation and efficient mine operations. These methods are already used by MCC where possible.

Directionally Drill MDWs from Outside IRAs

Directional drilling is limited by the thickness of overburden (or amount of rock) overlying the coal E seam. This limited thickness of overburden precludes the ability to drill exclusively from outside the IRA boundaries and hit the MDW targets needed in the ventilation plan. Therefore, use of directional drilling opportunities has been used as much as possible, however because in places the overburden is not thick enough that directional drilling either from outside the IRA is practical or possible, therefore some of the operations must be placed in the IRA

Do Not Construct Roads or MDWs in IRAs

An alternative that included acreage in the IRA separately was considered, but eliminated from detailed study because, with Regional Forester approval of access roads to MDWs for health and safety reasons under 2001 RACR exception, it was determined unnecessary to analyze separately. Roadless will instead be analyzed as part of the Proposed Action. In addition, some areas that do not fall under the exceptions of the 2001 RACR will not be implementable, but will be analyzed in the event the RACR is changed.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative considered in detail. Information in the table is focused on activities and effects where different levels of

effects or outputs can be distinguished quantitatively or qualitatively among alternatives. The analysis assumed that since coal could not be mined economically without the methane drainage, ventilation shaft and escapeway, the Alternative 1 would result in previously leased coal not being mined from the area affected. As discussed earlier in this chapter, the no action alternative would likely cause underground coal mining operations in the E seam to slow significantly or diminish entirely over time, due to the economic feasibility.

Table 2-3
Comparison of Alternatives

	Alternative 1 **No Action (not final)**	**Alternative 2** **Proposed Action (not final)**
Workforce	Maintain current level of employment at West Elk Mine through 2008.	Maintain current level of employment at West Elk Mine through about 2015.
Revenues Generated (includes royalties)	No revenue or royalties received if coal not mined	$ 729 million
Coal Supplied	0 tons after 2008	75 million tons
Safety of mine workers	Mine worker safety protected through mine closure	Mine worker safety protected through adequate ventilation and escapeway.
Threatened, Endangered, Sensitive Species	No effect	Short-term loss of winter habitat for bald eagles. Short-term loss and temporary disturbance of Canada lynx habitat. Mitigation measures would ensure that species would not be adversely affected.
Management Indicator Species	No effect	Short-term loss of habitat and temporary disturbance for those MIS occupying the project area. Species may be temporarily displaced, but there would be no long-term impacts and population viabilities would not be reduced.
General Wildlife	No effect	Short-term loss of habitat and temporary disturbance for those wildlife species occupying the project area. Species may be temporarily displaced, but there would be no long-term impacts and population viabilities would not be reduced
Winter Range	No effect	Request relief from lease stipulations. This would result in some temporary disturbance and short-term loss of winter range, but long-term impacts would not occur.
Topographic surface	No change	Subsidence above the mined area
Land Stability	No effect	Minimal risk of destabilizing slopes
Soils	No effect	Maximum of 210 acres disturbed
Geologic hazards	No effect	Minimal risk of hazards due to slope, landslide and mass wasting

Table 2-3 Comparison of Alternatives		
	Alternative 1 No Action (not final)	**Alternative 2 Proposed Action (not final)**
Minerals	No additional coal removed	75 million tons of coal removed
Range Resources	0 acres disturbed	Maximum of 164 acres of Gambel oak, and 13 acres of grass/shrub disturbed
Wetlands	No effect	Minimal risk of vegetation disturbance
Forest	0 acres disturbed	Maximum of 106 acres of aspen and 3 acre of spruce-fir disturbed
Recreation	No impact	Some seasonal modification of recreational user's activity and access during the construction and operation of the methane drainage. Opportunities for semi-primitive motorized and non-motorized activities would be negatively impacted
Inventoried Roadless Area	Road use associated with the previously approved methane drainage activities would continue	0.6 miles of upgraded OHV access and ~2.5 miles of new road within IRA
Grazing	No impact	Short term decreases in available AUMs and potential long term increase in forage at reclamation sites in Gambel oak types
Roads	No impact	6.8 miles of upgraded roads and ~19 miles of new road, short term and periodic access restrictions on NFSR 711
Impacts on Visual Quality Objectives	No impact	Effects are consistent with partial retention VQO
Impacts to Class I Airsheds	No impact	No impact
Gaseous emissions (NO_2, SO_2, and CO)	No effect beyond current levels	36,000 pounds per year
Greenhouse gas (methane) emissions	No additional emissions	Less than 0.1% concentrations 50 meters from the source
Fugitive dust	No impact	32,000 pounds per year or less
Impacts to surface water flows and surface water quality, and riparian habitat	No effect	Minimal effect on surface water quality, 13 new stream crossings, ~6 acres of new and upgraded road disturbance in water influence zone with a maximum of 18 acres of riparian vegetation disturbance

Table 2-3 Comparison of Alternatives		
	Alternative 1 No Action (not final)	**Alternative 2 Proposed Action (not final)**
Impacts to ground water levels and ground water quality	No effect	No effects on ground water quality or quantity

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter describes the existing condition of the physical, biological, and social resources within the project area that may be affected and the direct, indirect, and cumulative effects of the alternatives described in Chapter 2. More detailed information on each resource can be found in the project file.

Direct, indirect, and cumulative effects are analyzed in context of the geographic and temporal scope of the project discussed in Chapter 1.

Short-term and Long-term Effects

Unless otherwise specified, short-term is the life of the project (approximately 12 years). Long-term effects are defined as those that would occur after use of the MDWs is complete.

Direct and Indirect Effects

Direct effects are caused by the action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable.

Direct and indirect effects analysis for each alternative and each resource are based on description of the alternatives provided in Chapter 2, including design criteria included in Table 2-2, and assumes all would be implemented as described.

Cumulative Effects

Cumulative impacts are impacts on the environment that result from incremental impact of the action when added to other past, present, and reasonably foreseeable future action. For each resource, an analysis area was defined to adequately measure cumulative effects of each alternative. Reasonably foreseeable surface use described below is considered in the direct and indirect effects analysis and in the cumulative effects section.

Past, Present and Reasonably Foreseeable Actions

West Elk Coal Mine

1981 to present, Future

The mine has been operating for 25 years and holds about 6,348 acres of Federal coal leases. Subsidence on the GMUG and BLM lands has occurred immediately north of the Dry Fork LBA tract. Minor surface tension cracks are visible in places on the surface. Topography has lowered between two and ten feet across the existing subsided areas. Mine life is currently projected for 12 additional years. No future development of the mine is proposed at this time, leaving only reclamation activities following mining of the E-seam.

Coal Exploration Drilling

1990s

Several drill holes dating from the 1970s and 1990s are within project area. Some access roads are still visible. Reclamation success has returned lands to prescribed uses. Road closures and/or obliteration are inhibiting traffic.

Methane Drainage Drilling

2001 to present

MCC was approved in 2002 for installing 58 methane drainage wells from 46 locations over existing leases.

Range use/ improvements

Past 100 years

NFS and BLM lands have been grazed for many years and are currently managed on an

intensive time-controlled system. MCC also leases private land for grazing. No changes in the grazing system are planned. Existing range features and improvements include stock trails, stock tanks, and fences.

Recreation

Past 20 years, Present and Future

The project area has no developed recreation sites. Dispersed recreation includes camping, use of all-terrain vehicles (ATVs), and horseback riding on a limited basis. Occasionally, the Dry Fork Road (National Forest System Road NFSR 711) is used for dirt bikes and mountain cyclists. Primary use occurs during hunting seasons. No recreation developments are planned.

Special Use Authorizations

Past 100 years, Present and Future

Minnesota Canal and Reservoir Company has a ditch, cabin, flumes, culverts and headgates, and appurtenant facilities under permit that convey water from an adjacent drainage basin (Little Gunnison Creek) into the ditch for transport to Dry Fork of Minnesota Creek to Minnesota Reservoir. Maintenance activities occur annually.

Road and Trail System

Past 30 years and Present

Forest Road (FR) 711 is the primary access used by forest visitors, range and special use permittees, and MCC. The road is low standard and maintained for travel in high clearance vehicles. MCC has performed maintenance in the past 10 years on portions of road. Other temporary roads have been constructed and reclaimed in the past 15 years for coal exploration or other drilling purposes. Simple decommissioning techniques such as blocking the routes have not been as effective as complete obliteration and reclamation of temporary roads by eliminating the use of these road prisms.

User-created off-highway vehicle (OHV) trails have proliferated in the area in the last 10 years and are expected to continue as recreational use of OHVs grows.

Air Quality

Affected Environment

Air quality in the study area is affected by activities currently conducted within the area. The study area for direct, indirect and cumulative effects is defined here as County of Gunnison (approximately a 40-mile radius around the City of Gunnison). Activities occurring within the study area that affect air quality include fixed facilities such as coal mining and subsequent coal mining operations (e.g., loading), concrete mix plants, gravel pits, lime storage facilities, natural-gas fired electrical generating plants, natural gas dehydration facilities, landfills, and crematoriums, etc. Portable source examples include facilities such as gravel crushers, associated processing equipment, and asphalt plants. Smoke from grass and forest fires from late spring through early fall can affect air quality depending on the year.

Potential impacts to air quality from installation of the methane drainage wells and the ventilation/escapeway shaft were evaluated using the type and source of priority pollutants (e.g., equipment engines emissions and dust from construction activities) and air regulations (including emission standards, as applicable) pertinent to the project.

Baseline information for air resources in the study area was derived from the 2006 Supplement to Coal Methane Drainage Project Panels 16-24 Environmental Assessment for Sylvester Gulch Road Construction, Long Draw Saddle Extension Road Upgrade (USDA 2006b), and Final North Fork Coal EIS (USDA FS 2000). Base information includes data such as area impacted by construction activities (e.g., drill pad areas, length of roads, etc.)

equipment type, and duration of construction and the project.

Comparative information, such as ambient air quality, atmospheric conditions, and existing air emission sources, were derived from databases maintained by the United States Environmental Protection Agency (U.S. EPA 2006a) and Colorado Department of Public Health and Environment, Air Pollution Control Commission (CAPCC 2006a). Regulatory standards for air quality (e.g., criteria pollutants) were obtained from U.S. EPA (U.S. EPA 2006b) and Colorado Department of Public Health and the Environment Air Pollution Control Commission (CAPCC 2006b).

Area Air Quality

The federal government and CAPCC have established ambient air quality standards for criteria air pollutants. The criteria pollutants are carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 microns (PM_{10}), ozone, and nitrogen dioxide (NO_2). In 1997, the U.S. EPA revised the federal primary and secondary particulate matter standards by establishing annual and 24-hour standards for particles 2.5 micrometers in diameter or smaller ($PM_{2.5}$).

Ambient air quality standards must not be exceeded in areas where the general public has access. **Table 3-1** lists federal and state air quality standards. National primary standards are levels of air quality necessary, with an adequate margin of safety, to protect public health. National secondary standards are levels

Table 3-1
State of Colorado and National Ambient Air Quality Standards

Pollutant	Averaging Time	Air Quality Standard Concentration [(a)]	
		Colorado	National
Ozone	1 hour	235 μg/m^3 (0.12 ppm)	235 μg/m^3 (0.12 ppm)
	8 hours	--	157 μg/m^3 (0.08 ppm)
Carbon Monoxide	1 hour	40,000 μg/m^3 (35 ppm)	40,000 μg/m^3 (35 ppm)
	8 hour	10,000 μg/m^3 (9 ppm)	10,000 μg/m^3 (9 ppm)
Nitrogen Oxides	Annual Arithmetic Mean	100 μg/m^3 (0.05 ppm)	100 μg/m^3 (0.053 ppm)
Sulfur Dioxide	Annual Arithmetic Mean	10 μg/m^3 (0.004 ppm)[(c)]	79 μg/m^3 (0.03 ppm)
	24 hours	50 μg/m^3 (0.02 ppm)[(c)]	367 μg/m^3 (0.14 ppm)
	3 hours	--	1,310 μg/m^3 (0.5 ppm)[(b)]
Particulate Matter as PM_{10}	Annual Arithmetic Mean	50 μg/m^3	50 μg/m^3
	24 hours	150 μg/m^3	150 μg/m^3
Particulate Matter as $PM_{2.5}$	Annual Arithmetic Mean	--	15 μg/m^3
	24 hours	--	65 μg/m^3
Lead (Pb)	Quarterly Arithmetic Mean	--	1.5 μg/m^3

Note: μg/m^3 = micrograms per cubic meter; ppm = parts per million; PM_{10} = Particulate Matter smaller than 10 microns; $PM_{2.5}$ = Particulate Matter smaller than 2.5 microns.

Sources: Colorado Code of Regulations (CCR) 5 CCR 1001-14 and Code of Federal Regulations, 40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards

(a) Primary Standard unless otherwise noted

(b) Secondary Standard

(c) Category II increment per 5-CCR-1001-14

of air quality necessary to protect public welfare from known or anticipated adverse effects of a regulated air pollutant.

The attainment status for pollutants within the project area is determined by monitoring levels of criteria pollutants (carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 microns (PM_{10}), ozone, and nitrogen dioxide (NO_2)) for which National Ambient Air Quality Standards (NAAQS) and Colorado Ambient Air Quality Standards exist. Air quality in the study area is designated as attainment for all criteria pollutants. The attainment designation means that no violations of Colorado or national air quality standards have been documented in the area.

No data is available regarding current ambient methane concentrations in air, because methane is not a regulated constituent.

PSD Classification

The area surrounding the study area is designated a Class II area, as defined by the Federal Prevention of Significant Deterioration (PSD) provision of the Clean Air Act. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. Industrial emission sources proposing construction or modifications must demonstrate that the proposed emissions will not cause significant deterioration of air quality in all areas. The standards for significant deterioration are more stringent for Class I areas than for Class II.

Federal/State Mandatory Class I Areas located within the project area include West Elk Wilderness at 10 miles south-southeast and Black Canyon of the Gunnison National Park approximately 25 miles southwest of the Somerset, Colorado.

Due to the nature of the project (i.e., mobile equipment), no specific permit requirements apply to gaseous emissions. However, construction will be required to comply with fugitive dust provisions under Regulation 1 (5 CCR 1001-3) which requires that precautions be taken to control fugitive emissions (e.g., airborne particulate matter) to levels below 20 percent opacity.

The West Elk Mine currently operates under air emission discharge permits obtained from the State of Colorado. Activities under the proposed action are not anticipated to require a modification of existing or application for new permits (USDA FS 2006b).

Environmental Consequences

Alternative 1

Under the No Action Alternative, gaseous and fugitive (e.g., particulate matter) emissions in the area would remain at current levels.

Alternative 2

Particulate Emissions

Potential sources of particulate (for example, PM_{10}, $PM_{2.5}$) would come from equipment used during the construction and operations and maintenance of the access roads, methane drainage wells, ventilation/escapeway shaft. These emissions would include fugitive dust from vehicles traveling on dirt roads and engine emissions. Fugitive dust quantities have been estimated at approximately 32,000 pounds per year (USDA FS 2006b) and would be less after dust suppression was applied. Fugitive dust emissions would further decrease once construction was complete. Design criteria to reduce dust during construction and maintenance will effectively reduce fugitive dust emissions.

Proposed Alternative Gaseous Emissions

Potential sources of gaseous emissions (NO_2, SO_2, and CO) would come from equipment used during the construction of the access roads, methane drainage wells, ventilation/escapeway shaft. Gaseous emissions have been estimated at approximately 36,000 pounds per year (USDA FS 2006b). These emissions would be from engines and would

decrease in quantity when construction is complete. Design criteria to reduce gaseous emissions (e.g. worker carpooling) would help decrease gaseous emissions during construction. Further decreases would occur when construction is complete. Operations and maintenance of the methane drainage wells, roads and ventilation/escapeway shaft would contribute gaseous emission, although at about half the pounds per year.

Gaseous emissions in the form of methane from methane drainage wells would occur during the project. Methane emissions, from an air permit perspective, are not regulated by the State of Colorado. Preliminary modeling results using EPA's SCREEN3 air model indicate that methane concentrations from the methane drainage wells would result in an increase of breathing zone methane concentrations in air to one tenth of one (1) percent (0.1%) by volume, at a distance of 50 meters from the source. This is below the Mine Safety and Health Administration (MSHA) level of one percent.

The Class 1 airshed (West Elk Wilderness) is 10 miles from the project area and there would be no effects on the Class 1 airshed from proposed activities.

Cumulative Effects

Alternative 1

Because Alternative 1 (No Action) would produce no additional direct or indirect effects, there would be no cumulative effects.

Alternative 2

Short-term impacts from the proposed action would contribute cumulative effect in the form of short-term particulate and gaseous emissions resulting from construction activities. Ongoing, existing activities discussed in the Affected Environment will continue to affect air quality, and emissions and particulate contributed by the proposed action would likely not be noticeable or measurable within the study area and would not exceed any established air quality standards.

Consistency with Forest Plan and Other Laws

The proposed action would be consistent with air quality and fugitive dust provisions required by the Colorado and National Ambient Air Quality Standards and PSD increments as well as alternative gaseous emissions regulated by the Mine Safety and Health Administration. The proposed action is also consistent with Forest Service Manual 2580-Air Resource Management and the 1991 GMUG Forest Plan.

Water

For surface water and ground water, the project impact area is the project area. The cumulative impact area for surface and ground water includes the surface watersheds and ground water basins associated with the Deep Creek, Deer Creek, Lick Creek, Poison Gulch, Trail Creek and the upper ephemeral tributaries to the Dry Fork of Minnesota Creek (**Figure 5**).

Affected Environment

Surface Water

The project area encompasses three watersheds, all of which are tributary to the North Fork of the Gunnison River:

- Deep Creek and tributaries in portions of Sections 35 and 36, Township 13 South, Range 90 West, and in portions of Sections 1 and 2, Township 12 South, Range 90 West 6th P.M.
- Upstream Portion of the Dry Fork of Minnesota Creek (a direct tributary to the North Fork via Minnesota Reservoir) and all its tributaries, including:
- Upper portion of the Lick Creek watershed (a tributary to the South Fork of Minnesota Creek) in portions of Section 9 and 10 Township 14 South, Range 90 West, 6th P.M.

There are approximately 4.6 miles of perennial and 6.8 miles of intermittent streams in the study area (USDA FS 2006d). With the

Figure 5. Project Area Surface Water and Wetland Features

exception of Deep Creek and the Dry Fork of Minnesota Creek (downstream of the outflow of the Deep Creek Ditch), which are perennial streams, the remaining tributary streams are surveyed as intermittent streams or have an unclassified designation (ephemeral drainage) (USDA FS 2006d). The incremental flow contributions to the North Fork from the project area watersheds are minor percentage of total annual and season flows.

During late summer the Dry Fork of Minnesota Creek receives much of its flow from the Deep Creek Ditch, an inter-basin diversion.

MCC maintains monitoring stations and regularly monitors flows and water quality on Minnesota Creek, Deep Creek, Dry Fork, and the North Fork of the Gunnison River. Flow measurements and field parameters are typically collected three times per year and water quality sampling occurs annually. Commitments for future monitoring are tied to initiation of active mining within a watershed area, with initial monitoring at least one year in advance of mining disturbance. In compliance with the terms of their approved DRMS mining permit, MCC will continue to monitor surface water flows and quality for all potentially affected surface drainages that overlie active mining areas.

Surface water quality data collected by MCC and others in the greater mine area from various tributaries of the North Fork is generally consistent with North Fork waterquality. Total dissolved solids, total settleable solids, and iron concentrations can increase dramatically during spring runoff and intense storm events, particularly in the smaller drainages. Water quality of streams can vary dramatically depending on time of year, volume of surface flows, and location.

After the late spring/early summer snow melt runoff, all surface water in the project area originates from springs and seeps. The exception to this is the aforementioned contribution by Deep Creek Ditch and any significant summer precipitation events.

Seeps and springs originate from either shallow perched water tables or from bedrock outcrops. Based on a map of surveyed springs and stock ponds provided in the Annual Hydrology Report (Exhibit 71, Map No. 1 and Exhibit 19c- PDF provided by USDA FS) covering the project there are approximately 6 perennial, one decreed, and 53 intermittent or historical springs in the project area (MCC 2007).

Bedrock springs in the project area originate in the Barren Member of the Mesa Verde Formation (USDA FS 2002a). Approximately 2/3 of the surveyed springs originate as bedrock springs based on their relative position as shown on the provided map relative to the bottom of the ephemeral and intermittent stream drainages. These springs exhibit seasonal fluctuation in flow, though not a pronounced as the shallow ground water springs. Water from bedrock springs is generally more saline than the surface water and shallow water table springs in the area.

Some of the springs and seeps in the project area have been captured by shallow seep basins and stock-water ponds developed to support livestock and wildlife. Based on review of the springs and seep survey map, there are 36 stock ponds in the study area.

Ground Water

MCC maintains a network of 28 ground water monitoring wells throughout the West Elk Mine permit and lease areas. A portion of this network covers the project area (**Figure 5**). The following monitoring wells have been affected by long wall mining subsidence resulting in collapse well casing and are no longer available to the monitoring network: So. W-1, SOM -45-H1, SOM 2H, SOM -16H, and 96-27-1. The remaining wells within the project area provide important background information on water quality and a

database from which to judge direct and indirect effects of mining activities on ground water resources.

Shallow ground water in the project area is limited due to geomorphologic controls from the relatively steep gradients and stream profiles of drainages, resulting in thin alluvial/colluvial deposits confined to the drainage bottoms. Ground water that surfaces as springs and seeps in drainage bottoms is associated with these shallow alluvial/colluvial deposits and does not appear to be hydrologically connected with deeper bedrock aquifers. There two shallow alluvial monitoring wells in the project area that are monitored as part of the West Elk hydrologic program, the Upper Dry Fork and Lower Dry Fork Alluvial wells. Based on water quality data provided in the West Elk Mine 2005 Annual Hydrology Report, water quality for alluvial/colluvial ground water aquifers and shallow perched ground water is commonly similar to surface water quality (HydroGeo 2006).

Recharge to these shallow aquifers occurs through stream flows under high flow conditions and direct infiltration of runoff from precipitation and snowmelt. Under low flow conditions, the saturated alluvial/colluvial deposits in the larger drainages discharge water to the stream channel (ground water recharge), supplying perennial surface water flows via springs and seeps. Given the semi-arid conditions in the area and relatively steep stream gradients, many of the smaller drainages do not receive enough recharge to maintain year-round surface flow.

Bedrock ground water resources in the project area are limited to isolated perched lenses and fracture/fault zones. There are several bedrock groundwater monitoring wells in the project area that are monitored by the West Elk Mine hydrologic program. These wells are sampled three times per year for field parameters and water level and once per annum for laboratory water quality analysis for parameter specified in the hydrologic monitoring program. Age-dating chemical analyses from the West Elk monitoring program have shown that bedrock groundwater resources in the vicinity of the mine are part of a deep inactive system that is not in direct contact with near-surface water (USDA Forest Service 2003a). Deeper perched ground water and any ground water associated with the coal seams that have been in contact with shale and mudstone may exhibit elevated levels of total dissolved solids (HydroGeo 2006).

Groundwater may also be present to a limited extent within coal seams. Bedrock and associated coal seams dip to the northeast, with the uppermost strata outcropping along the North Fork Valley. The occurrence of groundwater springs in the North Fork outcrops of the Mesa Verde formation is rare. BLM and MCC report that the coal seams in the West Elk Mine area are typically dry, with average moisture content of 5 percent. Groundwater discharges from faults intercepted by longwall panels in the West Elk Mine have experienced initially high volume discharge periods followed diminishing to negligible flow within a short time period. No effects to surface water resources have been documented from interception of water-bearing faults underground. Not all faults encountered during mining have contained water. Mine underdrain and mine inflow sites are currently monitored for flow and water quality by the West Elk hydrologic program. The total inflow for the West Elk Mine is approximately 200 acre-feet per year (HydroGeo 2006).

Direct and Indirect Effects

Alternative 1

Surface Water

Under the No Action alternative, current management plans, existing coal recovery related, and non-coal related activities will continue to occur and/or guide management of the project area. Since mining-related surface

disturbances will not occur, or be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, etc., the no action alternative will have no or negligible effects on surface water resources.

Ground Water

Under the No Action alternative, current management plans and non-coal related activities will continue to occur and/or guide management of the project area. Since mining-related subsurface disturbances will not occur, or be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, etc., the no action alternative will have no or negligible effects on ground water resources.

Alternative 2

Surface Water

The reuse of the previously constructed pad for the ventilation shaft/escapeway and road will likely have minimal direct effect on surface water quality. If raisedbore or blindbore shaft construction is utilized, any overshot waste rock generated will be handled subsurface and will have minimal direct effect on soil erosion and sedimentation. If conventional sink/line construction is utilized, overshot waste rock will be temporarily stored on the drill pad and eventually hauled out of the project area. This second type of shaft construction would have a higher potential to directly affect surface water by erosion and sedimentation; however surface disturbances associated with the shaft construction site will be mitigated by interim reclamation and runoff control measures. Modification of the access road to a light-use (low-volume) road once shaft and emergency structures are constructed would also lower the potential for direct impact. Final reclamation of the shaft and escapeway will include sealing the airshaft and escapeway with concrete/steel structure 10 feet below ground surface and performing final surface reclamations when no longer needed at end of life of mine (mine life estimated at 13-15 years).

A total of 33 drill pads will be located in or adjacent to water influence zone (WIZ) (100 feet on either side of the stream) buffer zones. To access these drill pads, approximately 5.8 acres of new or upgraded road will occur within these buffer zones including 13 creek crossings.

Construction in areas adjacent to a WIZ buffers will be reviewed on the ground by USFS personnel to determine wither or not the WIZ will be affected and if additional mitigation measures should be developed/implemented.

The design criteria including soil salvage and soil staging (Table 2-2), interim reclamation, drainage control measures for drill pads and road constructions, road maintenance, engineered crossings, erosion control measures on steep slopes, etc. will generally be effective in preventing or limiting soil erosion, and sedimentation. Despite these practices, erosion, soil loss, and sediment transport from newly disturbed areas will still directly affect nearby drainages. The degree of impact cause by sediment runoff upon surface water quality (turbidity and suspended solids), will be largely dependant upon its proximity of the disturbed areas to streams and the magnitude of runoff. Approximately 75% of the project construction disturbances will be outside any WIZ or similar surface water body, and these disturbed areas not located proximal to surface drainages will likely have minimal impact on surface water and riparian resources.

Leases contain stipulations restricting occupancy in areas of geologic hazards and steep slope. Avoid areas with high geologic hazards to prevent mass slope failure in Section 32, T13S, R90W, 6th P.M. unless specifically approved by authorized officer.*

Under the Controlled Surface Occupancy Stipulation, areas with moderate geological hazards will require analysis and mitigation

plans detailing construction and mitigation techniques to ensure stability of facilities in portions of Sections 27-29 and 32-34, T13S, R90W, 6th P.M. and Sections 3-4, 9-10, T14S, R90W, 6th P.M. unless specifically approved by authorized officer.*

Under the No Surface Occupancy Stipulation project construction activities will not be allowed on slopes greater than or equal to 60% or areas surrounded by slopes greater than or equal to 60% to prevent erosion, mass failure and loss of productivity in portions of Sections 27-29 and 32-34, T13S, R90W, 6th P.M. and Sections 3-4, 9-10 T14S, R90W, 6th P, M. unless specifically approved by authorized officer.*

Controlled Surface Use Stipulation Surface use on slopes 40-60% will be subject to analysis and mitigation plans detailing construction and mitigation techniques to minimize potential for soil loss, mass land movement, revegetation failure and unacceptable visual impairment except as otherwise approved by authorized officer. This may apply to lands in portions of Sections 27-29, 32-34 T13S, R90W, 6th P.M. and Sections 3-4, 9-10, T14S, R90W, 6th P.M.*

The potential for indirect surface water impacts due to the drilling, well completion, and maintenance of the MDWs is minor. Drill rig and support vehicles could accidentally spill drilling fluids or water and releases could occur from ruptured fuel tanks to potentially impact surface water quality in areas proximal to surface drainages, however this potential is small. Proper transportation and handling practices and the use of staging areas should help to minimize the potential for accidents. Since most equipment operations will occur in the drill pad areas, any minor spills will be contained by drainage control berms in these areas. All drilling fluid and circulation additives that will be used are either naturally occurring inorganic or organic materials or biodegradable compounds. Loss or spillage of these materials will not have any long-term adverse water quality effects.

Ground Water

Minimal bedrock water is expected to be intercepted during the proposed drilling operations, however shallow colluvial or perched ground water could be encountered during drilling or road construction near drainage bottoms. Temporary direct effects from drilling could include:

- Modification of the water table surface until equilibrium conditions are reestablished, and
- Degradation of groundwater quality due interaction with drilling fluids.

These direct effects are not expected and will be substantially mitigated by design criteria. Furthermore the duration of these temporal affects is expected to be on the order of days or months, with no forseeable long-term degradation expected. If substantial quantities of ground water were encountered in any borehole, high-density additives will be introduced with the circulation media to contain the water flows, and casing will be extended and cemented in place to case off the flow source. Based on MCC coal methane drainage experience on panels 16-24, drilling circulation media could include air, water, and biodegradable polymer foam. Gels, surfactants, and other bentonite-based drilling muds could also be used to stabilize the drillhole, if necessary. Other materials, including crushed peanut shells, cottonseed hulls and cedar fiber could also be added to the circulation medium to help stabilization. All drilling fluids and additive that could be used are either naturally occurring inorganic or organic materials or biodegradable compounds. (USDA FS 2002a).

Water quality in the shallow perched groundwater systems has been characterized as similar to surface water quality, such that substantial changes in geochemistry due to mixing from two distinct shallow perched

zones or from ground water/surface water mixing is not expected. Drilling operations will use circulation media including, air, water, and biodegradable polymer foams. Gels, surfactants, and bentonite-based drilling muds will also be used to stabilize boreholes during drilling, where necessary. These materials and other borehole stabilizing additives will normally maintain pressure in the borehole adequate to prevent substantial ground water inflow (and mixing) in borehole where ground water is encountered. Because all drilling fluids and stabilization additives will utilize biodegradable materials, any changes in ground water quality from drilling operations will be temporary.

Based on spring and seep survey locations (

Figure 5), several intermittent springs could potentially be affected by drilling activities. Approximately 12 intermittent springs lie within or are immediately adjacent to the proposed drill pad radii, are the most likely candidates for experiencing temporary effects. Possible indirect effects include temporarily modification of the shallow water table resulting in a decrease in discharge to area springs and seeps and/or modification to shallow ground water quality due to mixing of drilling fluids or distinctly separate water bearing zones. Once static equilibrium is re-established any temporal indirect effects from ground water interception or mixing will cease.

Drilling related activities could affect near-surface ground water quality, however implementing design criteria, including the use of biodegradable compounds or 100% natural drill additives along with casing-off water bearing zones during construction should minimize this occurrence (**Table 2-2**).

Cumulative Effects

Because indirect and direct effects to surface water and ground water are expected to be short-term, cumulative impacts from the proposed action are not anticipated. Drainage, sediment control and surface water monitoring requirements of the DRMS Performance Standards will also help to assure prevention of surface water impacts by providing a regulatory framework for development of interim mitigation measures.

Future resource development (coal exploration and leasing, methane gas development) in this portion of the North Fork drainage will undergo a similar level of environmental analysis and permitting as this proposed project, thereby limiting any unforeseen future cumulative effects.

Consistency with Forest Plan and Other Laws

Although design criteria state “drilling water (< 10 acre-feet per year for shaft and MDW) will be obtained from MCC’s non-tributary water in the mine or Minnesota Creek. This quantity of water is within the GMUG’s blanket consultation with USFWS for depletion associated with the Upper Colorado River System.” The following restriction with respect to water resources was found to be applicable to the proposed action after applying the unsuitability criteria stipulated in the amended LRMP dated September 1991 for the GMUG National Forests:

“In the future, if water to be used for mine related activities is to be taken from a source that is not considered to be non-tributary waters by the U.S. Fish and Wildlife Service, or which exceeds a depletion amount previously consulted upon, the permitting agency must enter into consultation with the U.S. Fish and Wildlife Service to determine appropriate conservation measures to offset effects to listed fish and critical habitat in the upper Colorado River Basin.”

All alternatives are consistent with the Clean Water Act and Forest Plan standards for water resources.

The stipulations for water resources are also consistent with the FS Region 2 Water Conservation Practices Handbook.

Geology

Affected Environment

The Deer Creek Shaft and MDW area lies within a portion of the watershed of the North Fork of the Gunnison River. Elevations in the area range from approximately 6,700 feet above mean sea level (amsl) near the southwest corner (Sec. 8, T14S, R90W) to approximately 9,120 feet amsl near the southeast corner (Sec. 1, T14S, R90W). Topography consists of small mesas (less than 100 acres) dissected by drainage channels up to 1,000 feet deep which have been incised by intermittent and perennial streams. Slopes within the drainages are characterized by irregular topography, in which cliffs and shelves are underlain by resistant sandstone and the intervening slopes are underlain by fine-grained material.

Regional topography displays abundant evidence of mass wasting of several types. Landslides and rockfalls are common, and landslides are often accompanied by subsequent creep within the slide mass. Mass wasting is generally associated with steep slopes, but saturated or near-saturated conditions in the near-surface may facilitate mass movement on lesser slopes.

Moderate (40 to 60 percent) and steep (greater than 60 percent) slopes are present in the area as bedrock cliffs and outcrops. These slopes may present a rockfall hazard, but such slopes are localized and overall, occupy a small percentage of the area (**Figure 6**). However, the entire project area appears to have the potential for mass wasting. Areas of known mass wasting and potential instability are depicted on **Figure 7**.

The Deer Creek Shaft and MDW area lies within the Paonia-Somerset coal field. The commercial coal beds occur in the Mesaverde Group of Late Cretaceous age. The Mesaverde is underlain by the Mancos Shale of Late Cretaceous age. In the eastern part of the area, the Mesaverde is overlain by the Wasatch and also Ohio Creek formations of Paleocene and Eocene age. Regionally, the bedrock sequence dips three to four degrees toward the north-northeast. Surficial deposits consist of colluvium (slopewash) on the slopes and alluvium in the larger stream valleys.

Coals in the Mesaverde Group are interbedded with shales and sandstones. The sandstone beds occasionally occur as thick, massive channel sandstones (Agapito 2005). The Mesaverde is divided into two members: the Upper Coal Member, which contains the D, E, and F coal seams, is approximately 220 feet thick and produces coal primarily from the E seam; the Lower Coal Member, which contains the A, B, and C coal seams, is approximately 270 feet thick and produces coal primarily from the B seam. E seam overburden thickness ranges from 1,000 feet in the northwest to 2,000 feet in the southeast (Agapito 2005).

Geologic hazards are present in the project area in the form of mass wasting features associated with unstable slopes. Areas of instability generally occur on moderate to steep slopes with saturated soil conditions. Land instability is more prevalent on the north and east aspects of drainages on the down-dip side of the strata. This is attributed to the dip of the local geologic strata being to the northeast. Ground water movement through the near surface ground water zone lubricates the slopes, and contributes to the instability.

Two fault zones identified in the West Elk Mine may be encountered in the eastern part of the Deer Creek Shaft and MDW area. The Gunnison and Deep Creek faults have no surface expression. Their presence is inferred

from limited seismic data and geometric analysis (Koontz 2005).

Direct and Indirect Effects

Alternative 1

The Deer Creek Shaft and methane drainage wells would not be installed. Without the installation of these safety features, mining of

Figure 6. Slope

Figure 7. Geologic Hazards

the coal underlying the project area may be conducted a slower rate or cease altogether.

All topographic and geologic conditions within the area would remain in their current state. Subsidence features anticipated in the Agapito (2005) study, including a general lowering of the land surface by five to seven feet, tension cracks, and potential aggravation of existing landslides and rockfalls, would not be developed. Natural processes of erosion and mass wasting would continue.

Alternative 2

Installation of the Deer Creek shaft would be conducted using a previously constructed pad and road. Reclamation requirements to return the land surface to approximate original contour will result in no permanent change to topography

Disturbance from constructing drill pads for MDWs would be approximately 114 acres. The drill pads would each require an adequate amount of grubbing and grading to provide a site level enough for safe drilling operations. Access for the methane drainage wells would be provided by 19 miles of new road, upgrades to 4.8 miles of road and a 0.6 mile re-route, resulting in a total disturbed area of 93 acres. Disturbance for this portion of the project would total 210 acres.

The methane drainage wells have been located with enough latitude to allow their location on topographically favorable sites in order to minimize disturbance (**Table 2-2**). A review of slopes calculated from the state digital elevation model (**Figure 6**) shows slopes within the methane drainage well project area from 40 to 60 percent. MDW locations would be selected to avoid steep slopes, however due to site conditions, some wells could be located on steeper slopes, potentially increasing the well footprint and risk of destabilizing the slope.

Although the estimated life of the methane drainage well program totals 12 years, the individual well will have an estimated life of three years and reclamation will take place as individual wells are taken out of service. Therefore, the total disturbed area at any given time will be much less than the total and no permanent impacts should be apparent following reclamation of the final sites at completion of the program.

The primary impacts to topography and geology from mining in the project area are expected to result from subsidence above the mined area (USDA FS 2005c). These subsidence effects are not expected to be noticeable to the casual observer (USDA FS 2003).

Cumulative Effects

Alternative 1 – No Action

The Deer Creek Shaft and methane drainage wells would not be installed. Without the installation of these safety features, mining of the coal underlying the project area would be conducted at a slower rate or cease entirely. Under this alternative, all topographic and geologic conditions within the area would remain in their current state. Subsidence features, already present in the mined area north of the project area may not occur.

Although no active landslides are mapped within the project area, active landslides have been mapped just outside the area to the north, east, south and west. These processes of mass wasting would continue to occur.

Alternative 2

Installation of the Deer Creek Shaft and methane drainage wells would allow the safe mining of coal reserves in the E seam in the project area. In addition to the direct consequences discussed above, mining would cause the extension of subsidence features southward from the currently mined area. These features would include a general lowering of the land surface by five to seven feet, tension cracks, and potential aggravation of existing landslides and rockfalls (Agapito

2005). Although such features would be more widespread, they would not be noticeable to the casual observer (USDA FS 2003).

Consistency with Forest Plan and Other Laws

The proposed action is consistent with Forest Plan standards for geology which establishes limits on ground-disturbing activity on unstable slopes and highly erodible sites, and regulations adopted pursuant to the Surface Mining Control and Reclamation Act of 1977 and the State of Colorado's OSM-approved permanent program for coal mining per the Colorado Surface Coal Mining Reclamation Act as administered by the CDMG with oversight from the OSM, which govern all direct effects of coal mining, including those that may impact soils. These acts and attendant regulations require that topsoil be removed, stockpiled, and replaced on reclaimed surfaces associated with construction or mining disturbance. Other impacts to the soil resource that may occur as a result of mining, including landslides and erosion, must be mitigated to stabilize the surface and return the land to an approved post-mining land use.

Soils

Affected Environment

Soils in the project area developed from a combination of residual, colluvial, and alluvial materials derived from local bedrock. The soil survey (Cryer and Hughes 1997) describes 12 map units that could be affected. The map unit name, dominant soil series and attendant percent map unit composition, relative depth, hazard classifications (water erosion, shrink swell, and mass movement), and considerations described in the soil survey are shown in **Table 3-2** and **Figure 8**.

Table 3-2
Summary of Soil Resources

Soil Map Unit Name / Number	Dominant Soil Series	Percent of Map Unit	Depth Class	Hazard			Considerations For Use
				Water Erosion	Shrink Swell	Mass Movement	
Broad Canyon - Scout family complex, 5 to 25% slopes 111	Broad Canyon and similar soils	50	VD	L	L	L	Soil erosion in steeper areas; low water-holding capacity; subsurface rock fragments.
	Scout family and similar soils	35	VD	L	L	L	
Cerro - Herm complex, 0 to 15 percent slopes 116	Cerro and similar soils	45	VD	L	H	L	High shrink-swell potential; slow permeability; clayey surface soil textures; clayey subsurface soil textures. Corrosivity in Cerro soils.
	Herm and similar soils	40	VD	L	H	L	
Coberly – Falcon, dry complex, 0-15% slopes 124	Coberly and similar soils	45	MD	L	L	L	Shallow bedrock; low water-holding capacity. Root limiting layer in Falcon dry soils.
	Falcon, dry and similar soils	40	S	L	L	L	

Table 3-2
Summary of Soil Resources

Soil Map Unit Name / Number	Dominant Soil Series	Percent of Map Unit	Depth Class	Hazard			Considerations For Use
				Water Erosion	Shrink Swell	Mass Movement	
Cryochrepts - Cryoborolls; rubble land complex, 15-90% slopes 130	Cryochrepts soil and similar soils	35	S - D	L - H	L	L - M	Steep slopes in some areas; high soil erosion hazard in the steeper areas; subsurface rock fragments, moderate mass movement potential.
	Cryoborolls and similar soils	30	S - VD	H	L	M	
	Rubble land	25					Large exposures of loose rock.
Cumulic Haploborolls, 1 to 3% slopes 131	Cumulic Haploborolls and similar soils	85	D - VD	L	L	L	Limited available water capacity; subsurface rock fragments; spring runoff flooding; low bearing capacity; subsurface rock fragments.
Haploborolls - Ustochrepts - Rock outcrop complex, 40 to 99% slopes 153	Haploborolls and similar soils	35	D - VD	H	M	L - M	Steep slopes; shallowness to bedrock in some areas; high soil erosion hazard; subsurface rock fragments; moderate mass movement potential.
	Ustochrepts and similar soils	30	S - D	H	L	M	
	Rock outcrop	25					
Herm - Fughes complex, 5 to 25% slopes 157	Herm and similar soils	45	VD	L	H	L	High shrink-swell potential; slow permeability; clayey subsurface soil textures. Clayey surface soil textures in Herm soils.
	Fughes and similar soils	40	D	L	H	L	
Herm - Fughes - Kolob Family Complex, 25-40% slopes 158	Herm and similar soils	35	VD	L - H	H	L - M	Steep slopes in some areas; high shrink-swell potential; slow permeability; high soil erosion hazard in steeper areas; moderate mass movement potential in steeper areas; clayey subsurface soil textures. Clayey surface soil textures in Herm soils. Subsurface rock fragments and clayey surface soil textures in Kolob Family soils.
	Fughes and similar soils	30	D	M - H	H	L - M	
	Kolob Family and similar soils	25	VD	L - H	M	L - M	

Table 3-2
Summary of Soil Resources

Soil Map Unit Name / Number	Dominant Soil Series	Percent of Map Unit	Depth Class	Hazard			Considerations For Use
				Water Erosion	Shrink Swell	Mass Movement	
Shawa - Sandia Family - Kolob Family Complex, 5-40 percent slopes 185	Shawa and similar soils	35	VD	L - H	L	L	High soil erosion hazard in steep slope areas. Slow permeability and subsurface rock fragments in Sandia soils.
	Sandia family and similar soils	30	D	L - H	L	L	
	Kolob Family and similar soils	25	VD	L - H	M	L - M	Slow permeability; moderate shrink-swell potential; high soil erosion hazard in steep slope areas; moderate mass movement potential in steep areas; clayey subsurface soil textures; subsurface rock fragments.
Taterheap - Papaspila Complex, 5-40 percent slopes 188	Taterheap and similar soils	50	VD	L - H	M	L	Elevated erosion hazard in steep slope areas. Moderately slow permeability. Subsurface rock fragments in Papaspila soils.
	Papaspila soil and similar soils	35	VD	L - H	L	L	
Taterheap - Papaspila complex, 40 to 65 percent slopes 189	Taterheap and similar soils	50	VD	H	M	L - M	Steep slopes; high soil erosion hazard; moderate mass movement potential in the steeper areas; moderately slow permeability. Subsurface rock fragments in Papaspila soils.
	Papaspila and similar soils	35	VD	H	L	L - M	
Wetopa - Wesdy Complex, 5-65 percent slopes 200	Wetopa soil and similar soils	50	VD	L - H	H	L - H	Slow permeability; high erosion hazard and mass movement potential on steep slopes; shrink-swell potential. Subsurface rock fragments in Wesdy soils.
	Wesdy and similar soils	35	VD	L - H	M	L - H	

Depth Classes: S = Shallow; MD = Moderately Deep; D = Deep; VD = Very Deep. Hazard Ratings: L = Low; M = Medium; H = High.
Source: Cryer and Hughes 1997.
[1] Ventilation shaft would be constructed using a previously approved and constructed drill pad.

Figure 8. Soils

Soils in the project area are generally deep, fine-textured and well suited for vegetative production with steep slopes being the primary limitation on use. Potential impacts on soil resources include soil loss during salvage and replacement, soil loss in stockpiles due to wind and water erosion, reduced biological activity and reduced soil structure. Soils on steeper slopes have slower infiltration rates, resulting in more surface flow and erosion. Mass movement on steep slopes is also a potential hazard, with Wetopa and Wesdy soil types having the highest potential hazard rating within the project area. Fine textures and high activity clays result in moderate to high shrink-swell hazard ratings for most soil types.

Analysis methods used for soils overestimates the amount of disturbance in each soil type because it incorporates broad road corridors and drill pad windows. This method captures anticipated disturbance which could occur in all possible soil types identified by road corridors and MDW buffers. The actual on-the-ground disturbance for a road in the corridor and an MDW in the window will be less than estimated with this method. Therefore, this analysis estimates the potential disturbance by soil type and is not representative of the actual acres that would be disturbed by the proposed action (**Table 3-3**).

Table 3-3 reports the acreage of individual map units that would be disturbed by alternative. However, because the analysis assumes placement of roads and MDW locations in corridors or windows disturbed soil acreages shown in the table should be regarded as conservative estimates that would change if road and drill pad locations are modified.

Direct and Indirect Effects

Alternative 1

No additional construction of drill pads or access roads, or the ventilation shaft / escape-way would occur and current management

Table 3-3
Anticipated Acres Disturbed by Soil Map Unit Under the Proposed Action

	Alternative 2			
Soil Map Unit Number	**Road Construction[1]**	**MDW Drilling**	**Ventilation Shaft Construction[1]**	**Staging Areas[2]**
111	0	0.8	0	0
116	0.23	4.8	4	0.8
124	5.4	17.6	0	0.6
130	0.63	1.6	0	0
131	0.08	0	0	0
153	0.06	3.2	0	0
157	2.6	4.8	0	0
158	45.2	75.2	0	1.1
185	6.2	15.2	0	1.0
188	19.1	23.2	0	2.4
189	3.5	4.0	0	0.4
200	9.5	25.6	0	0
Total Disturbance	**92.5**	**176**	**4**	**6.3**

[1] New and upgrades roads.
[2] Does not include staging areas that are located at MDW sites.

plans, existing coal-related approvals and non-coal related activities would continue to occur and/or guide management of the project area. Mining-related effects would be limited to reclamation and disturbance from surface resource monitoring activities such as installation of monitoring wells, surface water monitoring stations, etc and would occur sooner than anticipated under the No Action alternative.

Alternative 2

Shaft construction and soil stockpiling would create a 4-acre disturbance. In addition, installation of methane drainage wells and associated pads and access roads would disturb up to 210 acres of soil over 12 years.

Increased soil erosion could be expected from areas disturbed by construction activities. Most soils in the project area have high erosion hazard ratings when located in steep areas. Therefore, erosion would be most pronounced from areas having steep topography (**Figure 6**). Subsidence could aggravate existing landslides and stimulated new landslides especially if it occurs at the toe of slopes that are close to equilibrium, as this may be enough to release a weak portion of the slope. Disturbances related to road building may also trigger additional slope movement. Landslides are a form of erosion, if project related activities result in landslides then the erosion process will be accelerated. Land slides also result in a decline in soil productivity. (USFS personal communication with Terry Hughes, 2007). These effects would be minimized through the use of design criteria (**Table 2-2**).

Topsoil and subsoil stockpiles would be subject to potential erosion but measures would be taken to minimize this occurrence (e.g. soil would be replaced on backfill areas as soon as possible and configuration and immediate seeding of soil stockpiles would provide stabilization). Also, excavation and stockpiling of soil would destabilize soil aggregates which would reduce water holding capacity and increase susceptibility to erosion once the soils are replaced during reclamation (Brady and Weil 1999). Even though restoration has been rather successful in the past, there will be evidence of these disturbances for many (50+) years on steep slopes especially on steeper slopes and south and southwest aspects, especially where deep cuts such as roads and shallow soils exist. (USFS personal communication with Terry Hughes, 2007).

Cumulative Effects

Cumulative effects on soils include erosion contributed by drill pad and access road construction related to ongoing mine exploration, limited recreational OHV use, and grazing.

Natural landslides and other unstable features will continue to contribute to topographic changes and soil erosion in the area. Mine-related disturbances would cause erosion in specific areas, especially when disturbances occur on steep slopes, but these areas would be reclaimed making the duration of erosive processes short lived. Grazing and OHV use cause lesser amounts of soil disturbance compared to construction activities but are ongoing and therefore erosion from these activities would continue into the future.

Consistency with Forest Plan and Other Laws

Authorities specifically governing Forest Service soil management include the Multiple-Use Sustained Yield Act of 1960 and the Forest and Rangelands Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976 (NFMA). The proposed action is consistent with Forest Plan standards for soils that establish limits on ground-disturbing activity on unstable slopes and highly erodible sites. The Forest Plan further directs using site preparation methods to keep fertile topsoil intact, revegetating areas disturbed during road construction, and design mitigations and

restoration to ensure that 80 percent original ground cover occurs within 5 years after disturbance.

The proposed action also complies to regulations adopted pursuant to the Surface Mining Control and Reclamation Act of 1977 and the State of Colorado's OSM-approved permanent program for coal mining per the Colorado Surface Coal Mining Reclamation Act as administered by the CDMG with oversight from the OSM, which govern all direct effects of coal mining, including those that may impact soils. These acts and attendant regulations require that topsoil be removed, stockpiled, and replaced on reclaimed surfaces associated with construction or mining disturbance. Other impacts to the soil resource that may occur as a result of mining, including landslides and erosion, must be mitigated to stabilize the surface and return the land to an approved post-mining land use.

Vegetation

Affected Environment

Upland Vegetation

The vegetation type within the proposed project area is predominantly woodlands dominated by Gambel oak (*Quercus gambelii*) with an estimated coverage of 3,903 acres and forest dominated by quaking aspen (*Populus tremuloides*) with an approximate coverage of 1,788 acres (**Table 3-4**) (**Figure 9**). Dense stands of oak occur on the more xeric, south-facing slopes and have a brushy understory dominated by serviceberry (*Amelanchier* sp.), snowberry, and chokecherry (*Prunus virginiana*), and thin to moderate ground cover of grass and low forbs. Aspen stands dominate the mesic, northerly aspects and often have a shrub understory predominately consisting of snowberry (*Symphoricarpos* spp.) (Greystone 2001). Interspersed with this habitat type are open sagebrush (*Artemesia* spp.) meadows and small stands of aspen (Greystone 2001). Acres

Table 3-4
Acres Of Vegetation Cover Types In The Project Area, Potential Methane Drainage Well Locations, Deer Creek Shaft, and Staging Areas

Cover Type	Project Area Acres	Potential Well Pad Location Acres[1]	Ventilation Shaft Acres	Staging Area Acres[2]
Barren	2	0	0	0
Herbaceous	15	<1	0	0
Gambel oak	3,903	420	0	13
Shrub	115	13	0	<1
Willow	55	1	<1	0
Quaking aspen	1,788	167	4	8
Pinyon and juniper	64	2	0	0
Spruce and subalpine fir	74	1	0	0
Water	18	0	0	0
Total	6,034	605	4	22

Source: GIS derived acres based on CVU vegetation layer.

1 Includes MDW located on private land.

2 Staging area acres include the entire acreage for five proposed well pads which would also act as a staging area. It is likely only a portion of the proposed pad would be impacted. Disturbance acres from two existing and reclaimed staging areas are also included.

Figure 9. Vegetation Types

of each cover type found in the potential well pad location, ventilation shaft location, and stage area sites are presented in **Table 3-4**.

Riparian Vegetation

Forest Service Manuals on WatershedProtection and Wildlife, Fish, and Sensitive Plant Habitat Management defines riparian areas as geographically delineable areas with distinctive resource values and characteristics of aquatic and riparian ecosystems (with the riparian ecosystems as transition areas between the aquatic ecosystem and the adjacent terrestrial ecosystem), identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

Wetlands differ from riparian ecosystems because wetlands require saturated or seasonally saturated soils with obligate plants (USDA FS 1996). Seventeen acres of marsh are located along the Dry Fork of Minnesota Creek, the majority of which are just upstream from Minnesota Reservoir. In addition, there are four intermittent lakes in the project area which likely support wetland habitat. Three of the lakes are located along Lick Creek along the southern project area boundary, the fourth intermittent lake is east of Polson Creek; combined the lakes account for 1 acres of possible wetland habitat.

The Dry Fork of Minnesota Creek bisects the center of the project area (**Figure 9**), which is dominated by a shrub cover type consisting mainly of tall willows and alders (Wang 2004). This shrub-dominated area is probably a tall willow type consisting of Geyer's willow (*Salix geyeriana*), mountain willow (*S.* eastwoodiae), or Drummond's willow (*S. drummondiana*) with patches of Bebb willow (*S. bebbiana*) (Johnston 2004). This riparian ecosystem reaches a maximum width of approximately 500 feet and a length of approximately 2,500 feet (an estimated 28.0 acres). However, the stream channel through this area has been heavily impacted by beaver dam blowouts and the increased flows originating from the Deep Creek Interbasin Ditch (Wang 2004). Aspen, with a few stringers of spruce-fir communities, dominates the upstream remainder of the Dry Fork of Minnesota Creek. Stringers of spruce-fir exist in the drainage bottoms, primarily in the headwaters of the Deep Creek drainage, totaling an estimated 76 acres.

More open bench-land riparian areas characterize the upper reaches of Deep Creek; what were once beaver dams are now filled in with tall willow, alder, and sedges (*Carex* spp.). In addition to these natural riparian areas, there are some man-made stock ponds located in some of the intermittent streams that feed into Deep Creek from the west. These stock ponds are spring-fed by small perennial seeps and springs.

Federally Listed

The Uinta Basin hookless cactus (*Sclerocactus glaucus*) is the only federally listed, threatened plant species occurring near the GMUG, but it has not been documented on the Forests (USDA FS 2006a). It is endemic to alluvial benches, rocky hills and mesa slopes of desert shrub communities in west-central Colorado and Utah (CNHP 1999). This species was listed as threatened throughout its entire range in October 1979 (USDI 2006). Occurrences have been documented in Delta County on alluvial terraces along the Gunnison River (USDI 1990). Habitat for this species is not found within the GMUG National Forest and therefore, will not be included in any further analysis.

Sensitive Plants

Table 3-5 displays the sensitive plants or habitat known or likely to occur on the GMUG and in the project area. According to Paonia Ranger District Range Management Specialist, two Forest Service sensitive plant species, Rocky Mountain thistle (*Cirsium perplexans*) and Colorado tansy-aster (*Machaeranthera coloradoensis*) are known or likely to occur on

or near the Paonia Ranger District. Species that are not known or not likely to occur in the project area will not be affected by the proposed action; therefore, they will not be discussed further.

Rocky Mountain thistle (*Cirsium perplexans*) is a western Colorado endemic found in dry, sparsely vegetated or disturbed areas associated with sagebrush, mountain shrub, Gambel oak/serviceberry, and saltbush shrubland vegetation types at elevations of 5,700 feet to 7,560 feet. It occurs adjacent to drainages and dry washes and along roads (Spackman *et al.* 2002). Rocky Mountain thistle loosely resembles the noxious weed Canada thistle (*Cirsium arvense*). Its primary threat is the use of biological control and herbicides in the management of non-native *Cirsium* spp. (Panjabi and Anderson 2004). Currently, there is insufficient evidence for Federal listing. Panjabi and Anderson (2004) documented an occurrence on the Paonia Ranger District on Land's End Mountain in 1997 (approximately 18 miles southwest of the project area). This species has been found at lower elevations on BLM land in the "Redtop Peak area" about 6 miles northwest of the project area. In addition, the Paonia District Rangeland Management Specialist has located numerous populations on the BLM Oak Ridge area and the GMUG NF Sam's Divide area six miles to the west of the project area. All known populations on or near the Paonia RD have been found below 7700 feet. This species has not been documented in the project area; however, habitat of this type likely occurs there.

Colorado tansy-aster (*Machaeranthera coloradoensis*) is a south-central Wyoming, and central, west-central and western Colorado endemic found in sparsely vegetated gravelly, exposed soils of sedimentary or volcanic origin (Beatty and others 2004). In Colorado, it is associated with dry grassland communities ranging from ponderosa pine (*Pinus ponderosa*) to alpine fellfields and meadows at elevations from 7,675 feet to 12,940 feet. The primary threats to this species are direct and indirect effects of motorized and non-motorized recreation, and trail and road construction and maintenance (Beatty and others 2004). Three occurrences were documented in Gunnison County in 1950, 1997, and 1999 (Beatty and others 2004, USDI 2000). Occurrences of this species have not been documented in the project area but its habitat is likely to occur.

Table 3-5
GMUG Sensitive Plants, Habitats, and Occurrence

Species[1]	Scientific Name	Occurrence on the GMUG[1]	Habitat Known or Likely in Project Area	Habitat[2]
Whitebistle cottongrass	*Eriophorum altaicum var.neogaeum*	Known	No	Found in subalpine and alpine tundra zones in bogs, fens, wetlands and very wet streamsides at elevations from 10,160 to 13,198 feet (Ladyman 2004).
Slender cottongrass	*Eriophorum gracile*	Known	No	Found in subalpine and alpine wetlands and peaty soils with poor drainage from elevations of 7,000 to 11,140 feet (Decker, Culver, and

Table 3-5 GMUG Sensitive Plants, Habitats, and Occurrence				
Species[1]	**Scientific Name**	**Occurrence on the GMUG[1]**	**Habitat Known or Likely in Project Area**	**Habitat [2]**
				Anderson 2006a).
Lesser panicled sedge	*Carex diandra*	Likely	No	Montane and subalpine fens and wet meadows at elevations greater than 6,000 feet (Gage and Cooper 2006).
Lesser yellow lady's slipper	*Cypripedium parviflorum*	Likely	No	Found in mixed conifer and aspen stands from elevations of 5,800 to 12,683 feet on calcerious soils (Mergen 2006).
Simple bog sedge	*Kobresia simpliciuscula*	Likely	No	Mesic to wet tundra in shallow wetlands of glacial cirques in rich fens from elevations of 8,970 to 12,800 (Decker, Culver, and Anderson 2006b).
Wetherill Milkvetch	*Astragalus wetherilli*	Known	No	Steep slopes, canyon benches, and talus under cliffs. In sandy clay soils derived from shale or sandstone. Grows with sagebrush and juniper. Elev. 5,250-7,400 ft.
Arctic braya	*Braya glabella*	Known	No	Clacerous substrates, especially Leadville Limestone; sparsely vegetated slopes above timberline with fine gravels or on disturbed sites associated with inactive mines. Elv. 12,000 – 13,000
Rocky Mountain thistle	*Cirsium perplexans*	Known	Yes	Dry, sparsely vegetated or disturbed areas in sagebrush, mountain shrub, Gambel oak/serviceberry, and saltbush shrubland. Elev. 5,700-7,560 ft.
Roundleaf sundew	*Drosera rotundifolia*	Known	No	Floating peat mats, margins of acidic ponds and fens. Elev. 9,100-9,800 ft.
Stonecrop gilia	*Gilia sedifolia*	Known	No	Restricted to dry, rocky or gravelly talus of tuffaceous sandstone, at or above treeline. Elev. 11,750 ft or more.
Colorado tansy-aster	*Machaeranthera coloradoensis*	Known	Yes	Gravelly areas in mountain parks, slopes and rock outcrops up to dry tundra. Elev. 8,500-12,500 ft.

Table 3-5
GMUG Sensitive Plants, Habitats, and Occurrence

Species[1]	Scientific Name	Occurrence on the GMUG[1]	Habitat Known or Likely in Project Area	Habitat[2]
Kotzebue grass-of-parnassus	*Parnassia kotzebuei*	Known	No	Subalpine and alpine wet, rocky ledges, in streamlets and moss mats. Elev. 10,000-12,000.
Tundra buttercup	*Ranunculus karelinii (R. gelidus ssp. Grayi)*	Known	No	Among rocks and scree and exposed summits, slopes. Elev. 12,000-14,100 ft.
Hoary or silver willow	*Salix candida*	Known	No	On hummocks in nutrient-rich fens, and thickets or edges of ponds and on river terraces; often growing with other Salic and Carex species. Elev. 8,800-10,600.
Autumn willow	*Salix serssima*	Known	No	Marshes or fens with other Salix or Carex species. Elev. 7,800-9,300 ft.
Sun-loving meadowrue	*Thalictrum heliophilum*	Known	No	Sparsely vegetated, steep shale talus slopes of the Green River formation. Elev. 6,300-8,800 ft.
Lesser bladderwort	*Utricularia minor*	Known	No	Fixed aquatic species found in low energy environments that are up to 12 inches (Neid 2006).
Park milkvetch	*Astragalus leptalus*	Likely	No	Moist sedge meadows and grassy areas along stream banks.
Arizona willow	*Salix arizonica*	Likely	No	Sedge meadows and wet drainage ways in subalpine coniferous forests. Elev. 10,000-11,200 ft.
Debeque phacelia	*Phacelia scopulina var. submutica (Candidate)*	Known	No	Restricted to barren dark gray and brown clay soils in mixed conifer forests and pinyon-juniper woodlands from 4,921 to 6,200 feet (Ladyman 2003).

Sources:
[1] Rocky Mountain Region TEPS Species List 2006,
[2] Spackman and others 2002 unless otherwise noted.

Noxious Weeds and Invasive Species

Noxious weeds exist in the general area. These species are aggressive and compete with the more desirable native species. Newly disturbed areas are particularly susceptible to noxious weed infestations. Regulations require active control of noxious weeds in the areas where new infestations occur.

The most prevalent Colorado listed noxious weeds on the GMUG NF, Paonia Ranger District are Canada thistle (*Cirsium arvense*); musk thistle (*Carduus nutans*); yellow toadflax (*Linaria vulgaris*); houndstongue (*Hieracium cynoglossoides*); oxeye daisy (*Leucanthemum vulgare*); whitetop or hoary cress (*Cardaria draba*); and scentless chamomile ((*Anthemis arvensis*) (USDA FS 2006a). In addition, leafy spurge (*Euphorbia esula*), common teasel (*Dipsacus fullonum*) and tansy ragwort (*Senecio jacobii*) have been located and treated in the Dry Fork area. The Paonia RD and Mountain Coal Co. have been treating noxious weeds in the Dry fork area, since 1998. In 2006, over 30 sites were treated in or near the project area. Species treated were Canada thistle, musk thistle, yellow toadflax, houndstongue, white top and common teasel. A full inventory has not been conducted to determine all species or the extent of noxious weeds in the project area.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, there would be no impact on sensitive plants, no increased need for noxious weed treatment, and no impacts on upland and riparian vegetation from access road and well pad construction. Management would continue as it currently exists. Health and vigor of plant species would continue to be influenced by natural processes and managed land use activities such as livestock grazing.

Alternative 2

Vegetation resources would be impacted by both new access road and MDW construction. This disturbance would include lightly damaging plants which would eventually recover, and plants destroyed by trampling or construction activities. Disturbance would be short term (13 to 15 years). Road maintenance throughout the life of the project would cause varying degrees of vegetation damage.

Total vegetation disturbance from construction of the Deer Creek Shaft, 19 miles of new access road construction, existing road

Table 3-6
Anticipated Acres of Cover Type Disturbance Under the Proposed Action

Cover Types	Proposed Action			
	Forest Service Road Disturbance	Well Pad Disturbance[1]	Deer Creek Shaft Disturbance	Staging Area Disturbance[2]
Herbaceous	<1	<1	0	0
Shrub	4	5	0	<1
Gambel oak	50	133	0	1
Willow	<1	3	<1	0
Quaking aspen	33	77	4	3
Pinyon-juniper	0	<1	0	0
Spruce-subalpine fir	<1	2	0	0
Total	90	222	4	5

[1] Includes 17 acres of potential disturbance in well pads located on private lands.
[2] Does not include staging areas that are located at MDW sites.

upgrades, installation of 168 MDW on 139 drilling locations, and use of staging areas would total 210 acres. Disturbance associated with the Deer Creek Shaft would occur throughout the life of the project (13 to 15 years). Disturbance associated with MDWs and access roads would be short term; MDW life is estimated to be 3 years. MDW development would be staggered, thus wells would be at various stages of reclamation throughout the 12 year development period.

Upland Vegetation

Analysis methods used for soils overestimates the amount of disturbance in each soil type because it incorporates broad road corridors and drill pad windows. This method captures anticipated disturbance which could occur in all possible soil types identified by road corridors and MDW buffers. The actual on-the-ground disturbance for a road in the corridor and an MDW in the window will be less than estimated with this method. Therefore, this analysis estimates the potential disturbance by soil type and is not representative of the actual acres that would be disturbed by the proposed action (**Table 3-6**).

Up to 57 percent of the total disturbance would occur in Gambel oak cover types and 36 percent in quaking aspen cover types (**Table 3-6**). These are the dominant vegetation types in the project area. Both species can reproduce vegetatively by sprouting which greatly reduces disturbance recovery time. Due to the aggressive nature of these sprouters, it is likely that 10 years following site reclamation these species will be present on the site. Establishment of pre-disturbance communities would vary by site. In highly disturbed areas, which are reseeded to graminoid species, recovery of Gambel oak and quaking aspen will be delayed, but these species should eventually recolonize the site.

In the project area, nearly 98 percent of Gambel oak stands are mature. Mature oak stands often shade out understory species, thus limiting species and structural diversity. In some cases removal of mature Gambel oak will increases stand diversity and provide additional forage plants for wildlife and livestock, as well as improving animal movement through the area.

Disturbance would also occur in upland shrub, willow, pinyon-juniper, and spruce-fir cover types under the proposed action (**Table 3-6**). These disturbances would be on a small scale and are a small portion of the cover types in the project area. However, potential impacts exist in willow communities which are often adjacent to springs or streams and would require implementation of design criteria such as silt fencing and sediment traps to protect water quality. Disturbance could also occur in Engelmann spruce (*Picea engelmannii*) or subalpine fir (*Abies lasiocarpa*) communities that contain merchantable timber. Design criteria stipulate that the Forest Service would be compensated for removal of any merchantable timber. Disturbance in herbaceous and upland shrub communities would not require mitigation in addition to the proposed seeding and weed control.

Construction of the Deer Creek Shaft and stockpiling sub-soil material on site would disturb four acres (**Table 3-6**). Vegetation in this area is dominated by quaking aspen stands in the uplands and willow species in the bottoms. Disturbance estimates indicate 90 percent of the impact would occur in the quaking aspen type. Shaft construction in these cover types would reduce ground cover, alter community vertical structure, and may increase erosion and surface water sedimentation.

Road construction and upgrades would impact predominately Gambel oak and quaking aspen community types (**Table 3-6**). Affects on vegetation community types would be similar to those for MDW development. However, continued light disturbance would occur as MCC personnel access MDW sites for routine maintenance. Continued road use increases the risk of weed invasion into native plant commu-

nities and would require implementation of the proposed noxious weed treatment program.

Interim reclamation would occur in the form of seeding and mulching out-slopes and cut-slopes as well as temporary mud pits. Final reclamation would include sealing and capping all wells and the ventilation shaft, as well as obliterating new access roads and decommissioning existing roads. These areas would be seeded and contoured, creating grassland areas interspersed among other vegetation types. The proposed seed mix would include five native graminoid and three native forb species and be broadcast seeded at a rate of 20 lbs/ac following fertilization of the site. Weed-free mulch would be applied following seeding. Fencing around MDW sites would allow some protection from wildlife and livestock disturbance for vegetation establishment following well closure. Seeded areas would eventually convert to surrounding vegetation types, in most cases. Site conversion to pre-disturbance vegetation type would vary based environmental, vegetative and disturbance factors. Proposed design criteria would minimize the short-term disturbance effects on vegetation.

Although minimal, the potential for long-term vegetation community alteration exists. If spruce or subalpine fir is removed, these slow-growing trees would likely take several decades to dominate the site again. Following seeding, reintroduction of trees into well established herbaceous vegetation may be delayed due to resource competition among species, further slow tree development. Vegetation losses in these communities would be long term despite the comprehensive reclamation and revegetation that would follow well abandonment.

Mitigation design criteria stipulate 11 staging areas would be created to stockpile materials and equipment during project implementation to reduce vegetation disturbance. Two of the staging areas already exist; five other areas would also be MDW pads, resulting in four newly disturbed staging areas. Disturbance at new and existing staging areas would be approximately five acres (**Table 3-6**). Soil compaction and vegetation clearing and trampling would be the major forms of disturbance. These impacts would be short term and full reclamation would occur when the sites are no longer needed.

Riparian Vegetation

Riparian ecosystems would be affected by soil disturbance and vegetation damage and loss resulting from new access road construction. During construction vegetative ground cover would be damaged or destroyed. Furthermore, disturbance in riparian areas would increase the likelihood of noxious weed invasion into the disturbance area.

Approximately 16 acres of riparian vegetation fall within potential road buffers in the project

Table 3-7
Acres of Riparian Cover Types in Road Disturbance Buffers and Potential Methane Drainage Well Locations

Cover Types	Proposed Action	
	Riparian within Road Buffer	Riparian within Methane Drainage Well Locations
Marsh	<1	0
Willow and alder	12	3
Aspen	2	0
Spruce-subalpine fir	<1	0
Total	16	3

area (**Table 3-7**). While design criteria state riparian vegetation would be avoided wherever possible, the potential exists for some road building affects on riparian vegetation. Additional design criteria stipulate that within 100 ft. of water (water influence zone) an adequate vegetative buffer or filter strip would be maintained to filter runoff from the road before it reaches the creek, wherever possible. If portions of a road must be placed within the water influence zone silt fence and sediment traps or other sediment capture structures would be implemented to protect water quality. However, riparian vegetation would be damaged or destroyed completely with road construction in these types. The actual acres of riparian disturbance would be much less than the potential riparian vegetation in the road buffer.

Approximately three acres of willow and alder cover types fall within MDW pads. Design criteria stipulate MDW would not be located in riparian areas unless specifically authorized by a waiver. However, if MDW were located in riparian areas, vegetation would be damaged and destroyed and soils disturbed, increasing the potential for erosion and surface water sedimentation. Riparian sites would be reclaimed in the same manner as upland sites. However, due to additional available water, riparian vegetation often recovers faster than adjacent upland vegetation. Furthermore, riparian species would likely recolonize the area rapidly following reclamation due to favorable site conditions for hydrophilic vegetation.

Sensitive Plants

Surface disturbance from new road construction and MDW installation could affect sensitive plants if it happens to occur in the same location as a plant population. Design Criteria state appropriate populations or habitats will be surveyed on a site-specific basis prior to ground disturbance.

Colorado tansy-aster has not been documented in the project area, and if encounter would not be impacted by the proposed action. If populations are encountered they would be avoided or other mitigation would be implemented to avoid effects on plants or populations, where possible.

Rocky Mountain thistle may benefit by any drilling and associated surface disturbance by creating suitable habitat (Panjabi and Anderson 2004). If the species is present near an area of disturbance, it may be able to colonize newly disturbed areas. While this species may be adversely impacted by off-road vehicle use or inadvertent targeting of the species as part of a noxious weed control program, these impacts are not likely to occur as a result of the proposed project due to required design criteria (Table 2-2). Surveys for sensitive plants will be conducted in likely habitats before disturbance occurs and populations would be avoided or other mitigation implemented to avoid effects on plants or populations, if possible. During sensitive plant surveys, any occurrence of Rocky Mountain thistle would be flagged and mapped to avoid inadvertent herbicide application during weed treatments. Species identification information should also be provided to the weed control agent to further decrease the likelihood of species misidentification. For these reasons, there will likely be a beneficial impact to this species in the creation of disturbance areas suitable for propagation.

Table 3-8 displays the summary determination of effects for sensitive plants based on the effects analysis above.

Noxious Weeds

Surface disturbance and reduction of vegetation cover would provide suitable conditions for noxious weed invasion. Additionally, increased vehicle travel could spread noxious weed species into the area. New access roads and removal of Gambel oak allowing for greater movement by livestock could also increase weed spread. As a result, the potential for

Table 3-8 Summary Determination of Impacts on Forest Service Sensitive Plants			
Common Name	**Scientific Name**	**Alt. 1**	**Alt. 2**
Whitebristle cottongrass	*Eriophorum altaicum var. neogaeum*	No Impact	No Impact
Slender cottongrass	*Eriophorum gracile*	No Impact	No Impact
Lesser panicled sedge	*Carex diandra*	No Impact	No Impact
Lesser yellow lady's slipper	*Cypripedium parviflorum*	No Impact	No Impact
Simple bog sedge	*Kobresia simpliciuscula*	No Impact	No Impact
Wetherill milkvetch	*Astragalus wetherillii*	No Impact	No Impact
Arctic braya	*Braya glabella*	No Impact	No Impact
Rocky Mountain thistle	*Cirsium perplexans*	Yes	Beneficial impact
Roundleaf sundew	*Drosera rotundifolia*	No Impact	No Impact
Stonecrop gilia	*Gilia sedifolia*	No Impact	No Impact
Colorado tansyaster	*Machaeranthera coloradoensis*	No Impact	No Impact
Kotzebue grass-of-parnassus	*Parnassia kotzebuei*	No Impact	No Impact
Tundra buttercup	*Ranunculus karelinii (R. gelidus ssp. grayi)*	No Impact	No Impact
Hoary or silver willow	*Salix candida*	No Impact	No Impact
Autumn willow	*Salix serissima*	No Impact	No Impact
Sun-loving meadowrue	*Thalictrum heliophilum*	No Impact	No Impact
Lesser bladderwort	*Utricularia minor*	No Impact	No Impact
Park milkvetch	*Astragalus leptaleus*	No Impact	No Impact
Arizona willow	*Salix arizonica*	No Impact	No Impact

noxious weed establishment would increase over current infestation rates with increased travel in the area and ground disturbance, impacting plant communities in the project area.

To address this issue, design criteria require a herbicide use and weed control plan be approved by the Forest Service, annual weed monitoring as part of the weed control plan, MDW pad seeding and mulching, and power-washing project vehicles. Surface disturbance and reductions in vegetative cover would be mitigated by seeding and mulching disturbance areas including pads and staging areas, as well as providing resource competition if noxious weed do enter and area. Power-washing vehicles and equipment would reduce the probability weed seeds would be transported to the project area from the outside. These efforts combined with timely herbicide use would result in minor effects on native vegetation. Continued weed control may be required following project completion if weed populations happen to establish to the end of the project.

Cumulative Effects

Alternative 1

Since there would be no direct or indirect effects from the No Action alternative, there would be no cumulative effects.

Alternative 2

Vegetation has been affected by previous activities by MCC at lower elevations (north) of the project area, primarily as a result of road construction and installation of MDWs. The bulk of this affected vegetation has been oak brush, with lesser amounts of removal in aspen and spruce communities (USDA FS 2004). Because the bulk of the cover type in the proposed project area is Gambel oak (3,903 acres) and quaking aspen (1,788 acres), it is foreseeable that the bulk of the disturbance will occur in these upland vegetation types. In addition to vegetation removal, other effects include: a possible hardening of the site and/or compaction of soils where roads and vents are to be located, which could affect the future succession of vegetation; damage to tree trunks (especially thin-barked aspen) in the immediate surrounding resulting in weak and stressed trees; damage to tree roots as a result of blading or grade work; increased fuel load and the attraction of borers as result of the accumulation of large, woody debris; opening the forest and increasing the likelihood of windthrow; and introduction of noxious weeds.

Figure 10 shows typical vegetation re-establishment two growing seasons following reclamation in the Deer Creek area. Establishment of moderate ground cover, as experience on similar sites in the area, within two years post-reclamation mitigates the potential for soil erosion and further site degradation. Maintaining existing fencing around reclaimed areas immediately after seeding would improve reclamation success by deferring wildlife and livestock disturbance. Introduction of herbivores in newly reclaimed areas increases soil compaction, removes litter, and tramples seedlings slowing vegetation establishment.

Consistency with Forest Plan and other Regulations

The proposed action is consistent with the Forest Plan, NFMA, FSM 2670 at 2670.22 - Sensitive Species, Executive Order 11990 - Protection of Wetlands, and Executive Order 131120 - Invasive Species.

Figure 10. Reclaimed Methane Drainage Well

Fish and Wildlife

Affected Environment

The Deer Creek project area lies within the watershed of the North Fork of the Gunnison River. Elevations in the area range from approximately 6,700 feet amsl to approximately 9,120 feet amsl. Topography consists of small mesas dissected by drainage channels which have been incised by intermittent and perennial streams.

Terrestrial wildlife habitat consists of the vegetation cover types discussed in the *Vegetation* section. No old-growth habitat has been identified within the project area. There have been no old-growth surveys conducted in the project area.

Two perennial streams occur within the project area: the Dry Fork of Minnesota Creek and Deep Creek, neither is known to support a fishery.

Deep Creek is a small, flashy perennial stream with scoured banks and sediment deposits within the main channel. Deep Creek originates in a landslide feature. Stream width varies from 1 to 15 feet. Documented substrate types include bedrock, large and small boulders with mixed cobble, small boulders, cobble, coarse gravel, gravel, sand, and silt. Deep Creek is prone to blow-outs during large rain events; however, it still supports a moderately productive and diverse benthic community (WWE 1997). Open bench-land riparian areas characterize the upper reaches of Deep Creek; what were once beaver dams are now filled in with tall willow, alder, and sedges (*Carex* spp.). In addition to these natural riparian areas, there are some man-made stock ponds located in some of the intermittent streams that feed into Deep Creek from the west. These stock ponds are spring-fed by small perennial seeps and springs.

The Dry Fork of Minnesota Creek is a small intermittent stream with portions used as an irrigation ditch. The ditch causes a deep, incised channel and reduced flows. Stream width varies from 5 to 15 feet. Documented substrate types include small boulders, cobble, coarse gravel, gravel, sand, silt, clay, and cobble bed with a mix of gravel and sand. Limiting factors to a fishery include blow-outs, a highly erosive drainage, flow fluctuation due to irrigation, and excessive siltation. This creek is dominated by a shrub cover type consisting mainly of tall willows and alders (Wang 2004). This shrub-dominated area is probably a tall willow type consisting of Geyer's willow (*Salix geyeriana*), mountain willow (*S.* eastwoodiae), or Drummond's willow (*S. drummondiana*) with patches of Bebb willow (*S. bebbiana*) (Johnston 2004).

Management Indicator Species

Regulations for implementing the 1976 National Forest Management Act (NFMA) require that fish and wildlife habitat be managed to maintain viable populations of existing native and desired non-native vertebrate species within the planning area. The 1982 planning regulations provided guidance for implementation of NFMA and directed forests to select Management Indicator Species (MIS) as a method to 1) establish explicit Forest Plan objectives for wildlife and fish habitat, 2) analyze the degree to which the Forest Plan alternatives meet those objectives, and 3) monitor the effects of Forest Plan implementation (36CFR 219.19). The 1982 planning regulations have now been superseded by regulations published in the *Federal Register* on January 5, 2005 (the new rule), 70 Fed. Reg. 1022. In accordance with the new planning rule, 36 CFR 219.14(f) and the Forest Plan, there is no legal obligation relating to gathering population data for MIS at either the Forest or project level unless required by the local Forest Plan.

In March 2005, an EA/DN was prepared to amend the GMUG Forest Plan to address MIS and monitoring (USDA-FS 2005b). The amendment revises the MIS list in the Forest Plan to the following species: elk, Abert's squirrel, Brewer's sparrow, northern goshawk, Merriam's wild turkey, pine (American) marten, red-naped sapsucker and common trout (**Table 3-9**). The amendment also revises language in *Forest Direction and Standards and Guidelines for Management Areas* in the Forest Plan, and the Monitoring Plan. The revised language eliminated the project or forest-level requirement to monitor population numbers or trends.

Of the MIS, five have been identified to occur or have habitat within the project area, including: elk, Merriam's wild turkey, red-naped sapsucker, American marten and northern goshawk. Abert's squirrel and Brewer's sparrow or their habitat do not occur within or adjacent to the analysis area; therefore, these species would not be affected. Stream habitats within the project area do not support Colorado River cutthroat trout, rainbow, or brown trout (common trout) due to

their inherent high sediment loads and intermittent stream flows (**Figure 5**).

There are 74 acres of spruce fir habitat suitable to support pine marten (American marten) within the project area; however, the habitat is isolated and marginal (**Figure 9**). Because spruce-fir habitat makes up a very small percentage of the project area (1.2%) and would receive minimal surface disturbance, the proposed project will not affect pine marten; therefore, this species will not be discussed further.

MIS Species Potentially to Occur within the Project Area

Rocky Mountain Elk

A life history, biology, and habitat requirements for elk can be found in the Forest MIS Assessment (USDA FS 2001b). Elk are typically associated with semi-open forests and forest edge habitat adjacent to parks, meadows, and alpine tundra. Elk will both graze and browse, with grass and shrubs being heavily utilized in the winter and forbs becoming important for the spring and summer. Elk tend to migrate to high elevations in the summer and lower elevations for the winter. The Deer Creek area has been identified as elk overall, summer and winter range by the Colorado Department of Wildlife (CDOW) (see project file). Essentially all habitat types on the GMUG are suitable elk habitat (total suitable habitat is 3,433,217 acres). There are 6,035 acres of habitat suitable to elk within the project area or 0.2 percent of the habitat Forest-wide.

Table 3-9
Management Indicator Species for the GMUG National Forests (May 2005)

Common Name	Scientific Name	Habitat Association as described by Cover Type	Habitat or Species Present Within the Project Analysis Area?
Rocky Mountain elk	*Cervus elephus*	Early succession spruce-fir, Douglas-fir, lodgepole, aspen, mountain shrub. Also MIS for travel management.	Species and habitat present
Merriam's wild turkey	*Meleagris gallopovo merriami*	Pinyon-juniper, Gambel oak, mountain shrub, and lower elevation ponderosa pine habitats. Highly dependent on healthy Gambel oak acorn crop and pinyon pine nut crop.	Species and habitat present
Brewers sparrow	*Spizella breweri*	Sagebrush shrubland habitats	No
Red-naped sapsucker	*Syphyrapicus nuchalis*	Aspen and highly dependent upon infected aspen over 10 inches dbh. Species observed adjacent to project area during field surveys (Ward and Monarch 2005).	Species and Habitat present
Abert's squirrel	*Sciurus aberti*	Late-succession ponderosa pine	No
American marten	*Martes americana*	Late-succession spruce-fir, lodgepole pine	Habitat present
Northern goshawk	*Accipiter gentillis*	Late-succession aspen, aspen/mixed conifer	Habitat present
Common trout (cutthroat, brook, rainbow and brown trout)		Instream and riparian habitats	No

Approximately 2,601 acres of the suitable elk habitat within the project area is elk winter range. The winter range is located within the northern and northwestern portions of the project area. This habitat is primarily composed of aspen, Gambel oak, and mountain meadows.

Habitat for elk has improved on the GMUG as range management practices have been implemented and range condition has recovered from the livestock overgrazing that occurred in the early 1900s (USDA FS 2001b). Elk populations have been relatively stable or growing over the GMUG for the last decade.

Habitat Effectiveness (HE) for Elk: Elk HE is adversely influenced by the presence of open roads and trails (Thomas *et al.* 1979; Hoover *et al.* 1984). In general, habitat effectiveness decreases in proportion to the amount of motorized routes per square mile of habitat (Lyon 1983). This research is the basis for the Forest Service's HABCAP model used to determine habitat effectiveness. The factors considered when determining effects on elk are forage, cover (both thermal and hiding), route density (the miles of routes in a specific area), and the amount of motorized use along these routes. The Forest Plan identifies HABCAP as the model to be used to integrate these factors into calculated values to be used for assessing and comparing habitat conditions which may result from alternatives.

The Forest Plan requires the FS to "Manage public motorized use on roads and trails to maintain or enhance effective habitat for elk" (Page III-76) and sets a Forest-wide objective of elk HE at 40 percent (Page III-76). The Forest Plan also indicates that an acceptable method for determining HE is using the USFS Region 2 Habitat Capability computer model (HABCAP) (Page III-77). Previous HABCAP modeling completed on the Forest and adjacent to the project area indicates that the elk HE objective of 40 percent is being met (USFS 2002a). In 2002, HE was modeled and determined for the Coal Methane Drainage Project Panels 16-24 project analysis area and EA to be 33 percent for the years of active MDW operation from 2002 to 2007 and then increase to 48 percent at completion of the MDW project post 2007. The increase is a result of decommissioning project roads and user-developed ATV trails.

Merriam's Wild Turkey

Turkeys will utilize ponderosa pine and Gambel oak forests, grassland and shrubland meadows, riparian areas, aspen forests and higher elevation coniferous forests during the spring, and migrate to lower elevations in the winter. Important habitat features for turkeys include diverse understory and horizontal structure for nest cover, and dense conifer stands for thermal cover and pine seeds during the winter.

Within the GMUG Forest, the abundance and distribution of turkeys correlates to the availability of ponderosa pine, pinyon-juniper with ponderosa pine stringers, Gambel oak, and forest-meadow edges within or adjacent to these vegetation types (USDA FS 2005b). Turkeys use a variety of seasonal habitats, ideally with structural diversity within and between stands. Turkey populations on and adjacent to the Forest are apparently self sustaining and healthy enough to support both a spring and fall hunting season (USDA FS 2005b). The population of turkeys within Colorado has been expanded as a result of transplanting efforts by the CDOW. CDOW has conducted turkey reintroductions adjacent to the Forest in the last 16 years that may have contributed to local turkey populations and expanded turkey distributions. State-wide, there are an estimated 21,000 Merriam's turkeys (USDA FS 2005b).

Due to the diversity of habitats that turkeys utilize, all communities within the project area could potentially provide habitat for turkeys depending on the season. Approximately five years ago, the CDOW released 25 turkeys within the project area. While turkey surveys

have not been completed in the area, the current CDOW estimate of winter turkey populations within the Minnesota Creek drainage is approximately 30-40 turkeys (Madariaga 2007).

Red-naped Sapsuckers

Red-naped sapsuckers are associated with aspen forests or conifer forests mixed with aspen. They are most strongly associated with mature aspen. Aspen is important for successful reproduction and foraging, especially in close proximity to small openings and riparian zones. They will preferentially nest in aspen, even when conifer snags are available. Red-naped sapsuckers construct new cavities each year, frequently in the same tree. Nest trees are either green with heart rot, or dead. Their territory size is 5-12 acres. In Colorado, nest trees average 9.2 inches dbh and 3-35 feet in height (CPIF 2005f). Orientation of nest cavities is generally southward. Their diet consists of insects, tree sap from sap wells, and some fruits; they also hawk flying insects. Abandoned nest cavities are important to many secondary cavity nesters.

Population trends of this species are not adequately monitored by the Breeding Bir Survey in Colorado, but populations appear to be stable or slightly increasing at the continental scale. They were present on an average of 49.86 percent of the survey routes in Physiographic Area 62 in Colorado, 1988-1998, at an average abundance of 1.11 individuals per route (CPIF 2000f). Physiographic Area 62 covers much of the central region of Colorado. This physiographic area encompasses the majority of the forested lands in Colorado. This species is monitored by the Rocky Mountain Bird Observatory − Monitoring Colorado Birds with point transects.

Northern Goshawk

Northern goshawks are associated with mature forests and can use a variety of forests such as coniferous, deciduous, or mixed forests. On the GMUG, goshawks are strongly associated with mature aspen stands, although they also use mature ponderosa pine, lodgepole pine and spruce/fir stands (USDA FS 2001b). There are 730,525 acres of suitable goshawk nesting habitat on the GMUG (USDA FS 2001b) and 1,788 acres in the project area (0.2 percent of Forest-wide). This habitat is primarily composed of aspen.

Northern goshawks appear to be well distributed throughout the GMUG, based on the current available information (USDA FS 2001b) and goshawk populations are stable, and ample suitable habitat is available to support a viable population (USDA FS 2001b). Goshawks are known and documented to occur and nest within the Paonia District. Although nest sites have not been documented within the project area, suitable habitat is present.

A total of 110 active, alternative, and suspected goshawk nests have been found across the Forest. A total of 57 known active goshawk nests have been found between 1992 and 2003; over 90 percent of the nests built and occupied by goshawks are in aspen trees. Between 1992 and 2003 there have been 28 designated goshawk territories reported (LeFevre 2004). These territories are known to have been occupied by goshawks for one year or more. A minimum of 10 pairs of breeding birds has been provided as an estimate of a local viable goshawk population on the GMUG (USDA FS 2001b). Based on monitoring since 1984, there is a high probability that there are more than 10 goshawk pairs that have been surviving and reproducing on the GMUG.

Migratory Birds

Executive Order (EO 13186) enacted in 2001 requires federal agencies to consider the effect of projects on migratory birds, particularly those species for which there may be conservation concern. Migratory bird species of concern, for which project-level conservation opportunities may be applicable, are identified

by the Endangered Species Act, the Regional Forester's sensitive species list, the Forest's MIS list, and the U.S. Fish and Wildlife Service's Birds of Conservation Concern list (U.S. Fish and Wildlife Service 2002). This portion of the analysis is focused on reviewing the U.S. Fish and Wildlife Service's Birds of Conservation Concern list. Of the 16 bird species evaluated in the list (see the project file), eleven species are not expected to occur within or near the project area due to lack of habitat, and five species have habitat in or near the project area. The species on the Birds of Conservation Concern list that are not already evaluated in the Biological Assessment, Biological Evaluation or as an MIS, are: golden eagle, Swainson's hawk, peregrine falcon, Virginia's warbler, and Williamson's sapsucker.

Species associated with upland mountain shrublands include Virginia's warbler. This species is closely associated with mountain shrub habitats dominated by Gambel oak. Williamson's sapsucker is a bird species of concern that is dependent on snags and tree cavities. Williamson's sapsuckers are primary cavity excavators that are fairly common in the project area. This species constructs cavities in aspen greater than about nine inches in diameter (Tobalske 1997, Winn 1998, Yanishevsky and Petring-Rupp 1998, Schultz 2001). Aspen is the most abundant forested habitat within the project area, providing high quality habitat for snag and cavity-dependant birds because of the typically high number of standing dead trees and abundant tree cavities present, especially where aspen is mixed with other conifer trees. Both golden eagles and Swainson's hawk utilize open grasslands or agricultural lands, commonly with scattered trees or shrubs.

Threatened, Endangered and Sensitive Species

Table 3-10 displays the threatened, endangered and sensitive wildlife species that have been identified by the U.S. Fish and Wildlife Service (USFWS) and the Forest Service to potentially occur within the Deer Creek project area.

Bald Eagle

Bald eagles are typically associated with rivers and lakes, commonly with abundant fish. In Colorado, they are often located near reservoirs. Their diet consists primarily of fish, but they will also eat waterfowl, rodent, and carrion. Nesting typically occurs within mature riparian areas near rivers or lakes with healthy fish populations.

According to the 2006 CDOW Bald Eagle Monitoring Report, there are nearly 80 nest sites that have been occupied within the last five years in the state of Colorado. The breeding bald eagle population has substantially increased over the last 30 years, and the increase appears to be continuing. The CDOW monitors outcome at greater than 40 nests yearly, with eaglets banded at about a third of the monitored nests.

There are no current or historic records of bald eagle nests within the North Fork of the Gunnison drainage. The drainage has been designated by the CDOW as bald eagle winter range. There are approximately 85 acres of bald eagle winter foraging habitat located within the northwestern portion of the project area; however, no perch sites or roost sites are known to occur within the project area (USFS 2007).

Canada Lynx

Canada lynx was listed as a threatened species under the Endangered Species Act in 2000. Contrary to what was once believed, biologists now think that lynx were relatively common in Colorado prior to the early 1900s (Ruediger *et al.* 2000). In 1999, the CDOW began a re-introduction effort after biologists determined that, while lynx persisted in many areas, their populations were too small to be self-sustaining (Ruedriger *et al.* 2000). To date, 166 lynx have been released into the San Juan Mountains. Primary habitat for lynx in the southern Rocky

Mountains occurs in sub-alpine and upper montane forests between 8,000 and 12,000 feet elevation (Ruedriger *et al.* 2000).

The project area is within the Mount Gunnison lynx analysis unit (LAU) (**Figure 11** see **Table 3-10**) and contains mapped denning habitat, winter foraging habitat and "other" habitat

Figure 11. Lynx Analysis Areas and Habitat

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
WILDLIFE			
Bald Eagle (Haliaeetus leucocephalus)	T	Directly associated with aquatic environments as they tend to occupy riparian or lacustrine areas. Nesting and roosting occurs in large, dominant live trees or snags with open crowns and are typically found within 2 miles of a significant, permanent waterbody (Anthony and Isaacs 1989).	Yes – Although no nest sites or winter roosts have been identified within project area, the CDOW has identified approximately 85 acres of winter/foraging habitat to occur within the northwestern portion of the project area.
Canada Lynx (Lynx Canadensis)	T	Douglas fir, western spruce/fir and fir/hemlock vegetation types. A mosaic of habitat conditions is required with denning habitat existing primarily in mature and old growth conifer stands at high elevations, while foraging habitat is found in early successional coniferous forests (Butts 1992).	Yes – The project area is located within a Lynx Analysis Unit (LAU) and suitable lynx habitat does occur.
Mexican Spotted Owl (Strix occidentalis lucida)	T	Typically found at the bottom of steep, sheer-walled canyons where they nest and forage in mature to old growth mixed coniferous forests. Preference for high canopy closure with open understory.	No – The project area does not contain the required topography and forest stand structure.
Uncompahgre Fritillary Butterfly (Boloria acrocnema)	E	Now confined to small isolated patches of habitat located above 12,000 feet in the San Juan Mountains. This butterfly lives in association with snow willows and has small population size and low genetic variability.	No – The project area lies below the identified elevation zone.
American Bittern (Botaurus lentiginosus)	S	Associated with emergent wetlands, cattail marshes, sedge meadows and occasionally wet fields or grasslands with tall vegetation. Nesting habitat typically entails shallow wetlands with dense vegetation.	No – Only a minimal amount of grassland habitat and marginal wetlands occur within the project area.

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
American Marten (Martes americana)	S	Typically dense stands of mature and old-growth coniferous forest, with canopy cover over 30 percent, for denning, resting, and foraging (Clark and Casey 1989).	Yes–Only a small portion of the project area is coniferous forest (138 acres) and old growth habitat has not been identified. Spruce-fir habitat makes up a very small percentage of the project area (74 acres).
American Three-toed Woodpecker (Picoides dorsalis)	S	Core habitats are old growth spruce-fir, as well as lodgepole pine and ponderosa pine forests. Areas recently burned or infested by insects will also be exploited when possible. Breeding typically occurs at elevations above 8,000 feet (Wiggins 2004).	Yes – a small portion of the project area is coniferous forest (138 acres) and old-growth habitat has not been identified. Spruce-fir habitat makes up a very small percentage of the project area (74 acres).
Black Swift (Cypseloides niger)	S	The habitat constraint is nesting habitat which occurs on cliffs, crevices or ledges, commonly near or behind waterfalls (CPIF 2000a). Foraging habitats occurs within a variety of vegetation communities; typically in high elevation montane forest or adjacent lowlands.	No – Nesting habitat (i.e., cliffs or waterfalls) does not occur within the project area and area does not represent high elevation, montane forest.
Boreal Owl (Aegolius funereus)	S	Typically found in mature to old growth coniferous forests, especially spruce and occasionally lodgepole pine. Areas with large basal area trees, high canopy cover and less understory vegetation tend to be preferred (CPIF 2000b).	Yes - a small portion of the project area is coniferous forest (138 acres) and old-growth habitat has not been identified. Spruce-fir habitat makes up a very small percentage of the project area (74 acres).

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
Boreal Toad (Bufo boreas)	S	Typically found in alpine and spruce-fir forest meadows above 7,000 feet elevation (CDOW 2004b). Breeding occurs in shallow areas of lentic or slow moving waters with mud bottoms and can include lakes, marshes, ponds and bogs.	No – While boreal toad habitat could occur along Deep Creek and any other wetland type areas within the project area, there are no documented sightings of boreal toads. The closest documented boreal toad population is approximately 15-20 miles away from the project area, well outside their range for dispersal (Mortenson 2007). Boreal toads have been re-introduced at a location on the Grand Mesa. No re-introduction is planned for the project area (Rogers 2005).
Brewer's Sparrow (Spizella breweri)	S	Closely associated to sagebrush, where it breeds in tall, dense stands or stands broken up by grassy openings. They also nest in other shrubs, such as willows, mountain mahogany, rabbitbrush, and snowberry.	No – Sagebrush habitat does not occur within or adjacent to the project area.
Burrowing Owl (Athene cunicularia)	S	Habitat found in open, dry grasslands, agricultural, rangelands and desert habitats often associated with burrowing animals, particularly prairie dogs, ground squirrels and badgers.	No – A very small portion of the project area is grassland (15 acres) and has minor populations of burrowing animals (i.e., prairie dogs).
Ferruginous Hawk (Buteo regalis)	S	Commonly associated with native grasslands and sagebrush grasslands. They typically inhabit areas that have minimal disturbance.	No – The project area has very minimal grassland habitat (15 acres) and these areas are surrounded by unsuitable habitat as 97 percent of the project area is deciduous forest.
Flammulated Owl (Otus flammeolus)	S	Strongly associated with ponderosa pine forests and prefer open, single-storied stand structures. Areas that are composed predominately of mature ponderosa / Douglas-fir are occupied most often.	No – The project area does not have Ponderosa pine or Douglas-fir habitat. The project area is dominated by deciduous forest.

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
Fringed Myotis (Myotis thysanodes)	S	Utilizes coniferous forests and woodlands within moderate elevation zones (below 7,500 feet) such as ponderosa pine, pinyon-juniper, greasewood, saltbush and scrub oak (CDOW 2004a). Roost sites are found in rock crevices, abandoned mines, old buildings and trees.	No – Maximum elevation that this species occurs at in Colorado is 7,500 feet and the project area occurs at a higher elevation.
Gunnison's Sage Grouse (Centrocercus minimus)	S, C	Sagebrush obligate- Big sagebrush is utilized as primary food source and cover type. Summer and brood rearing habitat typically occurs in flat areas with gentle rolling hills and a strong presence of forbs and wet meadows.	No – Sagebrush grassland habitat does not occur in the project area and there are no known occurrences of sage grouse within the project area.
Gunnison's Prairie Dog (Cynomys gunnisoni)	S	Shortgrass prairies or shrublands occurring in high mountain valleys and plateaus. Typically found between elevations of 5,000 to 12,000 feet (Sevilleta LTER 1998).	No - The project area has very small, isolated patches of grassland or shrubland habitat and these areas are surrounded by unsuitable habitat.
Kit Fox (Vulpes velox)	S	Semi-desert shrubland and margins of pinyon-juniper woodland. Habitat typically has a saltbush, shadscale, sagebrush and greasewood presence.	No – A very minor portion of the project area is shrubland (115 acres) and is surrounded by unsuitable habitat.
Lewis' Woodpecker (Melanerpes lewis)	S	Breeding habitat occurs in low elevation, open forests of pine or cottonwood. The species nests in cavities of large dead or decaying trees, usually pine or cottonwood.	No – The project area is not low elevation and has very limited pine or cottonwood forests. In addition, there have been no documented occurrences within area.
Loggerhead Shrike (Lanius ludovicianus)	S	Utilize a variety of habitats such as grassland prairies with scattered trees, riparian areas, woody draws or cultivated lands with shelterbelts.	Yes – Suitable habitat is available within project area and species has been observed during wildlife surveys in areas adjacent to and representative of the project area (Ward and Monarch 2003; Ward and Monarch 2005).

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
Northern Goshawk (Accipiter gentilis)	S	Forest habitat generalist, although, they tend to avoid young, dense forests. Optimal habitat are forest stands with canopy cover greater that 60 percent, overstory trees greater than 15 inches in diameter, and a presence of dead or defective trees greater than 10 inches in diameter (Reynolds et al. 1992).	Yes – Suitable habitat does occur within the project area; although, no known nest sites have been documented.
Northen Harrier (Circus cyaneus)	S	Can occur and breed in a variety habitats. Typically associated with open grassland and wetland areas such as wet meadows, marshes, dry upland prairies, cropland and riparian woodlands.	No –Wetland, marsh or grassland habitat is lacking within the project area.
Northen Leopard Frog (Rana pipiens)	S	Commonly found in heavily vegetated wetlands such as valley bottom ponds, spillway ponds, beaver ponds, stock reservoirs, lakes, creeks, pools in intermittent streams, warm water springs potholes and marshes.	Yes – Suitable habitat does occur within the project area; there is the potential for occurrence.
Olive-sided Flycatcher (Contopus borealis)	S	Primarily select for open, mature coniferous forests, especially when adjacent to open meadows or wetlands.	Yes – Suitable habitat is available within project area and species has been observed during wildlife surveys in areas adjacent to and representative of the project area (Ward and Monarch 2004; Ward and Monarch 2005).
Peregrine Falcon (Falco peregrinus)	S	Inhabit open country near rivers, marshes or coasts. Nest sites on cliffs that are usually higher than 200 feet, with overhanging ledges or holes and a vertical surface.	Yes – This species has been documented to occur in areas adjacent to the project area (Ward and Monarch 2003) and the project area could be utilized as foraging habitat.
Purple Martin (Progne subis)	S	Typically found near water, associated with aspen woodland habitat. Also may utilize ponderosa pine, Douglas fir and riparian woodland forests.	Yes – Suitable habitat occurs within the project area and there is the potential for occurrence.

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
River Otter (Lontra canadensis)	S	Require access to open, permanent water source and prey species such as fish, frogs and crayfish. Habitat can include rivers, lakes, marshes, swamps and estuaries.	No – Project area does not provide required food sources or adequate water sources.
Sage Sparrow (Amphispiza bellii)	S	Open, shrublands, commonly in sagebrush grassland areas. Preference for dense stands of sagebrush with a modest amount of understory vegetation.	No – Sagebrush grassland does not occur within the project area and only minimal, isolated shrubland occurs.
Spotted Bat (Euderma maculatum)	S	A variety of habitats are utilized such as ponderosa pine, pinyon-juniper woodland and shrub desert Research suggests that preference is given to areas that have cliffs and water (CDOW 2004a).	Yes – Suitable habitat does occur within the project area.
Townsend Big-eared Bat (Corynorhinus townsendii)	S	Typically utilizes woodlands and forests below 9,500 feet (CDOW 2004a). Tendency to roost and hibernate in open areas, not crevices, such as caves, abandoned mines, tunnels and old buildings.	Yes – Suitable habitat does occur within the project area.
Trumpeter Swan (Cygnus buccinator)	S	Shallow lakes, ponds or marshes with abundant foods sources such as aquatic plants, insects and snails. Preference for areas with a low level of human disturbance.	No – Project area does not provide the necessary aquatic areas for this species.
White-tailed Prairie Dog (Cynomys leucurus)	S	Grassland, sagebrush grassland and mountain valley habitat. Found in northwestern Colorado between elevations of 3,700 to 10,500 feet.	No – Project area has very small, isolated patches of grassland or shrubland habitat and these areas are surrounded by unsuitable habitat.
White-tail Ptarmigan (Lagopus leucurus)	S	Typically occupy alpine forests with a wide variety of plant habitats. Summer habitat occurs in rocky areas that have a presence of moist vegetation. Winter habitat occurs in willow dominated basins or riparian areas below the tree line.	No – No alpine and minimal, marginal subalpine forests occur.

Table 3-10
Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area

Species	Status[1]	Habitat Description	Species/Habitat Present?
Wolverine (Gulo gulo)	S	Low-density, wide-ranging species that inhabits remote forested areas, ranging over a variety of habitats. Large home ranges ranging from 160 to 1,440 mi^2 (Banci 1994).	No – Suitable habitat does not occur.
Yellow-billed Cuckoo (Coccyzus americanus occidentalis)	S,C	Reliant on healthy, low elevation riparian areas with tall, deciduous forests and canopy closure. Most nesting territories have large, slow moving streams, ponds and lakes present	No – The project area is not low elevation.
FISH			
Bony Tail Chub (Gila elegans)	E	This species or critical habitat for this species is not present within the project area.	Although the species and habitat are not found within the project area, water depletions could potentially impact Colorado River populations.
Colorado Pikeminnow (Ptychocheilus lucius)	E	This species or critical habitat for this species is not present within the project area.	Although the species and habitat are not found within the project area, water depletions could potentially impact Colorado River populations.
Humpback Chub (Gila cypha)	E	This species or critical habitat for this species is not present within the project area.	Although the species and habitat are not found within the project area, water depletions could potentially impact Colorado River populations.
Razorback Sucker (Xyrauchen texanus)	E	This species or critical habitat for this species is not present within the project area.	Although the species and habitat are not found within the project area, water depletions could potentially impact Colorado River populations.
Colorado River Cutthroat Trout (Oncorhynchus clarki pleuriticus)	S	Neither the species nor their habitat occurs within the project area.	No – Species does not occur.

Table 3-10 Threatened, Endangered and Sensitive Species Potentially to Occur within the Project Area			
Species	**Status[1]**	**Habitat Description**	**Species/Habitat Present?**
Roundtail Chub (Gila robusta)	S	Neither the species nor their habitat occurs within the project area.	No – Species does not occur.
Bluehead Sucker (Catostomus discobolus)	S	Neither the species nor their habitat occurs within the project area.	No – Species does not occur.
Flannelmouth Sucker (Catostomas latipinnis)	S	Neither the species nor their habitat occurs within the project area.	No – Species does not occur.

1 T = Threatened, S= Sensitive, C= Candidate, E = Endangered

Source: Rocky Mountain Region Endangered, Threatened, Proposed and Sensitive Species List; April 2005.

(capable but currently not denning or winter foraging habitat). Within the project area, there are approximately 99 acres of suitable denning habitat which represents two percent of the denning habitat in the LAU, 55 acres of mapped winter foraging habitat which represents 13 percent of the winter foraging habitat in the LAU, and 2,918 acres of other" habitat which represents 20 percent of the other habitat in the LAU. The denning habitat is comprised of spruce-fir community that has more than 40 percent canopy cover and large to very large trees and aspen forest that has a canopy cover of more than 40 percent and 40 percent or more conifer-only tree stands with size class of large or very large trees. The winter foraging habitat in the project area is spruce-fir community with canopy cover of more than 40 percent and all stands with small or medium trees.

Little information is available on the status of lynx within the GMUG Forest or the project area. However, aerial surveys completed by the US Fish and Wildlife Service lynx in December 2006 did provide additional insight into the distribution of lynx on the GMUG. There were no sightings of lynx within the project area or within the Deep Creek, Minnesota Creek or Raven Creek areas. Lynx were observed in the Taylor Park area and on the south side of the Gunnison Basin (Madariaga 2007). In addition, lynx have been observed in the West Elk Mountains adjacent to the project area (USDA FS 2003), and while the project area represents only marginal lynx habitat, it is possible that transient lynx could utilize the area

Northern Leopard Frogs

Northern leopard frogs have been declining in Colorado as a result of habitat alteration, habitat loss, and predation from introduced species. Northern leopard frogs are known to occur within the North Fork Gunnison River (Hammerson 1999). In addition, they are known to occur and breed within the Paonia District. These frogs are typically found in ponds or areas with still water, but occasionally in intermittent streams and springs. There is the potential for northern leopard frogs to exist within the fringe areas of Deep Creek and Dry Fork Minnesota Creek or in any of the identified marshes and intermittent lakes, stock ponds, springs and seeps within the project area.

Loggerhead Shrike

Loggerhead shrike populations have been declining in Colorado due to habitat loss. Loggerhead shrikes tend to prefer areas with a significant presence of shrubs and forbs (Dechant *et al.* 1998). Approximately 11 percent of the project area is representative loggerhead shrike habitat. Loggerhead shrikes are assumed to utilize the suitable habitat available within the project area as the species has been observed during wildlife surveys in areas adjacent to and representative of the project area (Ward and Monarch 2003; Ward and Monarch 2004; Ward and Monarch 2005).

Northern Goshawk

Goshawks are discussed above under *Management Indicator Species*.

Olive-sided Flycatchers

Olive-sided flycatchers have been in decline within certain portions of Colorado. They are seasonal migrants within Colorado and, although limited, suitable olive-sided flycatcher habitat does occur within the project area and this species has been documented within representative areas adjacent to the project area (Ward and Monarch 2003; Ward and Monarch 2004; Ward and Monarch 2005). They can be associated with burned areas or areas with a many snags and will use tops of snags, high exposed limbs, or cliff sides for foraging.

Peregrine Falcon

Peregrine falcons are found in a variety of habitats and foraging habitat commonly occurs in open grasslands and meadows, forested treetop areas, around lakes and rivers, and shrub steppe communities. Nest sites are located on cliffs and outcrops from 4,550 ft to

9,000 ft elevation (CPIF 2000d). Cliff habitat suitable to nesting peregrines occurs near the project area along the edges of the West Flatiron. A peregrine falcon was observed in the vicinity of West Flatiron during a breeding bird survey (Ward and Monarch 2003). The CDOW has reintroduced peregrine falcons to many of their historic nest sites and there are approximately 100 nest sites in the state. In Colorado, peregrine falcons are rare summer residents and are occasionally observed in the North Fork Valley. There have been three nest sites identified on the Paonia Ranger District. There are known nest sites near the town of Crawford and in the Black Canyon. Colorado's peregrine falcon population is stable and expected to meet the objective of 100 to 120 nests statewide by 2012 (Taylor1995). Nesting habitat for peregrine falcons is not present within the project area, as there are no cliffs or rock outcrops; however, foraging habitat is represented.

Purple Martin

Purple martin typically occur in aspen-dominated woodlands and are obligate, secondary cavity nesters selecting for cavities in trees or snags with a diameter of 14 inches or larger (CPIF 2000e). Monitoring in Colorado has not been adequate to determine population trend. Purple martins have been documented to breed within the North Fork Gunnison River watershed and have been found nesting on the Paonia Ranger District.

Nesting habitat is typically found in mature aspen at mid-elevation (between 8,000 and 9,500 feet), near areas of open water and meadow openings. Approximately 31 percent of the project area is aspen woodland that is suitable purple martin habitat.

Spotted Bat

There is limited information available on the distribution of spotted bats on the GMUG. Spotted bats use a variety of habitats, although cliffs, rock outcrops and water are important habitat attributes. Spotted bat habitat likely occurs is areas throughout the project area and adjacent areas. There are no documented sightings of spotted bats within the project area; however, suitable roosting and foraging habitat is available and it is likely that the bats utilize the area.

Townsend's Big-eared Bat

Townsend's big-eared bats are known to occur throughout much of Colorado and there is the potential for them to utilize the project area. They are known to forage in a variety of habitats and typically roost in caves, abandoned mines and buildings or other man-made structures (CDOW 2004a). Although roosting habitat is not present within the project area, foraging habitat is represented.

Direct and Indirect Effects

Alternative 1

Alternative 1 would result in no disturbance to wildlife and habitat loss due to the project. Wildlife and wildlife habitat would continue to be managed as it currently is and impacts to wildlife species would not occur. This alternative has the highest likelihood of maintaining habitat diversity and function influencing wildlife species diversity and densities. There would most likely be no "human footprint" beyond what exists. Areas would not need to be revegetated; therefore, vegetation would continue to follow natural ecological processes. There is less possibility of created edges and fragmentation of habitats into smaller patches due to road and pad construction.

Alternative 2

Project Construction

Installation and development of the proposed ventilation shaft, MDWs, and associated roads could cause direct injury or mortality to wildlife species. Activities such as: site clearing and grading; construction of access roads and support facilities; and, vehicular travel during construction, could impact wildlife species. Species with the higher likelihood to be

impacted would include species with limited mobility, species that burrow, or avian species, as nests/burrows could be destroyed during project construction. Construction related disturbances within a given area would be short term and confined to the construction site or adjacent storage areas.

The installation and development of the proposed ventilation shaft, MDWs, staging areas, and associated roads would result in some habitat loss and fragmentation. Construction activities such as site clearing and grading for installation of MDWs and staging areas would result in approximately 122 acres potential habitat loss for species within the project area (118 acres for MDWs and four acres for staging areas). Loss of habitat and disturbance related to roads would occur as a result of newly constructed roads and upgraded existing roads (approximately 67 acres). In addition, winter range lease stipulations would be released and this would allow construction activities for the shaft to occur during the critical winter season. Due to increased energy needs and restricted energy budgets, wildlife can be sensitive to disturbance during winter months as it can force them to disperse and consequently increase energy demands.

The incremental installation and reclamation would lessen the impacts of disturbance. All disturbed areas would ultimately be reclaimed and seeded with grass and forb seed mixes. Reclamation would eventually restore the habitat to pre-disturbance conditions; however, prior to complete recovery, there would remain a footprint within disturbance areas and this may alter, on a small scale, the manner in which wildlife use the area, i.e. wildlife may forage in footprint areas or use them as travel corridors.

Construction activities would result in disturbance and behavioral interference. Noise, fugitive dust, and activities associated with site clearing and grading, installation of MDWs and the ventilation shaft, construction of access roads and support facilities could disturb and displace wildlife within and adjacent to impact areas. All wildlife species within or near impact areas would be susceptible to disturbance and disturbance would have the greatest impact during migration and breeding seasons. Some species with small home ranges or limited dispersal ability might experience a greater impact. These disturbances would be short term within a given portion of the project area, concentrated within the activity area (approximately 0.8 acres per drill pads), and would occur at an average installation rate of approximately 12 drill pads per year over a period of 10 years.

The project construction activities could also result in accidental exposure to contaminants. Accidental spills during equipment maintenance or refueling could result in temporary exposure to hazardous contaminants. However, spill prevention plans would be in place and impacted areas would be immediately reclaimed. In addition, exposure would be temporary and restricted to the site of spill; thus, impacts on wildlife would be unlikely.

The increase in roads would not increase public access to the areas as mine operation specific roads would not be open to the public. During reclamation phases, MCC would be closing user-created routes and therefore, reducing public access to the area

Operation of Methane Drainage Wells

The operation of the MDWs would result in minor disturbances to wildlife within the project area throughout their operation. The noise disturbance associated with the MDWs would be minimal. Exhausters would be running in various areas throughout the project and the noise emitted from the exhausters may deter wildlife from using areas immediately adjacent. The expected noise levels would be approximately 83 decibels when standing one to two feet away from the exhausters. The greatest disturbance associated with the operation of the MDWs would result from the regular maintenance visits. After installation of

the wells, inspections would occur twice per day, and this would be decreased to weekly as determined by MSHA. The vehicle traffic along roadways associated with these maintenance visits may result in noise disturbance to wildlife and, in rare instances, injury and death as a result of vehicle collisions.

Reclamation

All disturbed areas would be reclaimed to their pre-disturbance grade and vegetation (see the *Vegetation Section* for more detail on vegetation reclamation). Reclamation activities would occur throughout the life of the project; however, the majority of the activities would occur during the years of 2013, 2018, and 2020. It would take at least three to five years before the vegetation and habitat begins to resemble the pre-disturbance composition and structure. However, as the reclaimed areas reestablished, this would create an edge effect and would be beneficial to some species, such as elk and deer. Prior to complete recovery, there would remain a footprint within disturbance areas and this may alter, on a small scale, the manner in which wildlife use the area, i.e. wildlife may forage in footprint areas or use them as travel corridors.

Management Indicator Species

Rocky Mountain Elk

The Proposed Action would result in short-term impacts to elk due to direct habitat loss and disturbance related to construction activities and vehicle travel on roads. Approximately 122 acres of suitable elk habitat, including 37 acres of elk winter habitat, would be disturbed and temporarily unavailable due to the construction of drill pads and staging areas and operation of MDWs. Roads (new, upgraded, and existing) would have short-term impacts on approximately 169 acres of suitable elk habitat, including 67 acres of elk winter habitat. Disturbance associated with roads has been identified as a factor in reducing the quality of elk habitat (Lyon 1983). The temporary roads associated with the proposed action would disturb and potentially displace elk; however, these roads would be constructed and reclaimed in annual increments throughout the life of the project and this would reduce the impacts. In addition, winter range lease stipulations would be released and this would allow construction activities for the shaft to occur during the critical winter season. Due to increased energy/heat needs and restricted energy budgets, wildlife can be sensitive to disturbance during winter months as it can force them to disperse and consequently increase energy demands. This can negatively impact the health of wintering elk and ultimately can reduce reproductive rates. This would be particularly true for elk as these activities would occur within elk winter range. After MDWs are established and vehicle travel to the sites occurs only weekly, the disturbance to elk would be reduced.

The HABCAP model was used to determine potential impacts of the proposed action on elk within the project area. The HABCAP model evaluates the amount of hiding cover, foraging areas, and road and motorized trail densities. The result of HE modeling, evaluating road density for the entire life of the project, calculated a road density of 0.84 mi/mi^2. The average elk HE within the project area over the life of the project was 54 percent (63 percent for elk summer range and 45 percent for elk winter range). While the results of the modeling can give an indication of the impacts of project related roads, it is likely an over estimate of road density as newly constructed roads and upgraded roads would be closed to the public and these roads would be constructed and reclaimed incrementally throughout the life of the project, not concurrently as inputted into the model. However, even with an over estimate of road density, the elk HE within the project area would be within the Forest Plan objective of 40 percent during the project. All project associated roads would be reclaimed upon completion of the project and elk HE would return to the pre-project level.

The total impact on elk habitat within the project area would be 215 acres and this would result in approximately 4 percent of the elk habitat within the project area and a negligible percentage of the elk habitat within the elk habitat available within the GMUG. While the elk within the project area would experience disturbance and migrate to adjacent areas to avoid the disturbance, the majority of the disturbance would be related to the construction activities and vehicle travel on roads. These activities would be short term within a given portion of the project area, concentrated within the activity area (approximately 0.8 acres per drill pads), and would occur at an average installation rate of approximately 12 drill pads per year over a period of 10 years. Relative to the available habitat within the GMUG and areas surrounding the project area, implementation of the proposed action would not be expected to permanently displace the elk or impact the viability of the population.

Merriam's Turkey

The proposed action is expected to disturb approximately 215 acres over a 10 year period within the project area. While the implementation of the proposed action would result in some short-term loss of turkey habitat, this loss would not be expected to impact turkey populations within the area as suitable habitat is widely distributed throughout the Forest.

Turkeys could potentially be disturbed and displaced as a result of MDW and road construction activities. However, these impacts would be temporary within a given portion of the project area and would not result in long-term displacement of turkeys. Collisions due to vehicle travel on roads and increased hunter access could result in increased injury and fatality to turkeys within the project area. As roads are reclaimed within the project area, this risk would diminish and would not impact turkey populations. While turkeys could be impacted by the implementation of Alternative 2, these impacts would be relatively short-term and would not impact the viability of the turkey populations within the region.

Red-naped Sapsucker

The proposed action would result in the placement of 82 MDW pads within aspen habitat which would result in approximately 66 acres of habitat temporarily unavailable to red-naped sapsuckers. In addition, roads would disturb approximately 33 acres of aspen habitat within the project area. Throughout the 10 year life of the project, approximately two percent of the aspen habitat within the project area would be temporarily disturbed. However, disturbance and reclamation would occur within annual increments and this would reduce the effects of the habitat loss. Construction activities associated with MDW installation would likely present the greatest disturbance and could potentially displace red-naped sapsuckers; however, these activities would be temporary within a given portion of the project area and birds would return to the area upon completion of installation as MDW operation would likely not cause disturbance. There is the potential that spring construction activities could disturb or destroy nests. Birds could potentially re-nest in adjacent habitat and these disturbances would not be expected to reduce the viability of the population.

Northern Goshawk

See discussion below under the *Threatened, Endangered and Sensitive Species* section.

American Marten

See discussion below under the *Threatened, Endangered and Sensitive Species* section.

Threatened, Endangered and Sensitive Species

Bald Eagles

The proposed action would be expected to have minor impacts on bald eagles. Of the 85 acres of winter foraging habitat located within the project area, only 0.8 acres would be disturbed as a result of MDW drill pads and none of the proposed roads would be located in bald eagle

habitat. Foraging bald eagles that may utilize the project area could easily avoid those disturbed areas and use adjacent suitable habitat.

Canada Lynx

The implementation of the proposed action could affect lynx habitat within the project area. Drill pads would disturb approximately two acres of denning habitat, three acres of winter foraging habitat and 47 acres of other habitat. New and upgraded roads would affect an additional 1.5 acres of denning habitat, 0.9 acres of winter foraging habitat and 15.7 acres of other habitat. Ultimately, the proposed action would impact 1.5 percent of the denning and winter foraging habitat available within the project area and 0.5 percent of the 'other' habitat. While some habitat would be disturbed and unavailable over the short-term, this is a minimal amount of the available habitat within the project area and a negligible percentage of the available habitat within the LAU.

Disturbance impacts associated with the construction of MDWs, staging areas and associated roads could potentially impact lynx by increasing the level of disturbance within the project area. The project area represents marginal lynx habitat, which as defined by the USFWS is an area that acts as a sink, but is not able to solely support lynx populations (USFWS 2007). As such, the occurrence of a lynx within the project area would likely be transient. Compliance with the Canada Lynx Conservation Assessment and Strategy (CLCAS) (Ruediger *et al.* 2000) would ensure that the proposed action would not adversely impact lynx within the project area or the LAU. CLCAS recommends several project planning guidelines to minimize and protect lynx from impacts related to mines. These guidelines include: over-snow access should be restricted to designated routes; snow compaction should be minimized whenever possible through the use of remote monitoring; a reclamation plan should be developed to ensure the restoration of suitable lynx habitat; newly constructed roads should be closed to the public during project activities; and timing and surface use stipulations should be developed to protect lynx habitat. The Design Criteria, detailed in Table 2-2, has addressed and incorporated these guidelines.

Fish Species

Project related water use could contribute to water depletions of the Colorado River and subsequently impact the four endangered fish of the Colorado River. However, water use would be in-mine use and within the current MCC water right. In addition, water depletions would not exceed those depletions outlined within the Programmatic Biological Assessment (PBA) (USFS 2005). Impacts to the endangered fish species Colorado pikeminnow, bonytail chub, razorback sucker, and humpback chub are addressed within the PBA (USFA 2005) and the impacts were determined to be "may affect, not likely to adversely affect".

American Marten, Three-toed Woodpecker, and Boreal Owl

Impacts on American martens, three-toed woodpeckers and boreal owls would not occur as a result of the proposed action as only three MDW drill pads and minimal roads would occur within the coniferous forest habitat, with a total of 2.7 acres of disturbance (2.4 acres associated with MDWs and 0.3 acres associated with roads).

Northen Leopard Frog

Minimal impacts would occur to northern leopard frog habitat as a result of the proposed action. Potentially one of the delineated wetlands could be affected due to proposed roads and two intermittent lakes could be impacted due to MDW drill pads. These areas represent potential habitat for these amphibians and disturbance to these areas could impact these species. In addition, high levels of disturbance would occur during the breeding season and disturbances to breeding areas could impact local populations. Pre-disturbance

survey would be completed in these areas, as specified by the Forest Service, to ensure that northern leopard populations are not adversely impacted. In the event that breeding northern leopard frog populations are documented within the surveyed wetlands, disturbances to these wetland areas would be postponed until early June and the completion of the breeding season (CDOW 2003). In addition, wetland areas in general would be avoided wherever possible and BMPs would be implemented for all activities to occur adjacent to or within these aquatic features. The disturbed areas within or near these areas would be relatively small and would be reclaimed. While impacts on northern leopard frogs may occur as a result of these disturbances, disturbances would be short term and the viability of local populations would be protected through surveys and avoidance.

Loggerhead Shrike

The proposed action would result in disturbance to a relatively small amount of this habitat. Approximately six acres of habitat would be temporarily disturbed due to MDW drill pads and three acres due to associated roads. Ultimately, approximately seven percent of the available loggerhead shrike habitat within the project area would be temporarily disturbed as a result of Alternative 2. The majority of the disturbance to birds would occur during from the initial installation of the MDWs and would be reclaimed upon retirement of the MDWs. Nests could be disturbed or destroyed during construction activities; however, adjacent habitat would be available for bird to re-nest or nesting in the following nesting season. While some short-term impacts on loggerhead shrike habitat would occur as a result of Alternative 2, these impacts would not displace the birds over the long term and the viability of the local population would not be impacted.

Northen Goshawk

The proposed action would result in approximately 99 acres of goshawk habitat to be temporarily unavailable due to disturbance related directly to MDW drill pads and associated roads (66 acres due to MDWs and 33 acres due to road disturbance). Throughout the life of the project, approximately six percent of the goshawk habitat within the project area would be temporarily disturbed and this would represent a negligible percentage of the suitable goshawk habitat available Forest-wide. The disturbance and reclamation would occur within annual increments and this would reduce any effects of habitat loss.

Construction activities associated with MDW installation would likely present the greatest disturbance and could displace goshawks in the area; however, these activities would be temporary and birds would return to the area upon completion of installation as MDW operation would likely not cause disturbance. Spring construction activities could disturb goshawk nests as goshawks are very sensitive to disturbance during nesting and brood rearing. However, nesting raptors would be protected from disturbance as the MCC would be required to conduct surveys for nesting raptors prior to the development of any surface facilities. If a goshawk nest was located, no surface activities would be allowed within ¼ mile radius of the active nest site between the dates of March and July 31, unless authorized by the Forest Service on a site-specific basis. These mitigation measures would ensure that any impacts on goshawks would be short term and would not impact the viability of the population.

Olive-Sided Flycatcher

Alternative 2 impacts to olive-sided flycatcher habitat would be minor as only two MDW drill pad would occur within the coniferous forest (one in spruce/fir habitat and one in pinyon/juniper habitat), with a total of 1.6 acres of disturbance. Disturbance related to construction activities may temporarily displace birds and there is the potential for nest to be disturbed or destroyed during construction. However, birds could re-nest in

adjacent habitat and these disturbances would not be expected to reduce the viability of the population.

Peregrine Falcon

Impacts on peregrine falcons would be expected to be minor as nesting habitat for peregrine falcons is not present within the project area. The project area does represent foraging habitat and short-term loss of foraging habitat would occur as a result of MDW and road construction. Disturbance and reclamation would occur in annual increments and, ultimately, all areas would be reclaimed. While relatively minor, short-term losses of foraging habitat would occur, this would not have long-term impacts on peregrine falcons in the area and would not reduce the viability of populations.

Purple Marten

Alternative 2 would result in approximately 58 acres of habitat temporarily unavailable to purple martens. In addition, roads would disturb approximately 25 acres of aspen habitat within the project area. Throughout the 10 year life of the project, approximately four percent of the aspen habitat within the project area would be temporarily disturbed. However, disturbance and reclamation would occur within annual increments and this would reduce the effects of the habitat loss. Construction activities associated with MDW installation would likely present the greatest disturbance and could displace purple martens; however, these activities would be temporary and birds would return to the area upon completion of installation as MDW operation would likely not cause disturbance. Spring construction activities could disturb or destroy nests. Birds could potentially re-nest in adjacent habitat and these disturbances would not be expected to reduce the viability of the population.

Spotted Bat and Townsend's Big-eared Bat

Since bats are nocturnal, many of the disturbances associated with the MDW and road construction would not affect bats. The short-term loss of foraging habitat within the project area could have minor impacts on bats that utilize the project area; however, given that disturbance and reclamation would occur in annual increments and there is ample suitable habitat adjacent to the project area, these impacts would not be expected to reduce the viability of the local population.

Summary of Impacts on Threatened, Endangered and Sensitive Species

Table 3-11 displays the summary of impacts for each species.

Cumulative Effects

Alternative 1

Management of resources within the project area would not be changed; therefore, MIS, sensitive, or TES species would not experience direct or indirect impacts and, therefore, there would be no cumulative effects from the No Action alternative.

Alternative 2

The majority of the past, present and future activities within the region of the project area focus on mining activities (including exploration and MDW development), agricultural activities, and recreation. MDW development involves the highest amount of human activity and road development within the project area. Increase in motorized activity in areas where currently there is moderate to low motorized activity may cause wildlife to be displaced from these areas to adjacent habitat. This would be particularly true for those species that are sensitive to disturbance such as elk, lynx and goshawks. The result would be higher concentrations of wildlife in adjacent areas where there is limited activity. With the implementation of the proposed activities in addition to the foreseeable future mining activities, those wildlife species sensitive to disturbance would be more likely to concentrate and seek security areas, such as in the West Elk Wilderness south of the project area. There is the potential that small openings created by roads and pads could be converted

Table 3-11
Summary of Impacts on Threatened, Endangered and Sensitive Species

Species	Alternative 1	Alternative 2
Bald Eagle (threatened)	No Effect	May affect, but not likely to adversely affect
Canada Lynx (threatened)	No Effect	May affect, but not likely to adversely affect
American Marten (sensitive)	No Impact	No Impact
Boreal Owl (sensitive)	No Impact	No Impact
Loggerhead Shrike (sensitive)	No Impact	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species
Northern Goshawk (sensitive)	No Impact	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species
Northern Leopard Frog (sensitive)	No Impact	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species
Olive-sided Flycatcher (sensitive)	No Impact	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species
Three-toed Woodpecker (sensitive)	No Impact	No Impact
Peregrine Falcon (sensitive)	No Impact	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species
Purple Martin (sensitive)	No Impact	May impact individuals and habitat, but would not indicate a local or regional change in habitat quality or population status.
Spotted Bat (sensitive)	No Impact	No Impact
Townsend's Big-eared Bat (sensitive)	No Impact	No Impact
FISH		
Bony Tail Chub (Endangered)	No Effect	May affect, but not likely to adversely affect
Colorado Pikeminnow (Endangered)	No Effect	May affect, but not likely to adversely affect
Humpback Chub (Endangered)	No Effect	May affect, but not likely to adversely affect
Razorback Sucker (Endangered)	No Effect	May affect, but not likely to adversely affect

from forested aspen or oak stands to shrub or grass as a result of reclamation, thereby making the area less suitable for those species dependent on forested areas. There would likely be cumulative impacts as a result of the additional loss of aspen and Gambel oak habitat. However, the cumulative impacts

resulting from these activities would be temporary, as areas would be reclaimed.

Reclaimed areas would take five to 10 years before vegetation would be re-established to pre-disturbance conditions. Within the region of the project area, there are additional areas associated with the coal methane drainage project, Panel 16-24, that have recently been reclaimed (within the last two years). For more details on the reclamation of these projects, see the Vegetation Section. Prior to complete reclamation, areas can contribute to temporary habitat fragmentation on a small scale as vegetation is established. In addition, the footprint remaining after disturbance and prior to vegetation establishment can influence how wildlife utilize the area (i.e. increase in foraging or creating travel corridors).

There is a clear cumulative effect of constructing additional miles of motorized routes, when considered with other routes currently open. This contributes to a gradual reduction in the quality and amount of habitat available, although roads and MDWs will be temporary and ultimately reclaimed. Increased access into an area may result initially in higher numbers of animals killed or disturbed as a result of increased traffic and hunting.

Careful consideration of the staging of mining activities, reclamation of disturbed areas and mitigation measures would minimize human activities to one specific area or drainage may reduce wildlife displacement from the watershed. Wildlife populations within the GMUG are generally stable and while some cumulative impacts would occur, these impacts would be short-term and would not be expected to reduce the viability of the local populations.

Consistency with Forest Plan and Other Regulations

Threatened, Endangered, Proposed Species

The NFMA and the ESA require the Forest Service to manage wildlife habitat to maintain viable populations of native and desirable non-native wildlife species and conservation of listed threatened or endangered species populations (36 CFR 219.19). Additional guidance is found in FSM direction which states: *Identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species* (FSM 2670.31[6]). The ESA requires the Forest Service to manage for recovery of threatened, endangered, and proposed (TEP) species and the ecosystems upon which they depend. A Biological Assessment has been completed and assesses the impacts of the proposed action on threatened and endangered species. Consultation with the FWS would be completed.

Sensitive Species

The FSM also directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern. National Forests are then required to monitor sensitive species populations and prevent declines that could require listing under ESA (FSM 2670.32 (4)). The direction requires the Forest Service to manage the habitat of the species listed in the Regional Sensitive Species List to prevent further declines in populations, which could lead to Federal listing under the ESA.

The alternatives discussed in this EIS would not result in a decline or reduction of viability of the populations of sensitive species identified to occur on the GMUG National Forests. A Biological Evaluation has been completed to assess the impacts of the alternatives on sensitive species. The Biological Evaluation is located in the PF.

Management Indicator Species and Other Wildlife

All alternatives are consistent with the Forest Plan, NFMA, ESA, RPA, Executive Order 13186, the Bald and Golden Eagle Protection Act, Forest Service Manual (FSM) and Handbook (FSH) direction. All alternatives are consistent with the recent Management Indicator Species Amendment, Forest Plan Amendment 2005-01. This amendment was

approved in May 2005. The amendment revises language in Forest Direction and Standards and guidelines for Management Areas, and the Monitoring Plan (see pages A-1 through A-17 of Management Indicator Species Forest Plan Amendment EA, Appendix A).

Cultural Resources

Affected Environment

The cultural resource analysis of the proposed action was conducted in compliance with the National Historic Preservation Act, the Colorado State Protocol Agreement, and other Federal law, regulation, policy, and guidelines regarding cultural resources. In general, cultural resources inventories are conducted to meet requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C 4321), the Federal Land Policy and Management Act of 1979 (43 U.S.C. 1701), and the National Historic Preservation Act of 1966(NHPA). These laws are concerned with the identification, evaluation, and protection of fragile, non-renewable evidence of human activity, occupation and endeavor reflected in districts, sites, structures, artifacts, objects, ruins, works of art, architecture, and natural features that were of importance in human events. Such resources tend to be localized and highly sensitive to disturbance.

Within the project area, the potential for standing historic structures and prehistoric sites associated with smooth cliff faces or sheltered rock overhangs was analyzed by a study of aerial photographs combined with a patterned flight over portions of the project area, in 2004, at low altitude in a slow fixed-wing aircraft. At that time, no standing structures were observed and there were no rock outcroppings suitable for either rock art or rock shelter habitations. Extreme topography of the area indicates a low potential for historic and prehistoric habitations.

Part of the inventory process is to ascertain the significance of any recorded cultural properties because the National Historic Preservation Act of 1966 (NHPA) directs Federal agencies to ensure that Federally-initiated or authorized actions do not inadvertently disturb or destroy significant cultural resource values. Significance is a quality of cultural resource properties that qualifies them for inclusion in the National Register of Historic Places according to prescribed criteria given in the Code of Federal Regulations. Field assessments regarding significance are made as recommendations by the cultural resources consultant to the federal agencies and State Historic Preservation Officer (SHPO). The final determination of the site significance is made by the controlling agencies in consultation with the SHPO and the Keeper of the Register. The Code of Federal Regulations (CFR) is used as a guide for the in-field site evaluations. Titles 36 CFR 50, 36 CFR 800, and 36 CFR 64 are concerned with the concepts of significance and (possible) historic value of cultural resources. Titles 36 CFR 65 and 36 CFR 66 provide standards for the conduct of scientific data recovery activities. Finally, Title 36 CFR 60.4 establishes the measure of significance that is critical to the determination of a site's NRHP eligibility, which is used to assess a site's research potential.

According to the Colorado Office of Archaeology and Historic Preservation (OAHP) COMPASS Data Base, 19 heritage resource inventories have occurred in the project area since 1979, and many more inventories have occurred in nearby areas. The US Forest Service was aware of 11 additional heritage resource inventories that have not yet been recorded in the COMPASS database. These surveys indicate that heritage resources, either historic or prehistoric/Native American, are relatively rare in the general area.

Five resources are located within the project area; however, only one has been determined eligible for inclusion on the National Register of Historic Places (NRHP). Of the five heritage resources, one low density prehistoric open lithic scatter and two prehistoric isolated finds were determined ineligible for inclusion on the

NRHP. The only resource eligible for inclusion on the NRHP that is located in the project area is a historic irrigation ditch, the Minnesota Canal - Deep Creek Ditch. No other prehistoric or historic resources have been found in the project area; and, any additional resources are likely to be isolated finds or low density prehistoric lithic scatters. Such resources are not generally considered significant.

Direct and Indirect Effects

Alternative 1 – No Action

Under the no action alternative, there would be no effect to heritage resources.

Alternative 2 – Proposed Action

The Minnesota Canal – Deep Creek Ditch historic site is a heritage resource that occurs in the project area. MCC works with the ditch company to ensure the ditch is protected from their activities. The proposed project would have no effect on heritage resources. Effects on this NRHP-eligible site would be avoided through proper planning of surface facilities.

Cumulative Effects

Alternatives 1 and 2

No present and reasonably foreseeable actions are likely to affect historical resources as long as measures are taken to avoid the Minnesota Canal, site-specific surveys are completed before disturbance, and mitigation is applied to protect any new significant sites. Following these measures, there will be no cumulative effects on heritage resources.

The proposed action is consistent with the National Historic Preservation Act of 1966 (amended in 1976, 1980, and 1992) and all other heritage resource management laws and regulations that support, clarify, or expand on the National Historic Preservation Act. It also complies with Federal Regulations 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places, 36 CFR 296 (Protection of Archaeological Resources), and Forest Service Manual 2360 (FSM 2360) which provide the basis of specific heritage resource management practices.

Several other laws address various aspects of heritage resource management, including NEPA, NFMA, Antiquities Act of 1906, Historic Sites Act of 1935, and the Archaeological Resource Protection Act of 1979 as amended in 1988 (ARPA). ARPA and two other regulatory acts describe the role of tribes in the Federal decision-making process, including heritage management. ARPA requires Tribal notification and consultation regarding permitted removal of artifacts from Federal land. The Native American Graves Protection and Repatriation Act of 1990 recognizes tribal control of human remains and certain cultural objects on public land and requires consultation prior to their removal. The American Indian Religious Freedom Act of 1978 requires Federal agencies to consider impacts on traditional tribal cultural sites. The National Historic Preservation Act calls for tribal participation in the consultation process (Section 106). The proposed action is consistent with all of the laws listed herein governing cultural and historic resources.

Consistency with Forest Plan and Other Laws

The proposed action is consistent with the Forest Plan and all other laws governing archaeological resources.

Recreation

Affected Environment

Management of recreation is guided by the Grand Mesa, Uncompahgre and Gunnison Forest Plan (USDA FS 1983), and as amended (USDA FS 1991). As defined in the 1991 amendment, recreation management in the vicinity of the project area (portions of the Dry Fork of Minnesota Creek, Deep Creek, Sylvester Gulch and Lick Creek watersheds) includes land use considerations for wildlife habitat and livestock grazing. Both of these considerations allow for opportunities for semi-

primitive, non-motorized and motorized and roaded natural recreation. The adjacent West Elk Inventoried Roadless Area also provides semi-primitive and natural recreational opportunities.

Recreational opportunities are primarily dispersed use within the project area. No developed recreational facilities are located within the project area. Most dispersed recreational use occurs during hunting seasons along the limited transportation system, primarily from NFSR 711. Other recreational activities that use this primary access include off-highway vehicles (OHV) riding, camping, personal firewood gathering, and mountain biking. There is also a limited amount of snowmobiling that occurs in the area. Though there are no managed (maintained) recreation trails in the project area, there are several non-system OHV routes that are primarily used by hunters as well as mine personnel. Upgrade of the Sylvester Gulch Road and Long Draw Saddle Extension associated with the development of the Sylvester Gulch Methane Drainage 16-24 Panels Project in 2002 (USDA FS 2002a) and as amended in 2006 (USFS 2006b) provides for limited and controlled (gated) public access during hunting season within the northern portions of the project area. The DN/FONSI associated with the Sylvester Gulch Road and Long Draw Saddle Extension also considered additional provisions for a recreational system OHV trail, which due to proposed action will be constructed sooner than anticipated.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, dispersed recreation use opportunities within the general area would not change. Motorized and non-motorized recreational access would continue to use the FS roads within the project area.

Alternative 2

Recreational access would remain unchanged with the addition of new and upgraded roads to access MDW locations and the ventilation shaft. Primary recreational use within the project area is accessed by use of NFSR 711; whereas, the proposed primary project access would be from the north by use of the Sylvester Gulch Road. Therefore, no change to recreational user's activity and access would be anticipated during the construction and operation of the methane drainage program. No closure of NFSR 711 (or connecting NFSR 711.2A, 711.2B, or 711.2C) would occur during the life of the operation, though periodic access may be temporarily limited on this road system to allow for safe travel of construction and drilling vehicles to access the project area during shaft construction. To preclude impacts to fall hunting access, construction and drilling access would be limited on NFSR 711 to that required for shaft construction.

Project-specific access roads would be limited to FS and mine personnel access.

Since access to dispersed recreational opportunities would occur throughout the life of the methane drainage program, opportunities for semi-primitive motorized and non-motorized activities would still occur. Semi-primitive opportunities for summer camping may be negatively impacted within the immediate project area due to MDW and shaft construction and related vehicular traffic.

Opportunities for firewood gathering are minimal in the project area and would not be negatively impacted by project activities.

Hunting access should not be impacted, although the hunting experience may be negatively impacted by the modification of wildlife habitat and associated displacement disturbance associated with construction and operation of the MDWs and ventilation shaft. Per recommendations by CDOW, a user-created full-size vehicle route would be reclaimed at the end of this project to remove a duplicate route, therefore increasing big-game habitat potential. A ¼ mile section of another route would be left upgraded to allow hunter

access to Elijah Park, therefore improving hunter success.

Cumulative Effects

Road construction and coal-related activities have occurred in the area since the 1960's, with an intensification of activity near the project area over the past eight years. Most activity near the project area is the result of permitted activities such as grazing and mine-related access, however some recreational user-created routes, mostly due to big game retrieval, have evolved. User-created routes are not considered legal travel routes and therefore not part of the Forest System. The DN/FONSI associated with the Sylvester Gulch Road and Long Draw Saddle Extension (USDA FS 2002a and USDA FS 2006b) considered these past actions, while permitting access to mine personnel and added provisions for a recreational system OHV trail, which due to proposed action will be constructed sooner than anticipated.

An assessment of the West Elk IRA conducted for the Sylvester Gulch MDW Project EA identified that recreation-related roadless criterion had previously been compromised as first noted in the 1970s. Primitive and semi-primitive opportunities were and would continue to be to be compromised by existing roads within the area, and impacted by traffic noise from State Highway 122, adjacent rail line, and coal production facilities on private lands.

Consistency with Forest Plan and Other Laws

The proposed alternative is consistent with Forest Plan direction for recreation and special uses.

Inventoried Roadless Areas

Affected Environment

Approximately 927 acres of the 6,035 acre project area lay within the West Elk IRA, as shown on **Figure 1**. The proposed action includes constructing about three miles of road and 22 MDWs on coal leases within the IRA. Current management of IRAs is guided by the September 2006 re-instatement of the 2001 Roadless Area Conservation Rule (RACR) and subsequent clarifications, and the FS ID No. 1920-2006-1. The project activities in the IRA are exempt from the prohibitions of the RACR under Exemption 1, roads needed for health and safety, and Exemption 7, roads needed for continuation, extension, or renewal of mineral lease (Chapter 1, *Summary Description of Proposed Actions in Inventoried Roadless Areas*).

Coal exploration and underground mining activity have occurred in the West Elk IRA over the past 40 years. A detailed analysis was completed in 1995-1996 to determine the total mileage of motorized roads and trails within the Minnesota Creek/Dry Fork watershed. This analysis identified 70 miles of roads and trails in an area of approximately 29 square miles (road/trail density of 2.4 miles per square mile). Past drilling activities, access for range allotment improvements (building stock ponds in particular), recreational pursuits and hunting activities coupled with the use of ATV's have all combined to increase the density of roads and trails (including system, permitted and user-created routes) in this area over time.

Since 1979, about 30 miles of road have been constructed in association with coal exploration and methane drainage activities within the Coal Creek Mesa portion of the West Elk IRA. About a third of these road miles (generally those constructed prior to 1995) were closed to full-sized vehicle traffic following completion of coal activities, although some remain and are used as non-system ATV trails. The other half of those road miles have been constructed since 2001 and are associated with previous methane drainage projects, and have either been decommissioned by obliteration, been approved as life of mine roads, or will be decommissioned to ATV trails after about 2007-2008 per earlier decisions associated with the Panel 15-24 Methane Drainage Project DN/FONSI and Sylvester Gulch Road/Long

Draw Saddle Extension Upgrade DN/FONSI (USDA FS 2002a and USDA FS 2006).

As part of a coal exploration project in 1996, 4.9 miles of temporary road were approved and constructed. Of this total, 4.4 miles of road were subsequently reclaimed, barricaded, and posted as closed by administrative order. Approximately 0.5 miles of road to exploration drill-sites 96-22-1A and 96-22-1B was reconstructed. This road is located on land that has since been exchanged for other public lands and is now in private ownership. An additional 3.6 miles of road associated with past drilling sites was closed for a total of 8 miles of road closed in 1996. In 1998, 3.4 miles of temporary road and 18 exploration drill sites were proposed by MCC and approved by the USFS. None of these sites or roads was constructed

In the spring of 2001, MCC began a methane drainage program for operations in the B Seam to the north and east of the Deer Creek Shaft/E Seam project area. Through several analyses prepared between 2001 and 2005, about 17 miles of road construction was approved in the Coal Creek Mesa portion of the West Elk IRA (**Figure 12**). The analyses forecasted that these road mileages would affect the IRA through about 2007 or 2008. By mid-2006, all of this mileage had been constructed, and about eight miles of these roads had been decommissioned by obliteration, and about one mile had been decommissioned to an ATV trail (that portion being in Deep Creek which was approved to remain as ATV access for MCC monitoring of a ground water well in 2004). The DN/FONSI for the Sylvester Gulch Road Construction and Long Draw Saddle Extension Upgrade extended the term of use for about five of the 18 miles to life of mine (about 2030). The remainder of the mileage will be decommissioned by obliteration, or decommissioned to an ATV trail per the previous decisions.

Prior to the previously described activities, a number of roads had been established and existed in the Coal Creek Mesa portion of the West Elk IRA at the time it was designated as an IRA (RARE II, 1979). The historic and recent road construction activities have compromised the roadless character of the Coal Creek Mesa portion of West Elk IRA to some degree. While new disturbance activities would further compromise roadless character, these activities do provide an opportunity to partially restore roadless character through decommissioning, obliteration, and revegetation of both new and existing road disturbance areas. Existing approvals will compromise the roadless character in places until 2030. Others will contribute to restoring roadless character as roads are decommissioned by obliteration in the coming few years.

The West Elk IRA was identified in the Roadless Area Review and Evaluation II (RARE II), completed in 1979, which inventoried and evaluated for possible wilderness designation 53 roadless areas on the GMUG NF's. These areas contained 1,523,780 acres. It is this 1979 inventory that is officially on file in the USFS Washington Office, and is the information to be used when following the RACR.

In 1980, 374,900 acres of RARE II inventory lands on the GMUG were classified as wilderness by the Colorado Wilderness Act of 1980 (Public Law 96-560). About 122,000 acres of the West Elk IRA was added to the West Elk Wilderness at this time. The remaining portion of the West Elk IRA (96,281acres, which includes the portion of the IRA involved in this project) was not recommended for wilderness designation or identified as a "further planning area". The Colorado Wilderness Act of 1980 released the remaining portion of the West Elk IRA and all other GMUG NF system lands inventoried as roadless for non-wilderness management. The Colorado Wilderness Act of 1993 (Public Law 103-77) did not consider or designate any portion of the remaining West Elk IRA as wilderness.

In 2005, the West Elk IRA was evaluated within the Roadless Inventory & Evaluation of Potential Wilderness Areas (USDA FS 2005b) for the GMUG's Forest Plan Revision. This analysis evaluated 65 roadless "units" within the GMUG. The 8,730 acre Flatirons and 5,880 acre Sunset units overlap portions of the existing and proposed methane drainage project areas and were evaluated as to the character of roadless criterions and the potential for wilderness (**Figure 12**). The criterion evaluations of these two units corresponded with earlier determinations on the compromised quality and management of roadless character within the immediate area of this proposed project. However, based on court rulings in 2006, the management of the original RARE II West Elk IRA designation will be directed by the 2001 RACR.

The RACR defines roadless areas to contain nine characteristics and values (36 CFR 294.11, January 12, 2001:

High quality or undisturbed soil, water, air - Soils in the area have been disturbed for road construction and drilling operations since the late 1960s. Soils in the area are generally unstable and erodible. The project area encompasses portions of the Dry Fork of Minnesota Creek and it's tributaries, and a portion of Deep Creek. Both drainages ultimately drain to the North Fork of the Gunnison River (Chapter 3, *Water Resources*). The Dry Fork of Minnesota Creek is an intermittent drainage that is used to convey irrigation water to a reservoir. The irrigation water comes from a trans-basinal diversion to the east. Deep Creek provides a perennial water source in the area. Neither creek is a fishery or is used as a public drinking water supply. Air quality in the area meets the state standards; however it is not a classified airshed.

Sources of public drinking water - The Dry Fork of Minnesota Creek and Deep Creek drainages are not used for public drinking water sources.

Diversity of plant and animal communities - This project would not significantly affect vegetation, fish, or wildlife or affect the biological diversity of the area (Chapter 3, *Wildlife Section*).

Habitat for special status (threatened, endangered, proposed, candidate or sensitive) species and for those species dependent on large, undisturbed areas of land - This project would not affect special status species, or affect the biological diversity of the area (Chapter 3, *Wildlife Section, Threatened and Endangered Species*).

Primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation - Recreation is primarily dispersed use within the project area (Chapter 3, *Recreation*) Use of this area since has allowed motorized recreation, and will continue to offer semi-primitive motorized dispersed recreation, however is not a destination for primitive or semi-primitive non-motorized recreation.

Reference landscapes - Past disturbance in the area has introduced non-native plant species, which are being mitigated as a result of on-going monitoring efforts. Reclamation of past drilling activities has resulted in replacement of native vegetation with areas of grass and forbs to support livestock management and wildlife uses. The area not currently used for organized study or research, or as a reference landscape.

Natural appearing landscapes with high scenic quality - The portion of the IRA in the project area, particularly in the northern portion, has the appearance of having been modified by human influence and has not retained a natural appearance. Coal-related road construction activity, non-system ATV routes, and range improvements have modified the area over the past several decades.

Traditional cultural properties and sacred sites - According to the cultural resources surveys of the area, the likelihood of cultural resources in the project area are low.

Other locally identified unique characteristics - There are no other locally unique characteristics.

Under current policies and management plans, additional temporary roads would be considered, and if consistent with roadless area management rules in place at the time, and if approved, would be expected to temporarily affect roadless character for the duration of these activities. It is expected that subsequent road decommissioning would return areas to their pre-disturbance condition on completion of the activities and reclamation of project disturbance. Similar to the current project proposal, future activities would provide opportunities for reclamation of existing roads and trails and restoration of roadless character.

Direct and Indirect Effects

Alternative 1

Under the No-Action Alternative, road use associated with the previously approved methane drainage activities would continue for facilities inspection and methane monitoring and reclamation. The existing temporary and life of mine roads compromise roadless characteristics on about 1,260 acres of the West Elk IRA in the Deer Creek Shaft/E Seam project area. These effects would be reduced incrementally as temporary roads associated with earlier methane drainage projects continue to be decommissioned when no longer needed. Life of mine roads (**Figure 12**) would be in-place for another 25 years. Roadless character would be restored over time to the previously described compromised condition when the previously approved roads are decommissioned. No additional roads related to methane drainage and the development of subsurface coal resources would be added, except those previously approved in other projects.

Alternative 2

For effects to IRA criterions, the direct and indirect effects analysis area is the portions of the West Elk IRA in federal coal leases C-1362, COC-54667 and COC-67232. The cumulative effects area encompasses the Coal Creek Mesa portion of the West Elk IRA.

Under the proposed action, there would be 23.8 miles of road construction, 19 miles of which are new roads to access proposed MDWs, and 0.6 miles of which are a re-route of an existing life of mine road in the project area. Of the 23.8 miles of proposed road construction, 3.2 miles would occur in the IRA.

This proposed road construction and other disturbance is conservatively projected to temporarily affect approximately 29 acres of the 926 acres of the project area that are within IRA lands. The proposed action would result in a net decrease in mileage of life of mine roads in the IRA. The proposed re-route of the existing West Flatiron road and portion of Long Draw Saddle Extension in Section 27, T. 13 S., R.90 W. would decrease this long-term mileage from 1.2 miles to 0.6 miles.

Consistent with the RACR, the 19 miles of new access road would be decommissioned by obliteration when no longer needed for purposes of the lease. Because reclamation would occur throughout the 12 year life of the project, the effects of these roads would extend over approximately three year each. For the West Flatiron and Long Draw Saddle Extension re-route, this route would be decommissioned by obliteration once mining in lease C-1362 is complete and the road is no longer needed for lease operations, estimated to be in about 2025-2030.

Based on this evaluation and past evaluations of the roadless character, this area does not possess key criteria for roadless character. Therefore, the road construction and MDW development proposed for the IRA portion of the project area would not appreciably affect it. The long-term impact of proposed road and MDW pad development associated with this alternative would contribute to the negative trend upon sustaining roadless character and associated land use management. Long-term effects toward a more roaded character, would

be anticipated to last until 2030. As previously identified, roadless character criterions within this area have been substantially compromised by existing roads in and adjacent to the IRA, as well as from use of the area for historic land uses in addition to mining.

Cumulative Effects

Reasonably foreseeable future on-lease coal exploration, mine development, methane drainage, commercial methane development, grazing, and recreational activities in the area include the potential for construction and reclamation of additional roads in the IRA. In the past, MCC expressed interest in exploring for coal in an area southeast of the Deer Creek Shaft/E Seam project area that is in the IRA. Under the current roadless area direction, road construction or reconstruction could not be approved in that area, therefore no additional cumulative effects can be assumed.

Increased coal-related development (roads and methane drainage programs) has caused disruption and continues to effect roadless area management. IRA characteristics and values have been and would continue to be compromised by existing roads within the area, as well as from area-wide impacts by traffic noise from State Highway 133, adjacent rail line, and coal production facilities to the north of the project area. Long term cumulative impacts to roadless management would result from the associated long term diminished quality of essential criterions/characteristics and values.

Consistency with Forest Plan and Other Laws

The Forest Service management of IRAs is currently guided by Interim Directive No. 1920-2006-1. This interim directive guides where decision authority lies dependent upon the individual forest unit situation with respect to forest plan revision, completion of a forest-scale Roads Analysis Procedure, whether a project involves road construction in an IRA, and if the project requires an EIS. The GMUG has a Forest-Scale Roads Analysis Procedure completed, however does not have a revised Forest Plan. Under the terms of the Directive, the decision authority for this project lies with the Forest Supervisor. However, because this project requires an EIS and includes proposed road construction in an IRA, the Purpose of and Need for the proposed action must be approved by the Regional Forester. On January 18, 2007 the Regional Forester for the Rocky Mountain Region approved the Purpose of and Need for the proposed action.

Roads associated with accessing methane drainage wells would be constructed or reconstructed in the West Elk IRA under two of the exceptions stated in the Roadless Area Conservation Rule of 2001 (RACR), those being:

- Exception No. 1 – protection of public health and safety in the cases of imminent threat that without intervention would cause loss of life or property, and
- Exception No. 7 – roads are needed for the continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001.

The proposed action is consistent with Forest Plan and direction for management of IRAs.

Transportation

Affected Environment

Currently, state, county, and FS roads are used to access active MDWs operated by MCC above the West Elk Mine. The major transportation route in the Paonia and Somerset region is State Highway 133. This highway serves local residents and associated commercial traffic for local communities, including the mining operations at the West Elk Mine in the North Fork Valley. State Highway 133 is an all-weather, asphalt two-lane highway. During the past 20 years, several sections of this road have been upgraded and/or relocated.

Within the project area, National Forest System Roads (NFSR) have been constructed for National Forest visitor and commercial user access and are maintained for short-term and long-term vehicle use (**Table 3-12**). The system classified roads in the project area were built to be seasonal roads used during the dry periods of the year. Temporary project roads will receive only the minimum improvement needed for structural capacity, safety and erosion control and will be decommissioned and reclaimed upon completion of project. MCC under their existing RUP is responsible for maintenance of these classified, temporary and life of mine routes.

Prior to 2006, primary access by MCC for their existing methane drainage program was by NFSR 711 (Dry Fork Road) via County Road (CR) 710 from Paonia. NFSR 711 is managed by the USFS as a classified low standard road, suitable for high clearance vehicles. This road has been upgraded by MCC under a RUP to support access to approved MDWs. With

Table 3-12
Existing NFSRs Under RUP to MCC that will be Used to Access the Project Area

Road #/Name	Status	Purpose of Road & Type of Use
NFSR 711 (Dry Fork Road)	Existing Classified Road	General use
NFSR 711.A1 (West Flat Iron Road)	Existing Life of Mine Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a and USDA FS 2006) To be converted to an ATV Trail upon completion of MCC operations.
NFSR 711.A2 (Long Draw Saddle Road)	Existing Life of Mine Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a and USDA FS 2006) To be converted to an ATV Trail upon completion of MCC operations.
NFSR 711.A2A (Upper Sylvester Gulch Road)	Existing Life of Mine Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a and USDA FS 2006). To be decommissioned by obliteration upon completion of MCC operations.
NFSR 711.2B (Horse Gulch Road)	Existing Classified Road	General use.
NFSR 711.2A (Deer Creek Road)	Existing Classified Road	General use
NFSR 711.2C (Elijah Springs road)	Existing Classified Road	General use
NFSR 8039 (Upper Deep Creek Road)	Existing Temporary Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a). To be decommissioned by obliteration upon completion of that project. Portion of road was reclaimed in 2004 and would be reopened for proposed action.
Sylvester Gulch Road	Approved Life of Mine Road (Construction in Spring 2007)	Developed for Panels 16-24 MDWs Project (USDA FS 2006). To be decommissioned by obliteration upon completion of MCC operations.

Figure 12. Roads

issuance of the 2006 DN and FONSI for the Supplemental EA for the Sylvester Gulch/Long Draw Project, primary daily access to MDWs adjacent to the project area will be by the upgraded, life of mine, Sylvester Gulch Road (when completed in the summer 2007). The Sylvester Gulch Road provides direct access from West Elk Mine to existing MDWs in the northern portion of the project area. These project-related roads are open only for administrative and permittee use (Figure **12**).

The Sylvester Gulch Road will intersect NFSR 711.A1 (West Flatiron Road) which provides further operational access via NFSR 711.A2 (Long Draw Saddle Road) and NFSR 711.A2A (Upper Sylvester Gulch Road). Current access to methane drainage wells was approved under the DN/FONSI for the 2002 Panel 16 to 24 Methane Drainage Program (USDA FS 2002a). NFSR 711.2B (Horse Gulch Road) and the upgraded ATV-access, temporary Long Draw Saddle Extension provide a controlled gated "loop" via NFSR 711 for MDW operations. As per the Gunnison Forest Interim Travel Restriction DN/FONSI, cross-country motorized traffic is prohibited within the project area. Primary use periods for the described road system is restricted to spring and summer months to avoid winter wildlife use periods and fall hunting opportunity conflicts.

Until the Sylvester Gulch Road is completed, some mine traffic does utilize NFSR 711 and CR 710 to Paonia. Current use of NFSR 711 by other users is low and primarily associated with an array of dispersed summer, fall, and winter recreational use in the project area (see *Recreation*). Other land uses supported by NFSR 711 include livestock grazing allotment access.

Other existing NFSRs in the immediate project area include NFSR 711.2A (Deer Creek Road), NFSR 711.2C (Elijah Springs Road), and NFSR 8039 (Upper Deep Creek Road). NFSR 711 becomes more primitive past NFSR 8039, passable only to high clearance vehicles. No FS maintained trails exist in the project area, though a special use trail used by the Minnesota Canal and Reservoir Company parallels their ditch. A non-system trail parallels Deep Creek for approximately one mile north of the NFSR 711 and NFSR 8039 intersection. This trail was used by motorized vehicles until 2002, at which time the USFS closed this route to motorized use (USDA FS 2002a). MCC upgraded the first 0.25 mile of trail to a temporary road to accommodate MDWs-related traffic in 2002, and decommissioned it back to a trail in 2004.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, no new or upgraded roads and access within the USFS transportation system would be developed for the E Seam MDWs and ventilation shaft. Motorized and non-motorized access would continue to use the existing USFS transportation system within the project area. Use of the state and county transportation system to access managed open and restricted (gated) access on USFS lands would continue. Access for current mine-related traffic associated with existing methane drainage programs and public use for dispersed recreation access within the general area would not change. Use by MCC would continue to use the existing county road system and NFSRs through the anticipated life of the West Elk Mine (~2030) on previously approved routes. Ongoing public and permitted road uses would continue.

Maintenance and upgrade of the state, county, and USFS transportation system would be required to maintain safe and unhindered access, as well as to minimize impact on other resources. As defined in MCC's RUP for their existing methane drainage program, grading, clean-out and repair of drainage structures would be conducted to preserve, repair, and/or protect the roadbed. On NFSRs, dust suppression would be conducted by MCC to minimize dust emissions from access and

operation of their existing methane drainage operations.

Alternative 2

State road use of State Highway 133 as primary access to West Elk Mine, and secondary access use of CR 710 would continue for access to shaft during construction period (approximately 18 months). It is anticipated that these access routes would need to be maintained and upgraded over time as a result of transportation use and inherent degradation, safety considerations, and resource protection. Road maintenance activities on these roads would be conducted regardless of the limited use for operation of the existing MDWs or development of the proposed action.

Development of new and upgraded, unpaved and ungraveled, dirt roads to access MDW locations and the area of the ventilation shaft may slightly change the existing FS transportation system, as the roads added are restricted-access. Upgrade of 4.8 miles of existing NFSRs and construction of 16.5 miles of new access on USFS system lands would require closure and access limitations during the life of the proposed MDWs. Proposed upgrade and construction activities are anticipated to occur during the summer months, when conditions are dry with limited potential of erosion and sedimentation into the Dry Fork of Minnesota Creek), Deep Creek, Sylvester Gulch and Lick Creek watersheds. Resource protection measures included as part of the proposed action (Table 2-2), as well as road use, construction and maintenance stipulations for road use would minimize most impacts to other resources resulting from construction and operation of the existing and modified NFSRs.

Short term effects are increased traffic loading and potential increased sediment movement due to soil disturbance. The increased traffic volume of oversize and heavy vehicles would cause a rapid degrading (one semi pass equals the degradation of approximately 10,000 passenger vehicles) of the road surface which would have a negative effect on the comfort and safety level of all road users. However, the use of design criteria would nearly eliminate erosion and sedimentation from roads. Additionally, there would be minimal increase in the probability and severity of accidents associated with this increase in traffic volume and different vehicle use, particularly the mixing of heavy commercial vehicle traffic with recreational users as most project roads are not open to public use and project traffic would be minimized on general use NFSRs except during shaft construction.

Some short- and long-term modification of public use of the current USFS transportation system would occur. Though public use within the project area is accessed by use of NFSR 711, the primary access to the existing and proposed methane drainage project(s) would be from the north from the West Elk Mine via use of the Sylvester Gulch Road. When this road is completed, short term and periodic access restrictions on NFSR 711 would be anticipated. No closure of NFSR 711 (or connecting NFSR 711.2A, 711.2B, or 711.2C) would occur during the life of the operation, though periodic access may be temporarily limited to allow for safe travel of construction and drilling vehicles to access the shaft site in the summer of 2007 through 2008. To preclude any impact to late-summer and fall public access, construction and drilling access limitations would not occur on NFSR 711. Access on upgraded project-specific routes would be limited to USFS and mine personnel during summer operations and over-snow access in winter. Other than life of mine roads and unless specified otherwise, all proposed MDW access roads would be temporary and reclaimed by obliteration (or returned to their original condition) when no longer needed to maintain MDWs.

Route placement and engineering would be determined during the site-specific field fitting with MCC and USFS representatives to minimize environmental impacts while properly engineering routes that are suitable for MCC's hauling and access needs. Road improvements may include curve widening on

existing routes, increasing line of sight, use of cut-and- fill techniques, surfacing requirements, erosion mitigation, etc. MCC would follow the conditions of their RUP developed for this proposed action. Impacts to existing routes may be beneficial, providing improved visibility, proper drainage due to increased maintenance, reduction in accidents due to longer sight distance, and more stable roads as a result of upgrading.

As described in the analysis for *Inventoried Roadless Areas*, the addition of more roads would further deteriorate roadless character criteria. As previously identified, roadless character criterions within this area have already been substantially compromised by existing roads in and adjacent to the IRA, as well as from historic land uses in addition to mining. Since the long term impact of roads and associated methane drainage activities within the IRA would contribute to the negative trend upon sustaining roadless management, modification of future USFS transportation system planning would need to be considered.

Cumulative Effects

The cumulative effects analysis is defined as past, ongoing and reasonably foreseeable future actions in the project area that would affect the existing transportation system. The area chosen for the cumulative effects analysis is the same as the project area.

Project traffic associated with mining at the West Elk Mine would be combined with other traffic in the area primarily along State highway 133. Such traffic would come from continued mining at the Bowie and Oxbow mines, future coal exploration activities, recreational users, commercial traffic, and residential traffic. Project traffic from shaft construction would continue to mingle with public use on some NFSRs (e.g. NFSR 711), although most project roads would be closed or restricted to public motorized use during the drilling season. Additional roads created for MDW access would be administrative use only and closed to the public including life of mine roads. Traffic counts are projected to continue to increase as mine use grows in this area. A minimal increase in recreational travel due to upgraded roads would be expected to occur.

Historic land use and access together with proposed road development in Alternative 2 would continue to compromise roadless area character and management. How unroaded areas are managed by the GMUG for future transportation system planning would need to be considered.

Consistency with Forest Plan and Other Laws

GMUG Forest Plan Management Goals & Desired Future Condition for transportation are summarized below:

- A minimum road system will be designed to meet the goals of the project. Emphasis will be placed on utilizing the current road system, minimizing new construction, and using temporary roads when feasible and decommission/ rehabilitation of disturbed areas.
- Where required, short-term and long term roads would be constructed or reconstructed to the standard necessary to accommodate gas pipeline construction traffic with minimum long term impact to the adjacent resources.
- A safe, functional, and environmentally sound transportation system.
- Substandard conditions and design will be improved to accommodate use and safety features.
- Any road construction would be coordinated with other permitted resource activities.
- Use of the Forest transportation system will be defined in a Road Use Permit (RUP).
- Some roads may be decommissioned upon completion of the project if they are no longer needed.

Travel Management Direction

The regulations regarding travel management on National Forest System lands related to vehicle use, including off-highway vehicles, authorizes the FS to control the use on roads, trails, and areas open to vehicles by vehicle class and time of year. These regulations also authorize the FS to require users to make improvements to roads prior to their use in order to accommodate the anticipated traffic. For this project, travel management and vehicle use would be accomplished through the SUA and RUP. Traffic related to this project would use only those travel routes specifically designated in the RUP or SUA. All other routes and areas are closed to project related vehicle use under *Title 16 USC; 36 Code of Federal Regulations.*

The remainder of the transportation system generally developed as a result of grazing, water development, and other resource management operations with recreation use (hunting and user-creation of routes) and impacts continuing to increase in importance and influence. Road and access management within the project area (portions of the Dry Fork of Minnesota Creek, Deep Creek, Sylvester Gulch and Lick Creek watersheds) is guided by the Grand Mesa, Uncompahgre and Gunnison Land and Resource Management Plan (USDA FS 1983), as amended (USDA FS 1991), and the Gunnison Forest Interim Travel Restriction DN and FONSI (USDA FS 2001a). These roads and access routes are managed to provide public and administrative access, and recreational opportunities while protecting the quality and management of other resources (i.e. roadless area management, water quality, wildlife habitat).

Visual Quality

Affected Environment

Visual resource management is guided by the GMUG Forest Plan (USDA FS 1983) as amended (USDA FS 1991). Visual resource management promotes protection, and if possible enhancement, of the visual quality of an area. The project area includes the viewsheds (Dry Fork of Minnesota Creek, Deep Creek, Sylvester Gulch and Lick Creek watersheds) potentially affected by the methane drainage and ventilation shaft development. The GMUG determined Visual Quality Objectives (VQOs) when the land resource management plan was developed in 1983. Since then, the FS has changed to the Scenery Management System (SMS) described in Agricultural Handbook 701 (USDA FS 1995). The GMUG uses a SMS and VQOs respectively to evaluate visual resources.

VQO criteria include landscape character, scenic attractiveness, scenic integrity, concern levels, and distance zones. Landscape character expresses the visual image of a geographic area and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. The term delineates landscape attributes that distinguish an area. The landscape character of the project area is generally natural appearing with interspersed FS roads and livestock management facilities such as fences, water tanks, and corrals. Tree cover patterns help shield the access/road and adjacent mining activities, creating a visual combination of rock, water, and trees, which make up the aesthetic qualities of the area. The existing access roads are the predominant man-made feature of the landscape within the project area. Scenic Attractiveness is a class rating of the relative scenic value of a landscape. The project area is all in the typical class. Residents and tourists visit the area for scenic and recreation values.

The Forest Plan has assigned the VQO of modification to the majority of the project area, however, the middle, generally over Minnesota Creek and Deep Creek are partial retention. These VQOs can be translated into the SMS as low scenic integrity for modification and moderate scenic integrity for partial retention. Low scenic integrity appears moderately

altered, while moderate scenic integrity appears slightly altered.

The project area is not directly visible from a public highway, including the Grand Mesa Scenic and Historic Byway, or from the West Elk Loop Scenic Byway, both Concern Level 1 (high scenic integrity) travelways. The major transportation route in the Paonia and Somerset region is State Highway 133. This highway serves local vehicle and truck traffic for the communities in Delta County, including providing access to the coal handling facilities and existing spur rail line in the Somerset area and to operations at the West Elk Mine in the North Fork Valley. The FS transportation system in the area is primarily made up of secondary travelways and low use areas managed as Concern Level 3 (low scenic integrity). NFSR 711 traverses through the middle of the project area and is considered a Concern Level 2 (medium scenic integrity) travelway.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, the proposed methane drainage program and ventilation shaft would not be approved. Though existing methane drainage actions would continue, no impacts to the visual environment are expected if the No Action Alternative is selected.

Alternative 2

Under the proposed action, well pads and new road would be developed for the long term operation of the methane drainage program and ventilation shaft. These impacts would be consistent with the modification and partial retention VQOs in the GMUG land and resource management plan. A portion of the project area is Concern Level 2 (medium) because it would be visible in the foreground (within 0.5 mile) and middle ground (between 0.5 and four miles) from the open NFSR 711, NFSR 711.2A, NFSR 711.2B, NFSR 711.2C, and NFSR 8039. The rest of the project area is Concern Level 3 (low), where areas would be visible in the background (more than four miles from the road). Project related disturbance would be observable in the foreground and middle ground from NFSR 711.A1, NFSR 711.A2, NFSR 711.A2A, Sylvester Gulch Road, and Long Draw Extension, but the visual impact to forest users would be limited to fall months due to these areas being restricted (gated) from public access. New roads developed for the proposed action would preclude public motorized access for the life of the project. Limited access along these travelways would likewise limit access to the immediate viewshed. Proposed protection measures and road use stipulations to reduce visual line and contrast would minimize the long term impact to visual management.

Construction and reclamation activities will affect form, line and color patterns.

The GMUG land and resource management plan identified West Elk IRA for active management and open to road construction and reconstruction. Since new and upgraded roads developed within IRA would preclude public motorized access for the life of the project, limited access along these travelways would likewise limit access to the immediate viewshed. Proposed protection measures and road use stipulations to reduce visual line and contrast would minimize the long term impact to visual management in this portion of the IRA, though development of roads in an unroaded environment may impact future roadless management.

Cumulative Effects

Long term reasonably foreseeable ground disturbing activities associated with Alternative 2 and previous methane drainage and historical use route would be visible. Though these disturbances would be reclaimed, or viewshed access restricted by gates and road closures, a long term visual quality impact could be anticipated throughout the project area due to the alteration of line and form and color with the addition of differing vegetation. The impact within non-IRA portions of the project area

would be minimal based upon the limited effect on VQO criterions. It would be anticipated that long and short term VQOs would be met in this area. However, the cumulative modification of the unroaded environment to a roaded environment in the IRA portions of the project area (regardless of visibility from key viewsheds along open FS roads) would likely result in future conflicts with roadless criterions supported by VQOs.

Consistency with Forest Plan and Other Laws

The proposed action is consistent with road and trail direction under the GMUG Forest Plan, Gunnison National Forest Interim Travel Restrictions, and Forest Service Handbook (FSH) 7700.

Livestock Management

Affected Environment

The Dry Fork cattle allotment is managed using an intensive time-controlled rotation grazing strategy that includes Forest Service, and several BLM, allotments (Dry Fork, Oak Ridge, and Jumbo Mountain).

Grazing management is guided by an Allotment Management Plan under direction of the GMUG Forest Plan.

Management practices involve systematically grazing individual areas and rotating livestock between units to control grazing intensity to prevent over-grazing of any unit and allow forage to recover between annual grazing intervals. Within individual grazing units, livestock distribution and grazing utilization and intensity are controlled primarily by fencing, natural obstructions, plant community distribution, watering sources, salting, the location of livestock trails, and herding the cattle. The management strategy is designed to improve plant diversity, increase vegetative cover, and stimulate plant vigor by controlling the frequency and intensity of grazing, while providing sufficient opportunity for forage to grow or re-grow between grazing intervals.

The project area lies within the Deer Creek/Apache, Deep Creek, Ditch, Sherwood and Tin Can Units of the Dry Fork cattle allotment. Under the current rotational grazing system, up to 573 cow/calf pairs and 54 yearlings graze 25 units on four different allotments, with grazing periods ranging from 2 to 30 days in each unit. Grazing in the project area varies annually, depending on the rotation schedules. The grazing season is May 10 to October 20. The Forest Service and permit holders meet annually, prior to the beginning of the grazing season to discuss the Annual Operating Instructions for that year, which establish the sequence and duration of grazing for each grazing unit for that annual grazing season and information on upland and riparian utilization standards and trailing routes. There are four fence-lines and a perimeter fence surrounding the Lower Cow Camp that cross the project area. Traffic in the area is generally not considered a hazard to livestock, although there is the potential for vehicles to collide with livestock congregating on roads or other injuries if vehicles push stock through cattleguards or into fencing. These incidents have occurred in the past. A more pressing past issue has been the failure of individuals to close allotment gates. There are approximately eight gates in the project area that would be used by mine operation vehicles. Open gates allows livestock to move into grazing units that are not scheduled for use at that time, often resulting stock congregating on roadways or riparian areas, and losses in time and resources required to round up and move the stock into the proper pasture.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, existing livestock grazing would continue in the area without change. Range management practices would continue to be implemented on an annual basis. Any existing range improvements would be unaffected under this alternative.

Alternative 2

Total vegetation disturbance from construction of the Deer Creek Shaft, 19 miles of new access road construction, existing road upgrades, and installation of 168 MDW on 139 drilling locations is estimated to be 74 acres. Disturbance associated with the Deer Creek Shaft would occur throughout the life of the project (13 to 15 years). Disturbance associated with MDWs and access roads would be short term; MDW life is estimated to be 3 years. MDW development would be staggered, thus wells would be at various stages of reclamation throughout the 12 year development period. Analysis methods have overestimated the amount of disturbance in each cover type due to using broad road corridor and MDW pad estimates and will be much less when exact placement is determined after field investigation. Therefore, this analysis estimates the potential disturbance by cover type (**Table 3-13**). Disturbance associated with the Deer Creek Shaft would occur throughout the life of the project (13 to 15 years). Disturbance associated with MDWs and access roads would be short term, well life is estimated to be 3 years. Well development would be staggered, thus wells would be at various stages of reclamation throughout the 12 year well development period. The majority of the disturbance would occur in the Gambel oak and quaking aspen cover types as these are the dominant vegetation types in the project area. Both species can reproduce by sprouting following disturbance, which greatly reduces plant recovery time.

Young Gambel oak stands have fair grazing capacity. As oak stands mature they shade out understory species reducing graze capacity and animal movement. In some instances removing small areas of oak would increase species diversity and stimulate forage production, as well as improve animal movement through the area. Nearly 62 percent (150 AUMs) of the project disturbance would occur in this type. Maximum disturbance could be as high 164 acres under the proposed action (**Table 3-13**). If this amount of disturbance occurred simultaneously the effects on range resources would be significant, however, disturbance in this cover type will be stagger by pasture and implementation date. Short-term grazing resources could improve following reclamation in mature oak stands.

Aspen stands are highly productive and desired for summer grazing, thus the more aspen communities removed due to well development

Table 3-13
Potential Acres of Cover Type Disturbance for the Proposed Action

Cover Types	Proposed Action			
	Forest Service Road Disturbance	Well Pad Disturbance[1]	Deer Creek Shaft Disturbance	Staging Area Disturbance[2]
Herbaceous	<1	<1	0	0
Shrub	4	6	0	<1
Gambel oak	50	114	0	1
Willow	<1	2	<1	0
Quaking aspen	33	66	4	3
Pinyon-juniper	0	<1	0	0
Spruce-subalpine fir	<1	2	0	0
Total	90	191	4	5

[1] Includes 17 acres of potential disturbance in well pads located on private lands.
[2] Does not include staging areas that are located at MDW sites.

the greater the loss in forage. If impacted, these areas would be converted to grasslands until adjacent aspen stands recolonize the area. Analysis indicates that approximately 39 percent (92 AUMs) of the disturbance could occur in aspen cover types under the proposed action. Maximum acres of disturbance would be as high as 106 acres (**Table 3-13**). While this loss could be concentrated in a grazing unit where aspen is already limited, it is unlikely. Under this worst case scenario impacts to grazing capacity would be moderate.

Stocking rate is often used to describe how many animals a particular piece of land will support. To quantify stocking rates the animal unit month (AUM) concept is widely used. AUMs provide an approximate of forage a 1000 pound cow with a calf will eat in one month (Pratt and Rasmussen 2001). Using Natural Resources Conservation Service (NRCS) State Soil Geographic Data Base (STATSGO) soils information generalized AUM values were calculated for the various soil types impacted by the proposed action. Assumptions limited average cow with calf weight to 1000 pounds and defaulted site productivity to the lowest potential value listed in STATSGO for the soil type. Site productivity is difficult to estimate due to variations in precipitation, site condition, and other factors, and should be calculated on a site specific basis. **Table 3-14** presents the life of mine potential loss in AUMs under the proposed action.

Table 3-14
Life of Mine Potential Loss in Animal Unit Months Under the Proposed Action

Disturbance Types[1]	Proposed Action Animal Unit Months
Road Disturbance	
New construction	58
Upgraded from ATV	9
Full upgrade	13
Methane Drainage Wells	
Well footprint	150
Staging Areas[2]	
Existing areas	<1
New areas	6
Total	237

[1] Includes potential disturbance on private lands.
[2] Does not include staging areas that are located at MDW sites.

Table 3-14 assumes all disturbance associated with the proposed action would occur simultaneously. Development of various roads, staging areas, and MDWs would occur in phases over a 12 year period. Furthermore, disturbance associated with MDW development would occur in different pastures throughout the allotment, further diluting the number of AUMs lost at any one time in the Dry Fork allotment. Using this method the total AUMs for the project area are 4803, however, not all areas are accessible to livestock for grazing, depending on factors such as slope, distance from water, and barriers to travel. Under a worst case scenario where all proposed development occurred simultaneously, only 5 percent of the project area AUMs would be unavailable for grazing.

Losses in AUMs resulting from MDW development would be short term, last for up to four years (three year life-of-well and potentially one season for reclamation). Disturbance associated with road construction and staging areas would be longer term depending on how long each road and staging area would be required to maintain MDWs in the area. Some areas would likely be disturbed for the life of mine, thus eliminating those AUMs for up to 13 years.

Reclamation in Gambel oak cover types would likely produce more available forage than the original community due to removal of the extremely competitive oak overstory. Furthermore, livestock movement through the area would increase.

In highly disturbed areas which are reseeded to graminoid species, recovery of Gambel oak and quaking aspen would be delayed but these species should eventually recolonize the site.

Site conversion to pre-disturbance vegetation type would vary based environmental, vegetative and disturbance factors. Proposed design criteria would minimize disturbance effects on vegetation.

The potential for livestock injuries may increase around MDW sites. Livestock often congregate along fence lines and structures, especially if the ground has been leveled in the area. Injuries could occur due to the fencing materials or as a result of animals getting inside the well sites and encountering well equipment or structures.

People in vehicles occasionally leave gates open and chase livestock on roads. Open gates result in animal movement from unit to unit regardless of the scheduled grazing rotation. Chasing cattle off of roads or pushing them through cattleguards leads to livestock injuries and could move portions of a herd into different management units before they are scheduled to enter the unit. Prolonged periods in one unit could result in overgrazing while shortened periods in another unit reduces forage utilization and management efficiency.

New access road construction allows livestock to move through the units more efficiently. While livestock tend to congregate on or near roads they could access parts of the grazing unit previously inaccessible. This would better utilize forage in the allotment but also increase the time required for herding livestock to move them into different units or remove them when the grazing season is over. Not allowing permittees vehicle access to new access roads in the units would limit the permittees' ability to herd and monitor their livestock.

Cumulative Effects

The cumulative impact area includes the Deer Creek/Apache, Deep Creek, Lower Cow Camp, Tin Can, Sherwood, and Ditch grazing units. Private land to the southwest of the project area was not analyzed.

Alternatives 1

Under the No Action alternative, there would be no additional cumulative effects on grazing in the proposed project area. Grazing activities would continue as previously directed.

Alternative 2

Road construction and coal-related drilling activities have occurred in the area since the 1970s. Activity has been intense for the past eight years. These ongoing activities have affected the range management plan for the area, as increased traffic and seasonal use have caused migration of cattle off the scheduled allotment outside of the planned times. Gates being left open have also contributed to disrupting the range management system by allowing livestock to move between grazing units before the scheduled move date or to move back on to a previously grazed unit.

Past drilling activity that has occurred in surrounding areas has removed vegetation in several communities. In many cases, late seral oakbrush has been cleared and the areas revegetated with palatable grass species. These reclaimed areas have been beneficial to grazing as they provide openings in the vegetation and increase forage opportunities. However, livestock use on newly reclaimed areas has in some cases reduced the success of reclamation and revegetation efforts. These situations have also affected the ability of the mining company to achieve successful reclamation. Effects from MDWs and associated road construct could have effects on range resources for years following site reclamation. Road upgrades may encourage increased recreational use in the area. In addition, development of pre-disturbance vegetation communities on reclaimed sites may take anywhere from 10 years post-reclamation in Gambel oak and quaking aspen types to several decades in timber types, altering current range resources for many years.

Consistency with Forest Plan and Other Laws

The proposed action is consistent with range management direction under the GMUG Forest Plan and Forest Service Manual 2200-Range Management.

Health and Safety

Affected Environment

Mountain Coal Company is currently operating in compliance with local and federal health and safety guidelines. There have been no safety or health issues identified for surface activities to occur within the project area.

Based on previous research and mining experience in the area, there is the concern of methane gas accumulations. Methane gas occurs naturally in all coal mines, trapped in pores within the coal bed and surrounding strata. It is released as the rock is broken up during the mining process. Methane (chemical formula CH_4) is a colorless, odorless, flammable gas. When mixed with air, methane is explosive in concentrations between approximately 5 and 15 percent. Methane is non-toxic but it can be can be asphyxiating in high concentrations as it displaces available oxygen. High levels of methane pose a real danger to the health and safety of miners in the existing underground mine. High methane levels could potentially require the temporary cessation of mining operations and have a major adverse impact on ongoing coal production. Hazardous concentrations of methane underground can be controlled by dilution (ventilation), capture before entering the host air stream (e.g., methane drainage), or isolation (seals and stoppings).

In addition, Federal coal mining safety standards (30 CFR 75.1502) have been modified to improve the available escapeways within underground coal mines. As the West Elk Mine continues to expand, it is critical that adequate emergency escapeways are available.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, the methane accumulation, air quality and emergency escape issues would not be addressed. Consequently, this would result in unsafe working conditions, and ultimately, the cessation of coal mining activities.

Alternative 2

Federal safety standards mandate that, when 1.0 percent or more methane is present in a working place or an intake air course, electrically powered equipment in the affected area shall be de-energized, and other mechanized equipment shall be shut off. Field efforts to address the methane problem and a related study have determined that vertical methane drainage wells from the surface in the advance of mining are the best means of achieving effective methane drainage. Development and operation of the proposed methane drainage wells, in conjunction with mine ventilation and horizontal methane drainage methods, can reduce methane concentrations in the mine to safe operating levels.

Ventilation Shaft

A sound ventilation plan is essential to maintaining adequate ventilation and respirable dust control in the mine (MSHA 1992). Federal safety standards for ventilating underground coal mines mandate that the air in areas where people work or travel shall contain at least 19.5 percent oxygen and not more than 0.5 percent carbon dioxide, and the volume and velocity of the air current in these areas shall be sufficient to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes. The proposed ventilation shaft would allow for the dilution of potentially dangerous gases, thus maintaining safe operating levels.

Emergency Exit

Coal Mining Safety and Health Regulations require that emergency exits be available within underground coal mines. The installation of the emergency escapeway would improve the safety of the mine and allow for the mine to continue expanding at the scheduled rate.

Health and Safety during Implementation of Action Alternatives

All Health and Safety standards and Standard Operating Procedures would be adhered to during the implementation of the selected action alternative.

Cumulative Effects

Because the mine would either cease operations (under No Action), or proceed under safe conditions, there would be no direct or indirect effects on human health or safety from any of the alternatives, and therefore no cumulative effects on human health would occur.

Consistency with Forest Plan and Other Laws

The proposed action is consistent with the Coal Mine Health and Safety Act 2002 No 129, the Federal Mine Safety Act of 1977, and Mine Safety and Health Administration Title 30 CFR mineral resource operations.

Social and Economic Resources

Affected Environment

The Environmental Justice Executive Order 12898, released by the White House in February 1994, places attention on any adverse human health and environmental effects of agency actions that may disproportionately impact minority and low-income populations. Low-income populations are households that live below the subsistence or poverty level as defined by local, states, or national government. The Order simultaneously directs Federal agencies to avoid making decisions that discriminate against these communities.

Environmental justice means that to the greatest extent practicable and permitted by law, 1) populations are provided the opportunity to comment before decisions are rendered on, and 2) are allowed to share in the benefits of, are not excluded from and are not affected in a disproportionately high and adverse manner by government programs and activities affecting human health or the environment.

The area of influence for the social and economic elements of this EIS includes both Delta and Gunnison counties in west central Colorado. Delta County is the area of influence for the population and demographic component because the majority of employees at the coal mining facilities and their families live within the communities in its jurisdiction. Gunnison County is included in the economic area of influence because the project area is located within its jurisdiction. Gunnison County receives tax and other revenues from mine operations. Ark Land and MCC are wholly owned subsidiaries of Arch Coal, Inc. and are interested in adding reserves to their existing reserve base and extending the life of the West Elk Mine. The cumulative impact area would include both Gunnison and Delta counties.

Baseline data for the counties in the area of influence includes population and demographic data as well as current business and economic statistics information for the Information in this section was obtained from the US Bureau of the Census based on the 2000 census data and 2004 estimates. Additional information was obtained from the Sonoran Institute (2004).

Population

Table 3-15 (population) presents basic population and demographic information for the Delta County and the state of Colorado.

Delta County comprises 1,142 square miles with 24.4 people per square mile and a total population of 27,834 people in 2000. Delta County's population grew by almost 33 percent between 1990 and 2000. According to the

Sonoran Institute (2004), Delta County's population grew slower than the state but faster than the nation between 1970 and 2000, with an annual average growth rate of 2.7 percent. The median age in Delta County is 42.3 years with 24.0 percent of the population being under the age of 18 and almost 20 percent being 65 years or older. Over 80 percent of the people age 25 and older in Delta County have graduated from high school, and just over 17 percent have graduated from college (US Census Bureau 2006).

Table 3-15
Population by Category, 1990 and 2000, Delta County and the State of Colorado

	1990	2000	Percent Annual Change 1990-2000
Population			
Delta County	20,980	27,834	3.3
Colorado	3,294,394	4,301,261	3.1
Male			
Delta County	10,353	13,972	3.5
Colorado	1,631,295	2,165,983	3.3
Female			
Delta County	10,627	13,862	3.0
Colorado	1,663,099	2,135,278	2.8
Under 20 years			
Delta County	5,571	7,291	3.1
Colorado	958,341	1,224,668	2.8
65 years and over			
Delta County	4,691	5,473	1.7
Colorado	329,443	416,073	2.6
Median Age			
Delta County	NA	42.3	
Colorado	NA	34.3	

Source: Sonoran Institute 2004.

The Town of Delta is the largest town in Delta County with a 2004 population of 8,087, an increase of 26 percent since 2000. Other communities in the county include Cedaredge (2004 population of 2,190), Crawford (2004 population of 397), Hotchkiss (2004 population of 1,024), Orchard City (2004 population of 3,094), and Paonia (2004 population of 1,639) (Region 10 2005).

The 2000 US Census reports that there were 12,374 housing units in Delta County that housed 11,058 households, indicating a vacancy rate of less than 11 percent. Only 3.7 percent of the vacant houses are classified as seasonal, recreational, or for occasional use. Approximately eight percent of rental units were classified as vacant. There were 2.43 persons per household. Delta County had a home ownership rate of 77.5 percent in 2000, well above the state average of 67 percent. The median value of an owner occupied housing unit was $115,500, well below the state average of $166,600 (US Census Bureau 2006).

Economic Resources

The area of influence for economic resources is comprised of Delta and Gunnison Counties. Delta County is the county of residence for most of the mining personnel and supports most of the indirect employment that provides supplies and services to mine workers and their families. Gunnison County is included in the area of influence because the West Elk Mine is in Gunnison County, and the county receives royalty and tax revenues from the mine. Gunnison County receives about $2 million annually in tax revenues from the West Elk Mine. Mining companies are the largest property tax revenue sources for Gunnison County. Gunnison County has identified the areas surrounding the coal mines as the *North Fork Valley Coal Resource Special Area.*

Together, these counties supported 24,519 full- and part-time jobs in 2000, an increase of 16,007 jobs since 1970. In 2004, in Gunnison County, 655 of its 7,511 wage and salary jobs are in the mining sector, and increase of 55 jobs since 2000. Mining employment in Delta County was not reported because the data was

suppressed for confidentiality (Region 10 2005).

The unemployment rate in Gunnison County in 2004 was 4.2 percent, below the statewide average of 5.5 percent. The Delta County unemployment rate of 5.2 percent, is also lower than the statewide average (Region 10 2005).

As of September 2006, the West Elk Mine employed approximately 442 full and part time workers with an annual payroll of approximately $26.6 million (MCC 2006). Average mining wages in Gunnison County in 2004 ($64,220) were more than twice the average wage for all employment sectors ($26,832) (Region 10 2005). The West Elk Mine spent approximately $35 million in 2006 locally for materials, supplies, and services, and royalty and tax payments totaled approximately $18.6 million (MCC 2006). Total direct economic benefits associated with the West Elk Mine exceed $60 million annually (MCC 2006).

Environmental Justice

Executive Order 12898 (Feb. 11, 1994), *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* was executed to avoid a disproportionate placement of adverse environmental, economic, social, or health effects from Federal actions and policies on minority and low-income populations. Analysis requires the identification of minority and low-income populations that may be affected by any of the alternatives.

The area of influence for environmental justice is Delta County, Colorado, where the majority of West Elk Mine workers and their families live. Demographic information on ethnicity, race, and economic status is provided in this section as the baseline against which potential effects can be identified and analyzed.

Identification of Minority and Low Income Populations

For purposes of this section, minority and low-income populations are defined as follows:

Minority populations are persons of Hispanic or Latino origin of any race, Blacks or African Americans, American Indians or Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders.

Low-income populations are persons living below the poverty level. In 2000, the poverty weighted average threshold for a family of four was $17,603 and $8,794 for an unrelated individual.

Estimates of these two populations were then developed to determine if environmental justice populations exist in Delta County (**Table 3-16**).

Table 3-16
Minority or Low-income Populations
Delta County and State of Colorado, 2004

Location	Total Population	Percent Minority	Percent below poverty (2003)
Delta	29,947	15.0	13.2
State of Colorado	4,665,177	27.5	10.0

Source: US Census Bureau 2006.

Minority populations were lower in Delta County than in the state of Colorado; the low-income population in Delta County was higher than for the state of Colorado.

The Council on Environmental Quality (CEQ) identifies minority and low income groups as EJ populations when either (1) the population of the affected area exceeds 50 percent or (2) the population percentage in the affected area is meaningfully greater (generally taken as being at least 10 percent more) than the population percentage in the general population of the region or state. Neither the minority population percentage nor the low-income population percentage that would be affected by the project meets the CEQ guidelines. As a result, it is assumed that no environmental justice populations exist within the area of influence, and no impact analysis is required.

Protection of Children

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 21, 1997), recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because (1) children's bodily systems are not fully developed, (2) children eat, drink, and breathe more in proportion to their body weight, (3) their size and weight may diminish protection from standard safety features, and (4) their behavior patterns may make them more susceptible to accidents. Based on these factors, the President directed each Federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each Federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Children are seldom present at the coal mining facilities. On such occasions, the coal mining companies have taken and will continue to take precautions for the safety of children by using a number of means, including fencing, limitations on access to certain areas, and provision of adult supervision. No additional impact analysis is required.

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, the primary impact would be that the estimated 75 million tons of recoverable coal would not be mined due to safety concerns and regulations. Mining of the reserves at the West Elk Mine would continue at existing rates until the available coal reserves are depleted in 2008. Job and associated salaries, local expenditures, royalty ($58.3 million) and tax payments would not be realized after the reserves are depleted (2008). This alternative would limit the opportunity to realize economic benefits. The Federal government would not receive the rents and royalties associated with mining the coal in the Federal Coal Lease C-1362 and the Dry Fork lease.

Alternative 2

Assuming that the ventilation shaft and the methane drainage wells are approved, employment at the West Elk Mine would continue. There would be no new or added employment at the West Elk Mine. No additional demand for housing or municipal services would be anticipated.

Mining operations would be extended throughout the period required to mine 75 million tons of recoverable coal reserves in the E Seam, or approximately 10.4 years of mining at the present average monthly extraction rate (600,000 tons per month). The E Seam coal would be mined from about 2008 to 2018. The extension of mining operations would also extend the annual payroll, local expenditures, and taxes and royalty payments. The direct economic benefits associated with continued mining would equal approximately $5.83 million per month (USDA FS 2004), which equates to approximately $729 million for the 10.4 year life of mine extension. Due to expected quality of the coal, the value may be somewhat less.

Royalty payments are 8 percent of the value of the coal removed from an underground mine (43 CFR 3473). The royalty on the value of the E-Seam coal is approximately $58.3 million. Royalties from the Federal coal are distributed in the following way: 50 percent returns to the Federal treasury in the general fund. The other 50 percent is returned to the state where the coal was mined, with a portion of that percentage being returned to the county where the coal was mined. In Colorado, those funds are managed by the State Department of Local Affairs in the Energy Impact Fund. These monies are distributed on a grant-like basis to counties affected by energy resource development for community benefit projects.

Cumulative Effects

Alternative 1

On a cumulative basis, if the ventilation shaft and methane drainage wells were not approved, coal mining at other coal mines in the North Fork of the Gunnison River Valley would continue. Delta and Gunnison counties are currently adding approximately 530 full-time or part-time positions annually. The West Elk Mine accounts for nearly two percent of the employment in the area of influence (442 out of 24,519 full time or part time jobs). Should mining cease at West Elk for safety reasons, the rate of increase of employment would exceed the loss in the area of influence in less than a year.

Mining accounts for 655 jobs in Gunnison County, a loss of 442 (67%) at the West Elk Mine would adversely affect the mining jobs available and the overall salary of jobs in the county.

Alternative 2

The cumulative social and economic effects of past, present and reasonably foreseeable actions in the North Fork of the Gunnison River Valley relative to coal mining operations would be to extend the mining employment sector.

Consistency with Forest Plan and Other Laws

The proposed action is consistent with Executive Orders 12898 (Feb. 11, 1994) and Executive Order 13045 (April 21, 1997) addressing Environmental Justice and the Protection of Children from Environmental Health Risks and Safety Risks respectively, and the 1991 GMUG Forest Plan and 1989 BLM Uncompahgre Basin Resource Management Plan (RMP).

Short-term Uses and Long-term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Soils

Short term losses of soil function and productivity would occur while drill pads and access roads exist in previously undisturbed areas. However soil would be stabilized in stockpiles and replaced on the disturbed areas and re-vegetated during reclamation. Replaced soils would be expected to regain function and productivity however these soils would exhibit some degree of reduced water holding capacity due to disruption of soil structure / aggregation upon repeated handling (Brady and Weil 1999).

Some amount of soil erosion would occur due to wind and run-off, especially if run-off occurs on steep disturbed slopes before BMPs can be implemented. This would constitute a long-term loss of productivity as the eroded soil would be permanently removed from the site. However, because project design criteria, BMPs, and lease stipulations would be in place to minimize erosion, this loss of productivity is predicted to be small.

Vegetation

Short term loss of vegetation would impact stocking rates for grazing and might result in the loss of some cover types. In addition, it is possible noxious weed species would increase following disturbance and site productivity would decrease. However, utilizing the mitigation practices established, vegetation resources would recover over time, providing suitable forage and habitat, and noxious weeds would be controlled. See the Environmental Consequences section for further discussion.

Recreation

Though road construction associated with Alternative 2 is considered long term, impacts to related recreational access and opportunities/utilization would be considered short term. Use of the existing Sylvester Gulch Road as primary access, with limited project related access on NFSR 711 and associated roads would be for the life of the subsurface West Elk Mine-coal mining operation. As discussed in Chapter 2, proposed new roads would be reclaimed upon completion of methane drainage activities, while upgraded roads would either continue to be maintained as such in perpetuity, restored to their original use, or reclaimed by obliteration.

Roadless

Road construction and operation adjacent to and within Alternative 2 would be considered long term, and would impact roadless area character and management long term; the resulting cumulative negative impact to key roadless criterions/characteristics would likely result in loss of sustained roadless character well beyond the life of the project.

Livestock Management

Short term loss of AUMs would occur as a result of fencing off MDW and ventilation shaft areas. AUMs would temporarily increase with the removal of Gamble's oak until the shrub reestablished on the site. Long-term productivity would not be impacted.

Health and Safety

If the No Action Alternative were selected, the mining operations may slow substantially or cease entirely due to unsafe levels of methane making coal recovery uneconomical and would result in a significant loss in the long-term productivity of the West Elk Mine. This loss in productivity would result in economic impacts to the local economy as a significant number of people within the community are employed at the mine.

Transportation

Though transportation system modification (upgrade and new construction) associated with Alternative 2 and 3 would be considered long term, impacts to related recreational use would be considered short term. However, modification of the transportation system by either Alternative 2 or 3 (though more directly by Alternative 3), may result in the long term impact to roadless character and sustained management of the portion of the West Elk IRA in the project area.

Use of the existing Sylvester Gulch Road as primary access, with project related access on NFSR 711 and associated roads would be long term and for the life of the subsurface West Elk Mine-coal mining operation. As discussed in Chapter 2, proposed new roads would be reclaimed upon completion of methane drainage activities, while upgraded roads would either continue to be maintained as such in perpetuity (existing roads) or restored to their original use (OHV-specific access).

Visual Quality

Road construction and operation adjacent to and within Alternative 2 would be considered long term impacts to VQOs. Proposed new roads in Alternative 2 would be reclaimed upon completion of methane drainage activities to their original use). The cumulative negative impact to key VQO criterions would be minimal in Alternative 2 non-IRA area. The long term impact on VQOs in the IRA portion of Alternative 2, as well as the cumulative modification to a roaded landscape associated with Alternative 2 would result in the direct effect upon roadless area character.

Unavoidable Adverse Effects

Water

Under the No Action alternative, since mining-related surface disturbance will not occur, or be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, etc., the no action

alternative will have no unavoidable adverse effects on the environment.

Under alternative 2, mining related activities will occur, generating potential short-term direct and indirect effects upon the environment; however no unavoidable long-term adverse effects are expected with regards to surface water and ground water resources.

Soils

Despite project design criteria, BMPs, and lease stipulations to minimize erosion during implementation of Alternative 2, some loss of soil due to erosion would occur due to wind and run-off, especially if run-off occurs on steep disturbed slopes before BMPs or lease stipulations are implemented. However, erosion control measures are expected to minimize the extent of this adverse effect to minimal levels.

Also, excavation and stockpiling of soil would destabilize soil aggregates (i.e. soil structure) which would reduce water holding capacity and increase susceptibility to erosion (Brady and Weil 1999).

Under Alternative 1 continued mining related activities such as installation of monitoring wells and exploratory drilling, recreational OHV use, and grazing would cause some degree of unavoidable soil loss but this effect would be much less extensive compared to that occurring under Alternative 2.

Vegetation

There are no unavoidable adverse effects on vegetation resources. Species composition and productivity might change as a result of site reclamation and revegetation for up to 10 years.

Roadless

Based upon the past effects of land use on roadless character within this portion of the West Elk IRA, development associated with both alternatives would continue unavoidable adverse impacts on roadless character beyond the life of the project. Alternative 2 stands to further deteriorate the roadless character.

Transportation

There are no unavoidable adverse direct impacts to transportation system management and use from any of the alternatives.

Visual Quality

Direct unavoidable adverse effects to VQOs and visual resource management from any of the three alternatives are not anticipated. Indirect adverse effects associated with modification of a unroaded to roaded visual landscape in both Alternative 2 and 3, may result in a cumulative impact to existing FS management for maintenance of roadless quality within the portion of the West Elk IRA in the project area.

Livestock Management

Changed patterns of livestock use may be a short-term unavoidable adverse effect resulting from this project.

Social and Economic

Alternative 1 would have an unavoidable adverse effect by reducing employment levels at the mine, loss of personal income to workers, loss of federal royalties and loss of tax revenue to counties caused by the curtailment of mining at the West Elk Mine.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Air Quality

Installation and use of methane relief drainage wells will irreversibly release methane gas.

Soils

Under Alternative 2, some irreversible loss of soil due to erosion would occur due to wind and run-off, especially if run-off occurs on steep disturbed slopes before BMPs and lease stipulations are implemented. Excavated and/or stockpiled soils would exhibit irretrievable losses of soil structure resulting in reduced water holding capacities.

Under Alternative 1 continued mining related activities such as installation of monitoring wells and exploratory drilling, recreational OHV use, and grazing would cause some degree of irreversible soil loss but this effect would be much less extensive compared to that occurring under Alternative 2.

Vegetation

Irreversible or irretrievable commitment of resources would occur if a special status plant or isolated populations of plants were missed during field inventories at MDW location sites. Disturbance associated with the construction and operation of the MDW and ventilation shaft could destroy these plants. General loss of vegetation could be considered an irreversible commitment of resources, however this loss would only last until the vegetation regenerated.

Recreation

There are no irreversible commitments of recreation-related resources from either of the alternatives. A long-term, life of subsurface coal mining operations irretrievable impact to recreation experience with the presence of MDW and direct extremely limited short term project area access may occur in Alternative 2 during equipment mobilization or demobilization. This commitment would be minimized and eliminated upon completion of operations and concurrent site restoration and reclamation.

Roadless

An irreversible commitment associated with sustained management of roadless character within this portion of the West Elk IRA would likely occur with development of Alternative 2. Further cumulative loss of roadless character in this portion of the IRA would result in the long term loss of manageability and planning consideration for this resource. Since roadless character effects currently exist and long term negative trend would be anticipated, considerations of impacts as irretrievable are limited.

Transportation

A long-term (through 2030) irretrievable impact to transportation system management and direct short term project area utilization would occur in Alternative 2.

Visual Quality

There are no direct irreversible commitments that would impact visual resource management by either of the alternatives. A long-term, life of subsurface coal mining operations irretrievable impact to VQOs would occur in Alternative 2. This commitment would be minimized and eliminated upon completion of operations and concurrent site restoration and reclamation.

An indirect irreversible commitment of resources associated with the modification of the visual landscape to a more roaded area (Alternative 2) could impact the sustained management of roadless character within this portion of the West Elk IRA.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders.”

- National Historic Preservation Act for causing ground disturbing actions in historical places; and
- U.S. Fish and Wildlife Service and the National Marine Fisheries Service in accordance with the ESA implementing regulations for projects with threatened or endangered species.
- National Environmental Policy Act (40 CFR 1500) to assess environmental effects and disclose decision-making process.
- Executive Order 13212 (May 18, 2001), Actions to Expedite Energy-Related Projects by expediting review and permitting of energy-related projects, while maintaining safety, public health, and environmental protections.

CHAPTER 4
CONSULTATION AND COORDINATION

Preparers

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

Table 4-1
Interdisciplinary Team Members

Name	Responsibilities in EIS Preparation	Education and Experience
Sally Crum, Archaeologist	Cultural Resources	BS-Anthropology, San Diego State University 25 years experience
Terry J. Hughes, Forest Soil Scientist, GMUG	Soils, Geologic Hazards, Water Quality	BS-Forestry (Soils emphasis), University of Wisconsin-Stevens Point 36 years experience
Dave Bradford, Rangeland Management Specialist, Paonia District	Range	BS-Range/Forest Management, Colorado State University 27 years experience in Colorado, South Dakota and Wyoming with BLM and USFS.
Ryan Taylor, Minerals Administrator, Paonia Ranger District	Minerals, Geology, Project Administration	BS-Geology and MS-Geology, University of North Carolina-Chapel Hill 5 years experience
Doug Marah, Supervisory Forest Civil Engineering Technician, GMUG	Transportation	Degree Civil Engineering Technology, Mesa College 26 years experience
Desty Dyer, BLM (Cooperating Agency) Mining Engineer/Inspector	Technical Advisor for Mining Operations	BS-Mining Engineering, Colorado School of Mines 25 years experience
Andrea Wang, FS Consultant Wildlife Biologist	Biology	BA-Biology, Western State College (Colorado) 19 years experience as wildlife biologist
Liane Mattson, Leasable Minerals Program Leader, GMUG	Technical Reviewer, all	BS-Geological Engineering, Colorado School of Mines 18 years professional experience
Niccole Mortenson, Engineering and Minerals NEPA Project Specialist (Team Leader)	Project Lead	BS-Natural Resource Conservation (Biology emphasis), University of Wisconsin-River Falls 15 years government experience

Table 4-2 Tetra Tech, Inc.		
Name	**Responsibilities in EIS Preparation**	**Education and Experience**
Cameo Flood	Project Manager, Socio/Economics, Environmental Justice	BS-Forest Management, University of Montana 21 years experience
C. Ray Windmueller, P.E.	Air Resources	BS-Petroleum Engineering, Montana College of Mineral Science and Technology 24 years experience
Dave Tyler	Geology	MA-Geology, Rice University BS-Geology, University of Southern California BS-Petroleum Engineering, University of Southern California 30 years experience
David Steed	Inventoried Roadless Areas, Visual Quality, Recreation, Transportation	BS-Biology, Idaho State University 18 years experience
Patricia Williams	GIS	BS-Wildlife Biology and MA-Geography/Cartography/GIS, University of Montana 5 years experience
Shane Matolyak	Soils	BS-Biology and Environmental Science, East Stroudsburg University MS-Land Rehabilitation, Montana State University 5 years experience
Stacy Pease	Wildlife/Fish/TES Species, Health and Safety	BS-Wildlife and Fisheries Science, University of Arizona MS-Watershed Management, University of Arizona 9 years experience
Thad Jones	Vegetation, Noxious Weeds, Grazing, GIS	BS-Forestry and MS-Forestry (Range emphasis), University of Montana 5 years experience
William Craig	Water	BS-Geology, Trinity University MS- Hydrogeology, University of Montana 12 years experience

Contributors

FEDERAL, STATE, AND LOCAL AGENCIES:

- US EPA Region VIII
- US EPA Climate Change Division
- USDA FS Regions 2, 4 &8
- USFS Region 4
- USDOI BLM WY State Office
- USDOI BLM Uncompahgre Field Office
- US Army Corps of Engineers
- MSHA
- US Fish and Wildlife Service

- Office of Surface Mining
- Colorado Division of Reclamation, Mining and Safety
- Colorado Division of Wildlife
- Gunnison County
- Gunnison County Planning Commission
- Delta County Board of Commissioners

TRIBES:

- Southern Ute Indian Tribe, Ignacio, Colorado
- Ute Mountain Ute Indian Tribe, Towoac, Colorado
- Ute Indian Tribe, Ft. Duchesne, Utah

OTHERS:

- Oxbow Mining, Inc./Gunnison Energy
- Bowie Resources, Ltd.
- High Country Citizen's Alliance
- Mountain Coal Company
- Thunder Mountain 4-Wheelers
- North Fork Coal Working Group
- Western Slope Environmental Resource Council
- The Wilderness Society
- Club 20
- Minnesota Canal & Reservoir Company
- Weekender Sports
- Several Individuals from District Mailing List

Distribution of the Environmental Impact Statement

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, federally recognized tribes, State and local governments, and organizations.

Agencies and Organizations

US Environmental Protection Agency

US Environmental Protection Agency, Region 8

USDA, National Agricultural Library Head, Acquisitions & Serials Branch

USDI, Director, Office of Environmental Policy and Compliance

Coalbed Methane Outreach Program, Climate Change Division, US Environmental Protection Agency

USDI Office of Surface Mining

USDI Bureau of Land Management

USDI Fish and Wildlife Service

Mine Safety and Health Administration

Colorado Division of Reclamation, Mining and Safety

Colorado Division of Wildlife

The Colorado Mining Association

Delta County Board of Commissioners

Western Slope Environmental Resource Council

High Country Citizens' Alliance

Bjork Lindley Little PC

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ACRONYMS

µg	microns
AMSL	Above mean sea level
BLM	Bureau of Land Management
BMP	Best Management Practices
BTU	British Thermal Unit
CAPCC	Colorado Department of Public Health and Environment Air Pollution Control Commission
CCR	Colorado Code of Regulations
CDMG	Colorado Department of Mines and Geology
CDOW	Colorado Department of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CNHP	Colorado Natural Heritage Program
CO	Carbon Monoxide or Colorado
CPIF	Colorado Partners in Flight
CRS	Colorado Surface Coal Mining Reclamation Act
CRW	From air section
DN	Decision Notice
DRMS	Division of Reclamation, Mining and Safety (Colorado)
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FS	Forest Service
GMUG	Grand Mesa, Uncompahgre and Gunnison National Forests
IRA	Inventoried Roadless Area
M^3	Cubic Meter
MCC	Mountain Coal Company
MDW	Methane Drainage Wells
MIS	Management Indicator Species
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFRIA	North Fork River Improvement Association
NFS	National Forest System
NFSR	National Forest System Road
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NRHP	National Register of Historic Places
OAHP	Office of Archaeology and Historic Preservation (Colorado)
OHV	Off-Highway Vehicle
OSM	Office of Surface Mining and Reclamation
P.M.	Prime Meridian
Pb	Lead
PM_{10}	Particulate Matter smaller than 10 microns
$PM_{2.5}$	Particulate Matter smaller than 2.5 microns
PPM	Parts Per Million
PSD	Prevention of Significant Deterioration
RARE II	Roadless Area Review and Evaluation II
RMP	Resource Management Plan
SHPO	State Historic Preservation Office
SIP	State Improvement Plan (Colorado)
SMCRA	Surface Mining Control and Reclamation Act
SMS	Scenery Management System
SO_2	Sulfur Dioxide

SPP	Species
SUA	Special Use Authorization
TDS	Total Dissolved Solids
USDA	United States Department of Agriculture
WIZ	Water Influence Zone
USDI	United States Department of the Interior
VQO	Visual Quality Objective

INDEX

APPENDIX A
REGIONAL OFFICE ROADLESS AREA COMPLIANCE

USDA United States Department of Agriculture | Forest Service | Rocky Mountain Region | P.O. Box 25127
Lakewood, CO 80225-0127
Delivery: 740 Simrns Street
Golden, CO 80401
Voice: 303-275-5350
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File Code: 2820-4/2730-3/1920 Date JAN 1 8, O7 –

Route To:

Subject: Regional Forester Review of Purpose and Need for Deer Creek Shaft and E Seam Methane Drainage Wells Project involving Roads in an Inventoried Roadless Area

To: Forest Supervisor. Grand Mesa, Uncompahgre, and Gunnison National Forests

The Grand Mesa, Uncompahgre and Gunnison National Forests (GMUG) is evaluating a proposal for surface use and access on National Forest System lands subject to terms of federal coal leases for operations associated with constructing, operating, and reclaiming methane drainage and ventilalion/escapewav facilities. These facilities are needed to efficiently produce federal coal reserves at the West Elk Mine, operated by Mountain Coal Company. Portions of the proposed activities fall within an inventoried roadless area (IRA).

The GMUG has a Forest-Scale Roads Analysis Procedure completed but does not have a revised Forest Plan. Consequently under the terms of Interim Directive No. 1920-2006-I. the decision authority for this project lies with the Forest Supervisor. However, because this project requires an EIS, the Purpose and Need must he approved by the Regional Forester. Details of the purpose and need arc given below.

Purpose of and Need for Action

Need for Action

The Forest Service has identified the need to authorize MCC. operator of the West Elk underground coal mine, to construct, operate, and reclaim up to 132 methane drainage well sites, one ventilation/escapeway facilities, and approximately 18 miles of associated road construction and reconstruction. The operations are needed for the West Elk Mine to comply with Mine Safety and Health Administration (MSHA) requirements for methane gas management to ensure worker safety in the underground mine. The operations would enable safe recovery of leased federal coal reserves in compliance with lease terms and requirements for efficient recovery of federal coal.

Purpose of Action

The purpose of the agency's action is to protect public health and safety, to prevent loss of leased federal coal resources (also considered property of MCC through rights granted in their leases), and to facilitate safe and efficient production of compliant and super compliant coal reserves.

Summary Description of Proposed Actions in Inventoried Roadless Areas

Operations are proposed on two existing federal coal leases and one federal coal lease tract scheduled for sale in January 2007 on the Gunnison National Forest. Portions of the leases are in the West Elk Inventoried Roadless Area (West Elk IRA), generally east of Paonia, CO. Approximately 2.5 miles of road construction is proposed on these leases in the West Elk IRA. The road construction is necessary for access to 21 sites for methane drainage wells. Twelve of these sites would be in the .A. No actions are being proposed on the IRA portion of the lease scheduled for sale. Roads proposed in the IRA would be for project and administrative use only, and would not be available for public use.

Lead and Cooperating Agencies

The Grand Mesa, Uncompahgre and Gunnison National Forests is the lead agency for the environmental analysis. The Uncompahgre Field Office of the BLM is a cooperating agency.

Responsible Official

The Responsible Official is the GMUG's Forest Supervisor. Charles S. Richmond. Given the purpose and need, the Responsible Official will review the proposed action, the other alternatives, and the environmental consequences in order to decide the following:

- Where surface use for the shaft/escapeway, access roads and methane drainage wells is acceptable.
- Conditions under which NFS lands can be used, and how non-mineral resources must be
  protected.
- Whether to grant relief from the lease stipulations for big game winter range for construction of the ventilation shaft and escapeway.

The Forest Service Responsible Official will determine if the activity is consistent with the GMUG Forest Plan, and identify the post-mining land use.

Regional Forester Review of Purpose and Need under the 2001 Roadless Rule:

I have reviewed the purpose of and need for this project, as described in the Notice of Intent to prepare an Environmental Impact Statement. published in the Federal Register on September 18, 2006 and submitted to me in a briefing paper. As is required of me in Interim Directive 1920- 2006-1 for the interim management of Forest Service roadless areas. I concur with the stated purpose and need for this project and the possibility that portions of the proposed methane drainage wells and access may be located within the West Elk Inventoried Roadless Area. Therefore, the proposed analysis for this project should proceed.

cc: Randy Karstaedt, Sharon Friedman

Project: Deer Creek Shaft and F Scam. Methane Drainage Wells Project
Level of NEPA: EIS
NEPA Lead: Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG)
NEPA Cooperating Agency: Uncompahgre Field Office BLM
NEPA 3rd Party Consultant: Maxim-Tetra Tech
Proponent: Mountain Coal Company (Operator Weal Elk Mine)

Purpose of and Need for Action

Need for Actions:

The Forest Service has identified the need to authorize Mountain Coal Company (MCC), operator of the West Elk underground coal mine, to construct, operate, and reclaim up to 132 methane drainage well sites, one ventilation/escapeway facility, and approximately 18 miles of associated road construction and reconstruction. The operations are needed for the West Elk Mine to comply with Mine Safely and Health Administration (MSHA) requirements for methane gas management to ensure worker safely in the underground mine. The operations would enable safe recovery of leased federal coal reserves in compliance with lease terms and requirements for efficient recovery of federal coal.

Purpose of Action

The purpose of the agency's action is to protect public health and safety, to prevent loss of leased federal coal resources (also considered property of MCC through rights granted in their leases), and to facilitate safe and efficient production of compliant and super compliant coal reserves.

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The accompanying map shows the E Seam Methane Drainage project proposed action, and previously approved methane drainage activities.

Compliance with the Roadless Area Conservation Rule

Roads associated with methane drainage wells may be constructed or reconstructed in the West Elk IRA under two exceptions to the RACR.

Exception No. 1 - protection of public health and safety in the cases of imminent threat that without intervention would cause toss of life or property.

- High levels of methane gas in the mine create unsafe working conditions for miners and must he reduced to acceptable levels under MSHA rules.
- High levels of methane gas in the mine can lead to loss of federal properly if the leased, mineable coal is destroyed through explosive or thermal events and cannot be mined.
- The only way to reduce methane to safe and acceptable levels is to install the methane drainage wells, which require temporary roads.
- Exception applies to all proposed road construction associated with methane drainage wells on all IRA lands included in the federal coal leases on which operations are proposed.

Exception No.7 - continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001

- The roads to access methane drainage wells are needed for coal mining operations and continuation of leases on lands that were under lease as of 1/12/2001.
- Exception applies to proposed road construction associated with methane drainage wells on all IRA lands included in the federal coal leases on which operations are proposed except for a 160-acre lease modification which extended lease COC-001362 on Oct. 15, 2001. (See details about leases under *Lease Information* below.)

Forest Service Proposed Action

The Forest Service proposes to authorize MCC to conduct operations associated with accessing, constructing, operating and reclaiming up to 154 individual methane drainage wells (MDWs) on 132 drilling locations, and one ventilation/escapeway shaft. The Forest Service also proposes to authorize the construction and use of about 18 miles of new roads necessary for these operations. The proposed action includes a 0.6-mile re-routing an existing life-of-mine administrative access road to address issues related to geologic hazards, sedimentation control and maintenance issues.

Approximately 2.5 miles of new roads (including the 0.6 mile re route) associated with constructing or providing access to about 27 methane drainage wells on 21 drill sites would be in the West Elk Inventoried Roadless Area. The attached map shows the location and geographic scope of the proposed action.

The Forest Service would issue a special use authorization for these uses of NFS lands. The special use authorization would be consistent with the terms of the two federal coal leases on which operations are proposed, and would include conditions identified in the environmental analysis and final Forest Service decision on the project.

Conditions attached to the special use authorization would be consistent with provisions al 36 CFR 204.12 (b)(7) with requires road construction and reconstruction on mineral leases to "be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulations, and laws." Also consistent with that provision of RACR, the Forest Service would require the operator to decommission all roads by obliteration when no longer needed for the purposes of the lease.

Regulatory and Policy Requirements

Forest Service Policy Applicable to Proposed Project

The GMUG has a Forest-Scale Roads Analysis Procedure completed but does not have a revised Forest Plan. Consequently under the terms of interim Directive No. 1920-2006- I, the decision authority for this project lies with the Forest Supervisor. However, because this project requires an EIS and includes proposed temporary road construction in an IRA, the Purpose and Need must be approved by the Regional Forester.

Provisions of the Roadless Area Conservation Rule Applicable to Proposed Project

On September 19, 2006, Judge Elizabeth U. Laporto of the United States District Court of the Northern District of California set aside the State Petitions Rule and reinstated the Roadless Area Conservation Rule of 2001 (RACR). Consequently, consideration must be

given to MCC's request for mine-related operations in an IRA, and whether such activities can be conducted in a manner consistent with the RACR.

Road construction activities associated with methane drainage wells proposed in the West Elk IRA are exempt from the prohibitions of the RACR under Exception No. 1 - protection of public health and safety in the cases of imminent threat that without intervention would cause loss of life or property. Most of the road construction associated with the wells is also exempt from prohibitions of the RACR under Exception No. 7 - continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001. One-tenth mile of road construction on a portion of a coal lease that was modified on October 15, 2001 is exempt under Exception No. 1, but may or may not be exempt under Exception No. 7.

Background and Description of Project

Mountain Coal Company (MCC) operates the West Elk Mine on federal coal leases underlying the GMUG. Since 2001, the underground mining operations have encountered quantities of naturally-occurring methane gas that left unmitigated, can create hazardous working conditions. Since 2001, the GMUG and the Forest Service Rocky Mountain Regional Office have analyzed and approved several methane drainage projects to continue operations at the West Elk Mine, including the ***Coal Methane Drainage Project Panels 16-24 Mountain Coal Company- West Elk Mine Environmental Assessment and DN/FONSI (signed by Regional Forester Rick Cables in May 2002)***. These project decisions have approved over 50 methane drainage well locations and about 20 miles or road construction in the West Elk IRA. Operations and contemporaneous reclamation have been on-going since these approvals were given. It is currently estimated that about 25 methane drainage well locations are currently operating, and 10 miles of project roads are in place within the IRA. About 23 additional methane drainage well locations have been constructed and reclaimed, along with 10 miles of road that have been constructed and decommissioned by obliteration.

Current Operations and Mining Requirements

The West Elk Mine operations are now moving into an area of leased federal coal reserves known as the E Seam reserves. To comply with Mine Safety and Health Administration (MSHA) requirements, the mine plan calls for an additional ventilation shaft and escapeway and methane drainage wells to support the mine ventilation system and provide for underground worker safety. MS!-IA requires that underground coal mines maintain low methane levels to ensure worker safety. MCC cannot meet these requirements without the methane drainage wells. Consequently, MCC has applied to install these facilities on their federal coal leases, some of which overlap with the West Elk IRA.

Lease Information

Two federal coal leases are involved in the proposed ventilation shaft and methane drainage wells, as follows.

Lease COC 001362

- 1967 issue date.
- Moth Iicd with a 160-acre extension on October 15, 2001
- 4,900 acres total (including modification), with 1,260 acres in the West Elk IRA (including modification)
- Proposed on lease: About 123 methane drainage wells on 113 sites and about 17 miles of road construction.
- Proposed on IRA portion of lease (including the 160-acre extension): 12 methane drainage well drill sites with 2.4 miles of road construction. This includes one—quarter (1/4) mile of road construction oil the lease, but in the IRA, to access methane drainage wells on the lease.
- Proposed on 160-acre modification two methane drainage well drill sites with one—tenth mile of road construction.
- Ventilation shaft/escapeway proposed on this lease is not in an IRA.

Lease COC-56447

- 1995 issue date.
- 2,910 acres total, all within the West Elk IRA.
- Proposed on lease: 240 feet road construction.

Project Details

The E Seam Methane Drainage Wells (MDW) Project Proposal includes:

Access and Road Construction:

Access needs to and from the E Seam MDW drilling area would use a combination of County, existing National Forest System Roads (NFSR5), existing lift-of-mine administrative access wads serving the coal leases, and newly constructed administrative access roads as follows (refer to map):

A. Daily project traffic (with the exception of oversize vehicles) is required to access from the north via the Sylvester Gulch Road (approved as a temporary road in the 2002 *Coal Methane Drainage Project Panels 16-24 Environmental Assessment and DN/FONSI May 2002.* and modified to a life-of-mine (to 2030) road in the 2006 *Supplement to Coal Methane Drainage Project Panels 16-24 Environmental Assessment for Sylvester Gulch Road Construction and Long Draw Saddle, Construction Upgrade.* Project traffic on the Minnesota Creek Road was an issue that has arisen from Delta

County and the town of Paonia in previous analysis. The Sylvester Gulch Road is currently under construction.

B. Oversize vehicles such as the drill rig and semi trucks would access from the west via Minnesota Creek Road in Delta County. Gunnison County Road 710, and NFSRs 710.711.

C. All project traffic would also use the existing life-of-mine administrative access roads known as the West Flatiron Road, Long Draw Saddle (and Extension), and NFSRs 710, 711, 771.2A and 711. 2B.

D. Eighteen miles of road construction or reconstruction between existing reads and new drill pads would occur. Two and one-half (2.5) of these miles are in the West Elk IRA. Approximate access disturbance is up to 65 acres (9 acres in the West Elk IRA) over 12 years. These roads would be for project and administrative use only, and would not be available for public use. These mileages would be decommissioned by obliteration after project use.

E. An existing life-of-mine (i.e. to 2030) administrative access road in the SE 1/4 Section 27, T 13S, R 90W would be re-routed to mitigate existing resource and maintenance problems due to geologic hazards, sedimentation and slope steepness. The existing administrative access road would be decommissioned by obliteration upon construction of the re-route. The existing access mute and proposed re-route are both in the West Elk IRA. The re-route is about 0.6 miles, and would decrease the mileage of the existing route by 0.6 miles. The re-route would be decommissioned by obliteration at the end of mine life (about 2030). The re-route would be for on-lease activity and administrative use only, and would not he available for public use.

Methane Drainage Well Installation, Operation and Reclamation:

• Drilling and casing of up to 154 methane drainage wells located on up to 132 pads. Approximate total pad and road construction disturbance is up to 170 acres over (2 years. About 18 of the 170 acres are in the West Elk IRA.

- Installing passive and/or active degassing equipment on each of the methane drainage wells.
- Operating and maintaining wells for ventilation of the mine.
- Interim reclamation of mud pits, arid seeding and mulching of out-slopes and cut-slopes.
- Plugging drill holes and performing final reclamation on roads and pads when drill holes are no longer performing their intended purpose. The estimated life of each methane drainage well is 3 years; construction would span 12 years and reclamation would span approximately 12 years.

Lead and Cooperating Agencies

The Grand Mesa, Uncompahgre and Gunnison National Forests is the lead agency for the environmental analysis. The Uncompahgre Field Office of the BLM is a cooperating agency.

Responsible Official

The Responsible Official is the GMUG's Forest Supervisor. Charles S. Richmond. Given the purpose and need, the Responsible Official will review the proposed action, the other alternatives, and the environmental consequences in order to decide the following:

- Where surface use for the shaft/escapeway, access roads and methane drainage wells is acceptable.
- Conditions under which NFS lands can be used, and how non-mineral resources must be protected.
- Whether to grant relief from the lease stipulations for big game winter range for construction of the ventilation shaft and escapeway.

The Forest Service Responsible Official will determine if the activity is consistent with the GMUG Forest Plan, and identify the post-mining land use.

Project Status

- NOI published September IS, 2006 *Federal Register,* September 20, 2006 *Della County Independent,* and September 20, 2006 *Grand Junction Daily Sentinel*- Five comments were received.
- Determination of issues and alternatives - November 2006.
- DEIS internal review - January 2007.
- Distribute DEIS - February 2007.
- FEIS/ROD release –May 2007.

Regulatory Framework

The Forest Service is directed by a number of laws/executive orders and internal manual direction to protect the soil resource, and prevent sedimentation from reaching stream networks. The main one includes:

National Forest Management Act - protect and, where appropriate, improve the quality of soil, water and air resources (Section 5)

Federal Land Policy and Management Act - Each right-of-way shall contain terms and conditions which will minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment; require compliance with applicable water quality standards (Section 505).

Clean Water Act —The objective of the Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters, (Section 101(a))

Clean Water Act - Regulates discharge of dredged or fill material into navigable waters (waters of the U-S.) (Section 404).

36 CFR 21927(a) (1 9S2) –Resource protection. All management prescriptions shall: (1) Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land; (4) Protect streams, stream banks. shorelines, lakes, wetlands, and other bodies of water; and (6) Provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species *and* provide that habitat for species chosen under § 219-19 is maintained and improved to the degree consistent with multiple-use objectives established in the plan.

EO 11990 - in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct and indirect support of new construction in wetlands wherever there is a practicable alternative.

FSM 2527 - Avoid adverse impacts that may be associated with the destruction, loss or - degradation of wetlands... void filling of land within floodplains and wetlands wherever practicable... Preserve and, where needed and feasible both economically and technically, enhance the natural and beneficial function and values of wetlands.

FSM 2550 — Manage forest and rangelands in a manner that will improve soil productivity. [SM 2553— Manage the soil resource to take advantage of its potential for increasing the productivity of forest and rangelands.

FSM 2503 Design all management activities of other resources to minimize short-term impacts on the soil and water resources and to maintain or enhance long term productivity, water quantity, and water quality.

GMUG- Individual Forest Direction and Guidance

Soils and Soils related (overall goals from Forest Plan)

Conserve soil resources.

Maintain long-term land productivity.

Protect the water quality in streams, lakes, riparian areas, and other water bodies.

APPENDIX B
MSHA HANDBOOK AND METHANE CONTROL

MSHA Handbook Series

U.S. Department of Labor
Mine Safety and Health Administration
Coal Mine Safety and Health
May 1992

Handbook Number PH92-V-6
Mine Ventilation Plan Approval Procedures

PREFACE

This handbook sets forth guidelines and instructions for evaluating and processing mine ventilation plans. The instructions are primarily procedural and are intended to serve as an organizational aid for all MSHA coal enforcement personnel.

TABLE OF CONTENTS

APPENDIX

Chapter 1
INTRODUCTION

A. Purpose Of Mine Ventilation Plans

Plans adopted by the mine operator and approved by the district manager define minimum safety and health requirements for the mine. A sound ventilation plan is essential to maintaining adequate ventilation and respirable dust control in the mine. A good plan includes information that supervisors and miners need to be aware of to have effective ventilation in their working environment. The plan adopted by the mine operator and approved by the district manager should define minimum requirements for the mine.

B. Authority

Section 303(o) of the Mine Act.

30 CFR 75.370

30 CFR 75.371 specifies information which must be included in the ventilation plan as a minimum. Additional information may be required to suit the particular conditions at the mine.

30 CFR 75.372 lists information the operator must submit on the mine map to MSHA. The map shows information which is critical to the plan approval process but is not subject to approval by the district manager. Only that portion of map which contains the information required under 30 CFR 75.371 is subject to approval.

C. Responsibility

Only the district manager or those designated as acting in the manager's absence have the responsibility and authority for plan approvals. THIS APPROVAL AUTHORITY CANNOT BE REDELEGATED.

Chapter 2

VENTILATION PLAN

A. Plan Submittal

The mine operator is required by 30 CFR 75.370 to set out in printed form a ventilation plan and revisions thereof. Under 30 CFR 75.370 the plan must be reviewed every 6 months by an authorized representative of the Secretary. This requirement implies that the plan in effect must be reviewed to determine if it is still appropriate for the mine and continues to provide for an adequate ventilation system. It is not necessary to routinely require a complete plan submittal to satisfy this review. However, when required in writing by the district manager, the operator must submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material.

Any changes to the ventilation system that may materially affect the safety and health of persons in the coal mine, or that constitute a change to the information provided pursuant to 75.371, are the type of changes that require approval by the district manager before they are implemented.

B. Maps

The operator is required to submit information in accordance with 30 CFR 75.372. This information is provided on an accurate up-to-date map at least once every 12 months. The map shows information which is critical to the plan approval process but is not subject to approval by the district manager. The information includes anticipated mine projections for at least a year and will assist in the evaluation of the adequacy of the ventilation system for the period of time between reviews.

Specific information that may be shown on the map to satisfy the requirements of 75.371, such as bleeder system evaluation details, is different from the informational requirements and shall be treated as plan requirements. The review process should identify and reference the 75.371 items which are shown on the map. Such information is subject to approval; and, no proposed revision to these plan requirements will be implemented before it is approved by the district manager.

Chapter 3
PROCEDURES FOR PLAN APPROVAL

While responding promptly to each request for a ventilation plan approval is an important part of the review process, review quality and thoroughness are utmost in importance. All districts should follow similar standard operating procedures to accomplish an expeditious and efficient review. The basic procedures are as follows:

A. All requests for approval of ventilation plans or revisions thereof should be submitted to the district office. Districts that desire an arrangement for mine operators to submit plans to other locations should obtain approval of these other locations by the Administrator.

B. The progress of the plan through the approval process should be coordinated by the Engineering Coordinator/ Chief of Engineering Services. Plan or revision requests should be handled efficiently with an effort to complete all requests of any proposed plan, revision, or change in a time period of 45 calendar days.

C. The supervising ventilation specialist or the ventilation subordinates will critically review the plan as follows:

1. The information to be included on the map is listed in 30 CFR 75.372. The maps should be reviewed against the standard to ensure that all the basic information is shown. In addition to a mechanical review of the listed items, the reviewer should apply his (her) expertise to ensure that the current and projected systems are viable and reliable. It is important to note that only that portion of the map which contains information required under 30 CFR 75.371 will be subject to approval by the district manager.

2. Determine that information required by 30 CFR 75.371 has been submitted. The plan needs to contain only the particular air flow, methane, and dust control measures necessary to address the unique conditions at the mine. Circumstances referred to in 75.371, but not present in the mine, do not need to be addressed. The ventilation regulations are structured to require in the plan only those standards which differ from requirements listed in the applicable standards. For example, an air quantity should be specified in the plan only if the quantity required at the intake to longwall sections is different from that specified in 30 CFR 75.325(c), 30,000 cfm.

3. Written comments from representatives of miners should be considered in the review process.
4. Ensure that the plan does not contain any statements which are inconsistent with existing mandatory regulations. The reviewer must be cognizant of this potential problem to avoid approving a plan containing a provision that

is required to be addressed as a petition for modification under Section 101(c) of the Mine Act.

5. Information that may be useful in the review process is listed at Appendix A.

D. The district ventilation group will take the steps necessary to have the subdistrict/assistant district manager, field office supervisor and a designated inspector provide input into the review process. A method of documenting this input should be established but the format and process is at the discretion of the district manager.

E. When the ventilation plan documents and review forms are completed, they will be forwarded to the Chief of Engineering Services/Engineering Coordinator. The coordinator is responsible for making a recommendation of approval or disapproval to the district manager.

F. It is recognized that many changes or revisions are proposed that address specific portions of the approved plan. Therefore, all steps in Paragraph C may be unnecessary in all situations. The Engineering Coordinator may expedite the review process where the nature of the revision warrants in that case. The persons indicated in Paragraph D will be informed at the earliest opportunity concerning the details of an approved revision.

G. After a thorough review of a proposed plan or revision, the operator must be notified in writing whether the proposed plan or revision is acceptable.

1. If the plan or revision is acceptable, the district manager will send written notification to the operator that approval is granted.

2. If a separate standard or a provision of a ventilation plan has been determined by MSHA to be unsuitable to the particular conditions at the mine, the district manager may require revisions by the operator. MSHA will advise the operator of the deficiencies of the proposed plan or revision for which approval is denied. The operator is then given an opportunity to discuss with the district manager the problems identified and potential solutions. If provision(s) cannot be approved, MSHA procedures established in the Program Policy Manual, Volume V, V.G-4 apply.

Chapter 4
MANAGEMENT SYSTEM CONTROLS

A Mine Plan Approval System (MPAS) is in place in each district. This program is a database application to track plan approvals and reviews. Data that must be entered into the system include:

A. dates plans were received;

B. dates plans were approved;

C. dates 6-month review letters were signed; and

D. mine identification number

The date on which an orignal plan is approved becomes the date of record for that plan. All subsequent six month reviews are conducted based on the orignal date of record. When a fully revised plan is submitted and approved, as provided in 30 CFR 75.370(a)(2), the new approval date becomes the date of record for subsequent six month reviews.

Although the above represents the minimum information to be tracked, the program can accept and track other information depending on the need or desire of the district.

Most information can be retrieved upon request to the district office. Quarterly reports, and reports generated for any other timeframe, can be produced and used to aid in tracking and maintaining programs current. Responsible personnel should familiarize themselves with the MPAS, which serves as a useful management tool.

Chapter 5
SIX MONTH REVIEWS

The periodic review of the ventilation plan is required at least every 6 months (30 CFR 75.370). However, reviews for producing and non-producing mines may vary somewhat.

A. Producing (A-status) Mines

Each 6-month review should include a physical inspection of the mine ventilation system by either a ventilation specialist or regular inspector. It is important that the ventilation plan be discussed with the operator and representative of the miners during the physical inspection and during the close-out conference following each physical ventilation inspection. Regular inspectors assigned to conduct ventilation reviews should schedule

sufficient underground activities to evaluate the application and adequacy of the ventilation plan.

The ventilation specialist should participate as frequently as possible in all facets of the plan review, including the in-mine inspection, with strong emphasis on mines with complex ventilation systems. A 6-month review consists of:

1. a complete re-examination of the ventilation plan;

2. a mine visit to observe the ventilation system in operation;

3. inspection of the bleeder system, if applicable;

4. examination of a representative portion of ventilated worked out areas;

5. observation of ventilation controls and construction;

6. review the information listed in Appendix A; and,

7. review of mine maps for required information.

It is not necessary to routinely require a complete plan submittal to satisfy this review. However, when required in writing by the district manager, the operator must submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material. When the number of revisions to the plan make it difficult to determine the operative provisions of the plan, the district manager should notify the operator in writing to submit a revised plan that incorporates all revisions in an orderly manner, and deletes those provisions that are no longer applicable.

The 6-month review should result in correspondence to the operator which identifies the material which constitutes the complete approved plan. A copy of the letter, identifying all material constituting the complete plan, should be used to check the contents of the Uniform Mine File for accuracy and completeness.

B. Non-producing (B-status) Mines

The procedures for the review of approved plans for non-producing mines should be the same as for producing mines except that these reviews need not require underground visits where no one is working or where all ongoing work is on the surface. In such cases the approved plan on file as well as the operational status of the mine should be reviewed.

Chapter 6
PLAN REVIEW FORMS 2000-204 AND 2000-86

Plan Review Form 2000-204 is submitted to document the completion of a 6-month ventilation plan review conducted by regular inspectors and to permit comment by the inspectors on the adequacy of the plan. When the review indicates a deficiency in the respirable dust control portion of the plan, Form 2000-86 should be completed to record the comments. The MPAS is designed to project 6-month ventilation plan review due dates. Form 2000-204 provides data for the program. The form is an in-house document and is not intended for distribution outside the district or to the public.

When preparing Form 2000-204 for submittal, the reviewer should record on the form the names of mine officials and miners' representatives who participated in the review discussion.

Chapter 7
INTERNAL CONTROL OF CONTENT OF PLAN

An important aspect of the plan approval process is minimizing the complexity and amount of information in such plans. This can be accomplished in part by eliminating unnecessary language. For example:

A. Mandatory standards should not be repeated in the written text of the plan. This avoids the potential for typographic errors that can change the meaning of the standard. This approach will also reduce the complexity of the plan, since there is no need to repeat mandatory standards in the plan.

B. Specific plans should not be required when the general plan is adequate. For example, the operator need not submit longwall recovery or setup ventilation plans each time a longwall is moved to a new location. One typical recovery and setup ventilation plan showing ventilation controls and minimum ventilation quantities for the planned longwall panels will suffice in most cases.

C. The operator should not be required to submit a revised plan each time a panel is developed for connection to the bleeder system. This is unnecessary duplication when the entire bleeder system design and mining projections are shown on the mine map.

Chapter 8
GUIDANCE FOR VENTILATION PLAN APPROVAL IN MINES WHERE DIESEL-POWERED EQUIPMENT IS OPERATED

Individual Units of Diesel-powered Equipment

§75.325(f)requires that a minimum quantity of ventilating air be maintained where individual units of diesel-powered equipment are being operated. The minimum ventilating air quantities for individual units of equipment are not required to be specified in the ventilation plan. Paragraphs (f)(1) through (f)(3) indicate the locations where the minimum ventilating air quantity must be maintained.

Paragraph (f)(1) requires the minimum ventilating air quantity to be maintained in any working place where the equipment is being operated. It is anticipated that this quantity will be measured in the same required location as the quantity reaching the working face, described in §75.325(a)(2). This would necessitate making only one air quantity measurement to determine compliance with both §75.325(a)(1) and §75.325(f)(1). However, an air quantity measurement in the entry of the working place would also be acceptable.

Paragraph (f)(2) requires the minimum ventilating air quantity to be maintained at the section loading point during any shift when equipment of the type that can be used to perform work at the section loading point is on the working section. The location for this quantity is required by §75.371(ll) to be specified in the mine ventilation plan.

Paragraph (f)(3) requires the minimum ventilating air quantity to be maintained in the entry where the equipment is being operated outby the section loading point in areas of the mine developed on or after April 25, 1997. This quantity can be determined either within one crosscut of the diesel-powered machine or with the machine pulled into a crosscut.

Paragraph (f)(4) requires the minimum ventilating air quantity to be maintained in any air course with single or multiple entries where the equipment is being operated outby the section loading point in areas of the mine developed prior to April 25, 1997. This quantity can be determined either within one crosscut of the diesel-powered machine or with the machine pulled into a crosscut. However, air quantity measurement locations in a multiple entry air course should be made in each entry directly across from the previous entry's measurement location.

Paragraph (f)(5) allows the district manager to require minimum ventilating air quantities at other locations where individual units of diesel-powered equipment are being operated. Any such locations should be specified in the ventilation plan. The preamble to the final rule provides some examples of such locations, including underground repair shops, permanent fuel storage facilities, temporary fuel storage areas, or construction sites.

Multiple Units of Diesel-powered Equipment

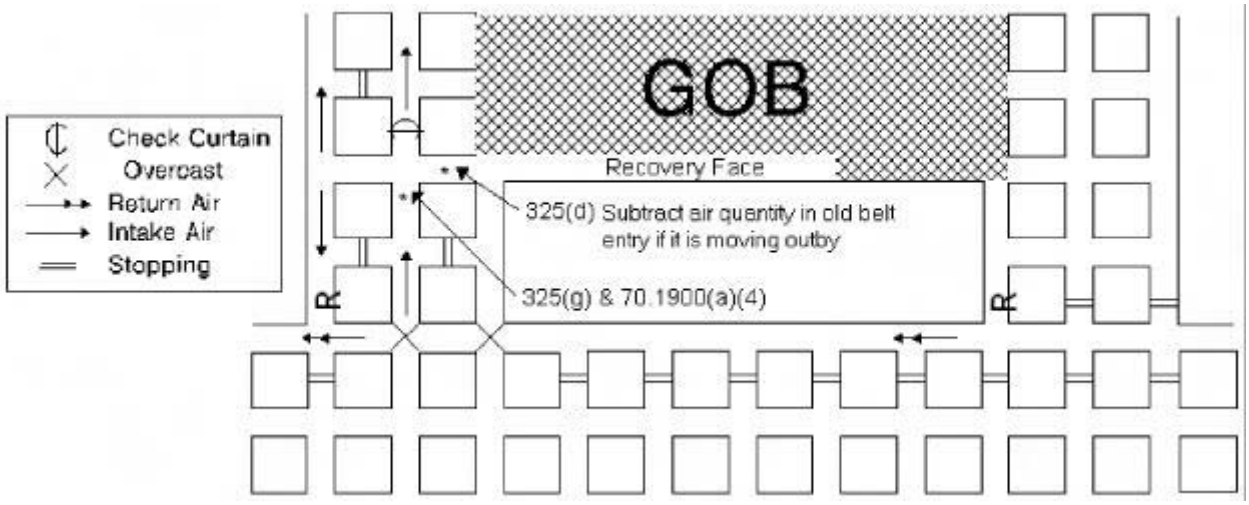
When multiple units of diesel-powered equipment are on the working section, the minimum ventilating air quantity shall represent the sum of the nameplate ventilating air quantities of all of the diesel-powered equipment located on the working section, i.e., equipment located inby the loading point, excluding any equipment specifically exempted in the plan. The locations where the minimum air quantity must be maintained are stipulated in paragraph (g)(1) through (g)(3).

When multiple units of diesel-powered equipment are being operated in areas where mechanized mining equipment is being installed or removed, the minimum ventilating air quantity approved in the ventilation plan should represent the sum of the nameplate ventilating air quantities of all of the diesel-powered equipment located inby the mouth of the panel, excluding any equipment specifically exempted in the plan. This equipment should include all diesel-powered equipment used in the setup or removal process, such as shield haulers, scoops, pickups, etc. The location of the minimum air quantity would be specified in the intake entry or entries just outby the crosscut conducting the air into the face. Also, a monitoring point(s) may be set up under §70.1900(a)(4) to ensure that diesel-powered equipment is being adequately ventilated in the intake haulage entry.

Paragraph (d) should be used to address diesel-powered equipment that is actually on the removal or setup face, i.e., those pieces of equipment inby the last loading point or future loading point. The initial air quantity (before any exclusions) would be the sum of the nameplate ventilating air quantities on those pieces of equipment. The location where the minimum quantity must be maintained would be either in the crosscut conducting the air onto the face or at another appropriate inby location.

The diagram below provides examples of locations where minimum ventilating air quantities should be maintained for multiple units of diesel-powered equipment, and also indicates an example of a location for an air quality monitoring point required under §70.1900(a)(4). This would be in addition to the monitoring point required by §70.1900(a)(3).

Longwall Removal



75.325(d) -Quantity for equipment located inby former loading point

75.325(g) -Quantity required to be maintained during removal of longwall equipment

70.1900(a)(4) - Possible sampling location designated by the District Manager

The following diesel-powered equipment may be excluded from the calculations of minimum ventilating air quantity under paragraph (g) for multiple units of diesel-powered equipment. All such exclusions must be approved by the district manager and specified in the ventilation plan:

1. Self-propelled equipment meeting the requirements of §75.1908(b) (this would be "light-duty" equipment). Generally, light-duty equipment may be excluded from the calculation if the operator can substantiate that the duty cycle of such equipment will have a minimal impact on the nitrogen dioxide and carbon monoxide exposure of miners. An example where the equipment may not be excluded is a diesel-powered pick-up truck operated frequently in the intake haulage entry during a longwall set-up, transporting supplies and personnel. The use of this equipment is such that it would contribute significantly to the miners' total exposure to carbon monoxide and nitrogen dioxide during the shift. An example where exclusion may be appropriate is a diesel-powered mantrip which has a duty cycle that does not contribute significantly to the miners exposure because the mantrip is operated only to take the crew to and from the working section.

2. Equipment that discharges its exhaust into intake air that is coursed directly into a return air course. Usually all such equipment would be excluded from the calculation.

3. Equipment that discharges its exhaust directly into a return air course. Usually all such equipment would be excluded from the calculation.

4. Other equipment having duty cycles such that the emissions would not significantly affect the exposure of miners. The length, duty cycle and type of operation of the equipment must be evaluated in making this determination. In some cases sampling may be needed to assess the effect of the equipment operation on the exposure of miners.

Approval of Reduced Minimum Ventilating Air Quantities under §75.325(i)

The minimum ventilating air quantity required under paragraph (g) is based upon the nameplate air quantities for the equipment engines. These nameplate quantities are determined by laboratory testing using MSHA test procedures, which are designed to approximate the duty cycles of the engines. The ventilation rates are based upon the exhaust contaminants measured at different engine speeds and loading factors. Because in-mine operation of multiple engines can vary depending on equipment loads and speeds, the regulations allow mine operators to request reductions in the required minimum ventilating air quantity for multiple units of equipment. It is important to note that the minimum ventilating air quantity for an individual unit of diesel-powered equipment cannot be reduced.

It is the mine operators responsibility to provide MSHA with data, such as results of on-shift, environmental, and personal sampling, to support any request for a reduced minimum ventilating air quantity. Such data may include a continuous and complete record of carbon monoxide, nitrogen dioxide, and the air quantities measured on the section. Data should be collected for all locations where the minimum air quantity is required to be maintained. Data logging instrumentation generally provides the most usable results. Computer-based mine wide monitoring systems could also provide valuable data. Data should indicate the time-weighted averages for the contaminants measured, peak contaminant concentrations, the associated measured air quantities, section production records, and the reduced minimum air quantity the company is requesting. The sampling period should be of a sufficient time to provide MSHA with enough data to make a valid determination.

To minimize possible concerns about the validity of the sampling data, MSHA should consider observing some portion of the mine operator's data gathering and sampling to assist in evaluating the request for reduced air quantities.

MSHA should review data to determine the potential effect of a reduction in ventilating air quantity by calculating the projected time-weighted average (TWA) concentrations for the contaminants. The following relationship can be used as a tool for making this determination:

$$TWA_{projected} = \frac{Q_{measured}}{Q_{requested}} * TWA_{measured}$$

The projected TWA must be less than the associated TLV for each contaminant for the reduced air quantity to be approved.

After calculating the projected TWA for the sampling data, the MSHA representative responsible for the data review can determine the potential for exceeding the 50 percent action level for sampling conducted as required under §70.1900. This can be calculated in the same manner as the projected TWA and is a method that can be used in determining if an increase in the action level requested by the mine operator is warranted:

$$PEAK_{projected} = \frac{Q_{measured}}{Q_{requested}} * PEAK_{measured}$$

When a reduction in the minimum ventilating air quantity has been approved and the reduction has been implemented, MSHA should confirm through sampling that the reduced air quantity is adequate to maintain compliance with the applicable TLV®s.

Approval of Higher Action Levels under §75.325(j)

The mine operator may request that the action level specified in §70.1900(c) be raised. The increase in action level may be requested either separately or at the same time that a request for reduction in minimum ventilating air quantities is made.

It is the mine operator's responibility to provide MSHA with data, such as results of on-shift, environmental, and personal sampling, to support any request for an increased action level. Such data may include a continuous and complete record of carbon monoxide, nitrogen dioxide, and the air quantities measured on the section where the sampling is conducted. Data should be collected for all locations where the minimum air quantity is required to be maintained. Data logging instrumentation generally provides the most usable results. Computer-based mine wide monitoring systems may also provide valuable data.

Sampling in the area(s) or location(s) being evaluated, and/or personal sampling, should be conducted to demonstrate that an increased action level would continue to ensure that miners are not being overexposed to gaseous diesel exhaust contaminants. Gas sampling data submitted to MSHA should include the peak concentrations for each location and time-weighted averages for each occupation.

If full shift exposures for miners are appropriate, the results should be compared to the peak concentrations measured in the corresponding area(s) or location(s). If compliance with the TLV®s is maintained at the same time that the gaseous contaminant levels in the return air course are greater than the 50 percent action level, the district manager may increase the action level.

Sampling should provide sufficient data representative of normal operating conditions. Duration should be appropriate depending on the circumstances at the mine. Data logging instrumentation will generally provide the most usable data for this analysis. MSHA should confirm through sampling that the increased action levels continue to provide protection to mine personnel.

Under §75.371(nn) the minimum ventilating air quantity for multiple units of equipment must be stipulated in the ventilation plan. This air quantity should be the sum of the nameplate air quantities of the units of diesel-powered equipment that are typically operated on the working section**.** However, if other units of diesel-powered equipment are being operated in addition to those that were used to calculate the air quantity stipulated in the ventilation plan, the minimum air quantity provided in locations stipulated in paragraph(g) must be the sum of the nameplate air quantities for all of the diesel-powered equipment, excluding exempted equipment, on the working section. This would result in a greater ventilating air quantity than the quantity stipulated in the ventilation plan.

MSHA inspectors, therefore, must measure the air quantity in the last open crosscut or other appropriate locations specified in §75.325, to determine if that air quantity is equal to or greater than the minimum air quantity stipulated in the ventilation plan. Inspectors must <u>also</u> identify the diesel-powered equipment on the working section and add up all of the equipment nameplate air quantities, excluding exempted equipment, to determine if the measured air quantity in the last open crosscut is equal to or greater than that summed minimum.

<u>Corrective Action in Response to Sampling Results above the Action Level under §70.1900(c)</u>
§70.1900(c) states that "Except as provided in §75.325(j) of this chapter, when sampling results indicate a concentration of CO and/or NO_2 exceeding an action level of 50 percent of the threshold limit values(TLV®) adopted by the American Conference of Governmental Industrial Hygienists, the mine operator shall immediately take appropriate action to reduce the concentrations of CO and/or NO_2 to below the applicable action level."

Actions that an operator may take to reduce the concentrations below the applicable action level include the following:

1. identification of the contaminant source, such as a poorly maintained diesel engine, and removing it from service;

2. redistribution of the available ventilating air quantity;

3. increasing the air quantity in the affected area; and

4. reduction of the number of diesel-powered equipment in service.

APPENDIX A

INFORMATION FOR EVALUATION

To effectively perform an evaluation of a plan, some information could be needed to diagnose the conditions or situation at the mine. The information may include, but is not limited to, the following:

1. A map for an overview of the mine.
2. Analyses of air samples for methane liberation.
3. Ignition history (if any).
4. Citations related to Subpart D - Ventilation.
5. Citations for exceeding the respirable dust standard.
6. Petitions for Modification related to ventilation.
7. Respirable Dust Inspection Reports.
8. Remote control operations.
9. Diesel equipment.
10. Escapeways identified on the map.
11. Comments from Representatives of Miners.