FINAL - August 2007

Environmental Impact Statement

Deer Creek Shaft and E Seam Methane Drainage Wells Project

Paonia Ranger District, Grand Mesa, Uncompahgre and Gunnison National Forests

Gunnison County, Colorado

Sections 17-29 and 32-34, Township 13 South, Range 90 West and
Sections 1-5 and 8-10, Township 14 South, Range 90 West, 6th Principal Meridian

United States Department of Agriculture

Forest Service

United States Department of the Interior

Bureau of Land Management

Office of Surface Mining Reclamation and Enforcement

Deer Creek Shaft and E Seam Methane Drainage Wells Project
Final Environmental Impact Statement
Gunnison County, Colorado

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Abstract: The Grand Mesa, Uncompahgre and Gunnison National Forest (GMUG) proposes to approve reasonable surface use and access on National Forest System (NFS) lands subject to terms of a federal coal lease held by Mountain Coal Company (MCC) for operations associated with constructing, operating and reclaiming methane drainage and ventilation and escapeway facilities in order to efficiently produce federal coal reserves. The purpose of the agency's action is to facilitate production of complaint and super compliant coal reserves, and allow MCC to exercise lease rights and perform operations. The environmental impact statement analyzes the effects of three alternatives. Alternative 1 – No Action would not approve the ventilation shaft or methane drainage wells. Alternative 2 – Proposed Action would allow the ventilation shaft and all methane drainage wells, including the 22 within the West Elk Inventoried Roadless Area, and Alternative 3 – No Activities in Inventoried Roadless, which eliminates wells and access roads in the Inventoried Roadless Area.

SUMMARY

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.

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 an angle (i.e. 'directionally drilled') are also effective. Therefore, MCC 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 Vicinity of 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 and the MSHA required ventilation plan also call 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 considered in this EIS.

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 respond, via its concurrence role in the state coal mine permitting process, to a mine permit action and future mine permit action handled by the Colorado DRMS (and further resulting in an Office of Surface Mining Reclamation and Enforcement mining plan modification due to the preparation of this EIS 30 CFR § 746.18(d)(5)) that would approve MCC (operator of the West Elk underground coal mine) to construct, operate, and reclaim up to 146 methane drainage well sites that would support 168 individual MDWs, one ventilation and escapeway facility, and use or construction of approximately 22.6 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.

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. In addition, the agency's action allows the lease-holder to exercise their lease rights.

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.

Location of Proposed Action

The Deer Creek ventilation shaft and 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 S-1** shows the project location.

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)…."

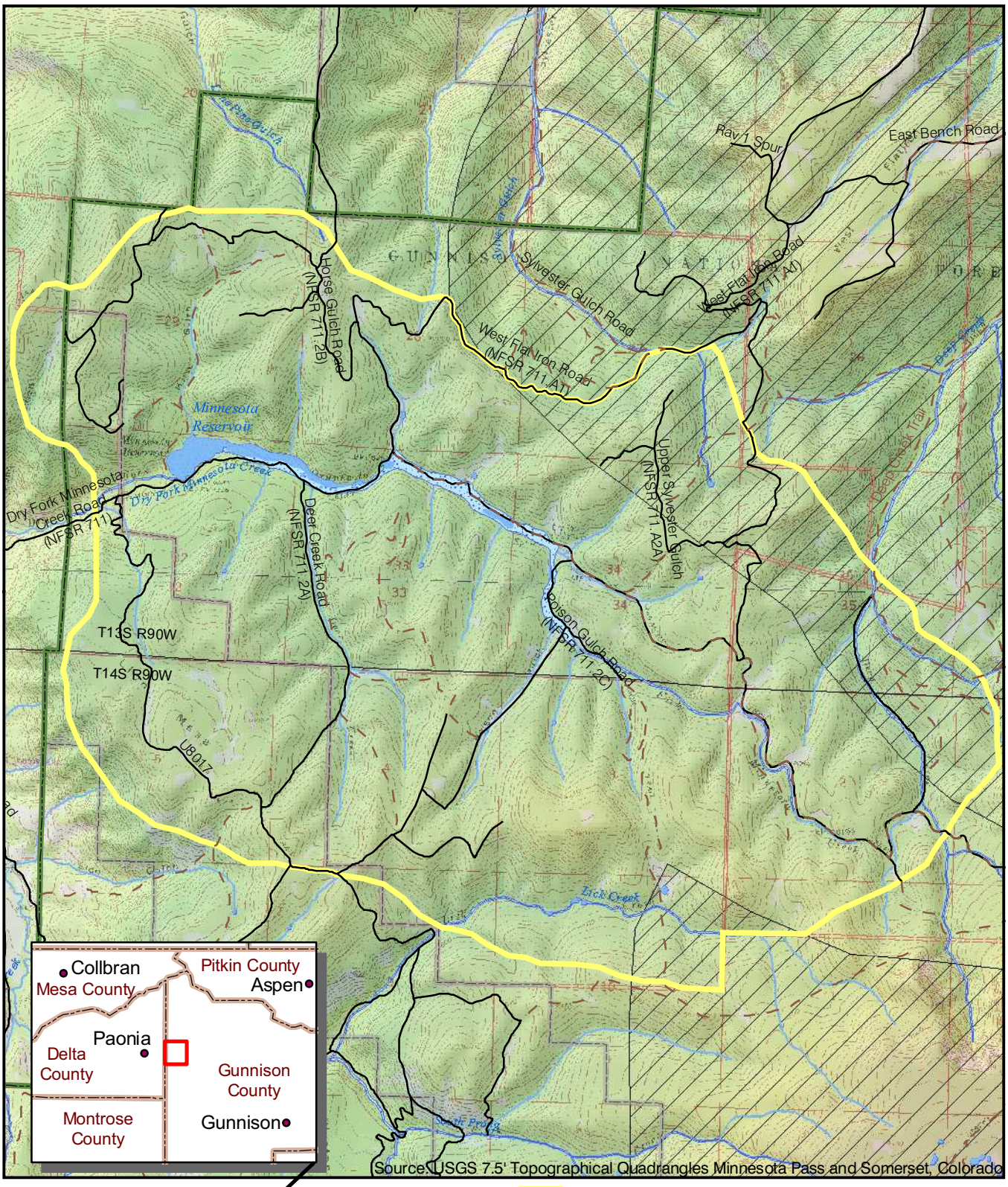
Significant Issues

The Forest Service identified the following issues which are analyzed in detail in the EIS. In most cases, a design criteria has been developed to minimize impacts, the remainder were addressed through effects analysis in Chapter 3.

- Socioeconomic
- Wildlife
- Soils and Geologic Hazards
- Vegetation
- Cultural Resources
- Land Uses, Including Recreation
- Inventoried Roadless Areas
- Roads and Facilities
- Visual Resources
- Livestock Management
- Air Quality
- Water Quality
- Safety/Emergency Response
- Cumulative Impacts

Alternatives Considered in Detail

In addition to the No Action Alternative (Alternative 1), and the Proposed Action (Alternative 2), and No Activities in Roadless



Project Location Map
Deer Creek FEIS
Gunnison County, Colorado
FIGURE S-1

(Alternative 3), 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. Due to public concern, the alternative that eliminated activities within IRA is now considered in detail. In the Draft EIS, it was considered but eliminated from detailed study.

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.

Alternative 2- The Proposed Action

Under the proposed action operations associated with accessing, drilling, constructing, operating, and reclaiming 168 MDWs on 146 drilling locations, and one ventilation/escapeway shaft, and associated road construction or reconstruction would occur. A portion of these activities is proposed in the West Elk IRA. Operations related to these authorizations are expected to begin late summer 2007 and continue for about 12 years (**Figure S-3**). Five of the drilling locations would also serve as staging areas. An additional six staging areas may be used, two of which are currently reclaimed areas.

The proposed action alternative 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. Additionally, it would grant relief from a least stipulation limiting occupancy in riparian areas, wetlands and floodplains specifically any riparian crossing with a road (this would primarily occur near the Dry Fork of Minnesota Creek and involve approximately 10 acres of riparian vegetation and <1 acre of wetland vegetation, See Chapter 3 *Vegetation* for further discussion of effects).

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.
- Constructing an emergency escapeway 6 to 6.5 feet in diameter by 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 S-3**).
- Performing Operations and Maintenance.
- Performing interim reclamation on pad and light-use (low-volume) road once shaft and emergency structures are constructed; and
- 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).

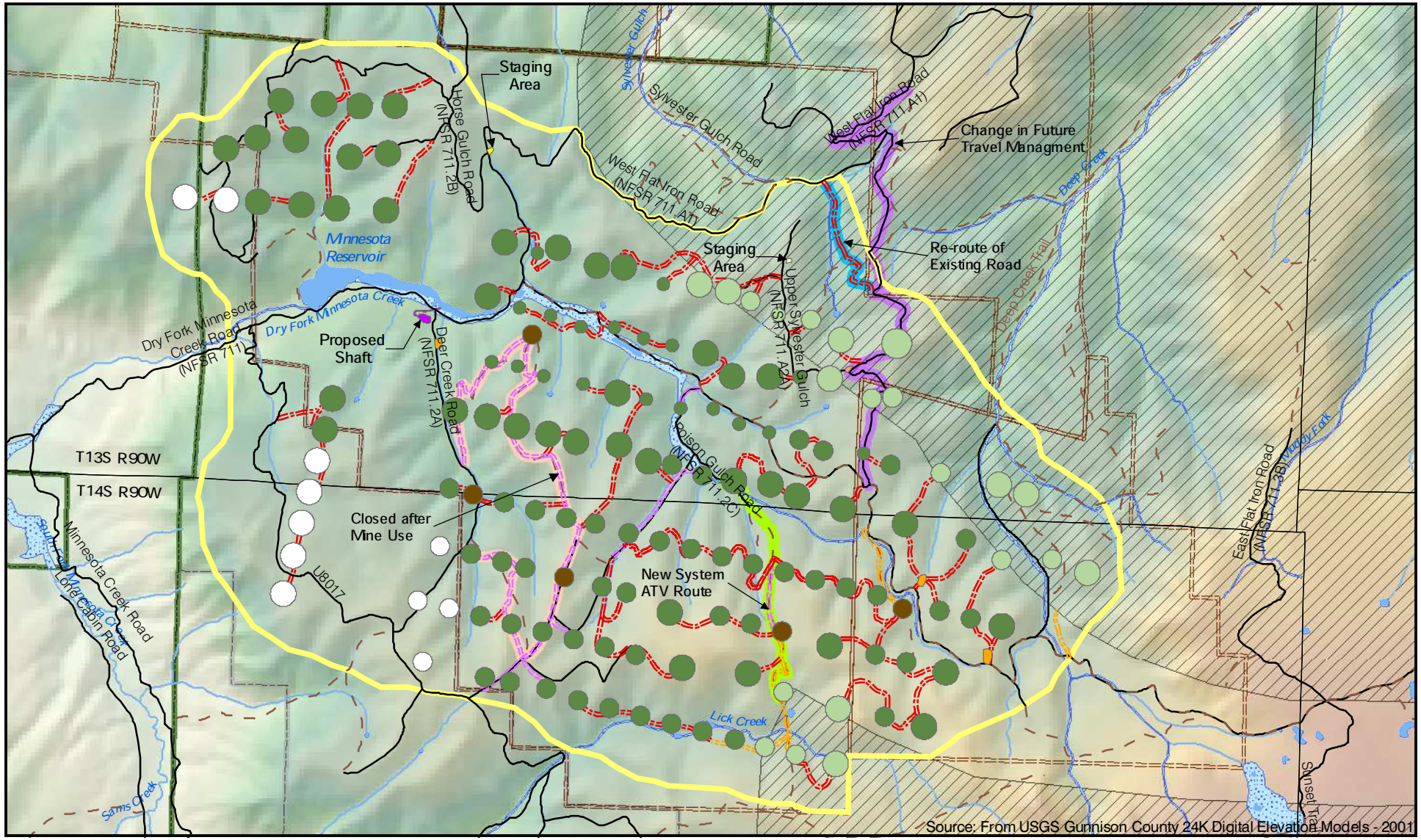
The Proposed Action includes analysis of the most surface disturbing method of shaft construction (conventional methods). However, construction activities, as planned, may be significantly less disturbing than the use of differing technology.

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.

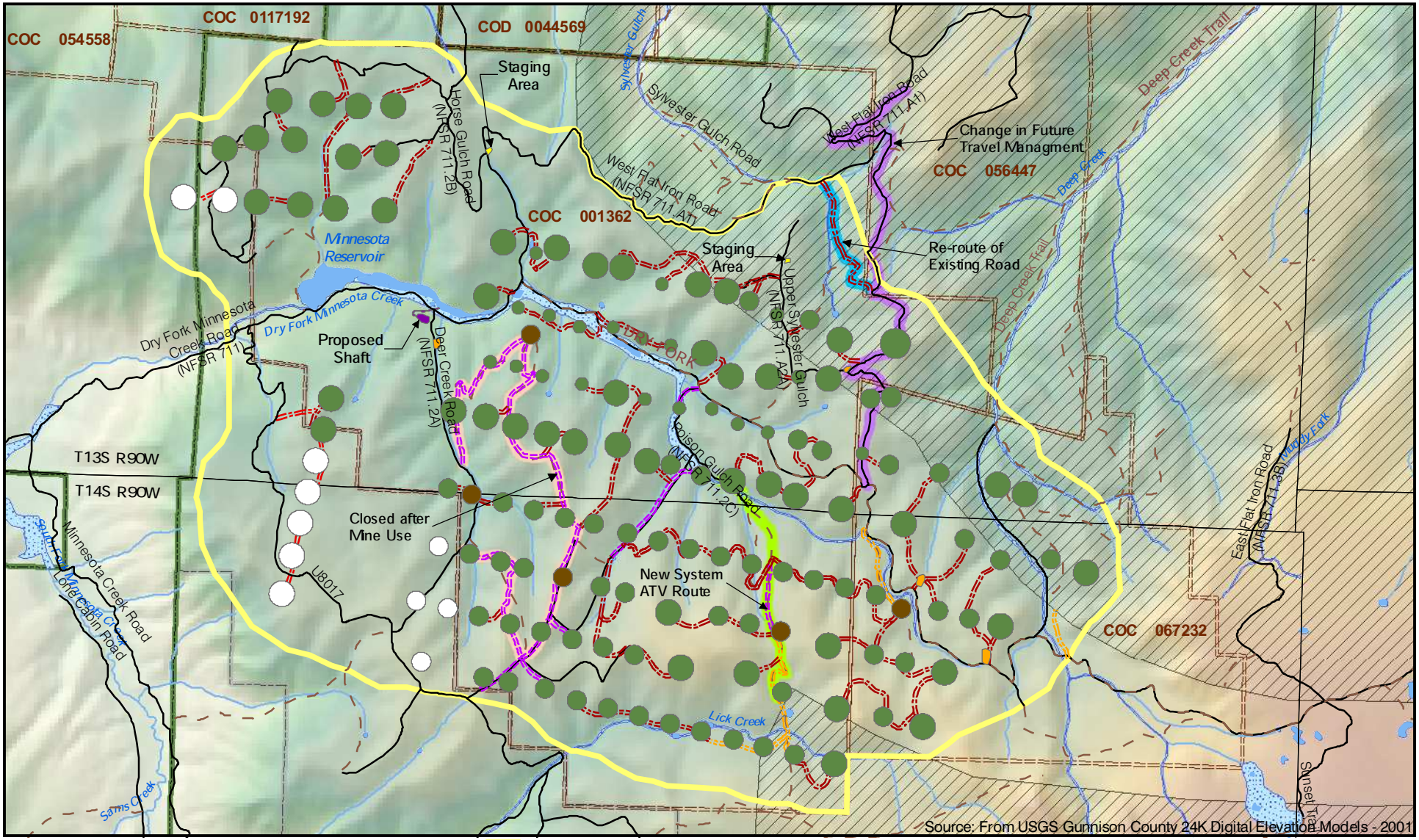
Anticipated noise and vibration issues include large frequent blasts, hoisting machinery, muck handling, ventilation fans, and large diesel powered generators.

E Seam Methane Drainage Wells (MDW) Includes:

- Drilling and casing of up to 168 MDWs located on up to 146 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 which are currently reclaimed areas. For analysis purposes, road corridors and drill pad window locations were used to facilitate optimal placement of facilities in the field. Therefore, the NEPA analysis over-estimated the amount of ground disturbance. The actual on-the-ground disturbance for roads in the corridor and on MDWs in the window will be



Proposed Action
Deer Creek FEIS
Gunnison County, Colorado
FIGURE S-2



Proposed Action
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 3

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.

- Constructing approximately 15.8 miles of new access road, over 12 years;
- Using and performing maintenance (upgrading) on approximately 4.8 miles of existing National Forest System Roads (NFSR) and approximately 2.0 miles of existing ATV trails on NFS lands;
- 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, surface preparation would occur before seeding;
- 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 all new access roads and decommissioning existing roads to desired service level or obliterating at end of needed project use.

Access and Road Construction

Relative to road construction, the Proposed Action would authorize construction and use of about 22.6 miles of roads necessary for these operations. About 15.8 of the 22.6 miles would be new road construction, about 4.8 miles of upgrades to existing NFSRs, and about 2.0 miles of upgrades to ATV trails on NFS lands. 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 hazards, sedimentation control and maintenance issues.

The Proposed Action includes approving construction of approximately 2.3 miles of new roads (including the 0.6 mile re-route) in the West Elk IRA. The Purpose of and Need for these locations have been approved by the Regional Forester as they fit an exception 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 S-3**):

- Daily project traffic (with the exception of oversize/over-length 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 approximately 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 and anticipated to by completed September, 2007.
- Oversize/over-length vehicles such as the drill rig and semi trucks (large equipment transport) would access from the west through the town of Paonia, then via Minnesota Creek Road in Delta County, Gunnison County Road 710, and NFSRs 710, 711. The estimated traffic associated with use of county roads for oversized vehicles is estimated at 5 round trips per year until project completion. For shaft construction activities where cement hauling is required, an estimated 7 round trips per day with full-sized vehicles (not to exceed 20,000 pounds per axle) will use these routes. Estimated duration of cementing on shaft is fall 2007 through summer 2008. MCC has developed a maintenance agreement with Delta County to avoid any conflicts with road use.
- 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), in addition to NFSRs 710, 711, 711.2A and 711. 2B.
- About 22.6 miles of road construction or reconstruction between existing roads and new drill pads would occur. Approximately 2.3 of these miles are in the West Elk IRA.

Approximate new road access disturbance is up to 62.6 acres (approximately 6.8 acres in the West Elk IRA; 6.6 acres associated with Lease COC-1362, 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 approximately 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. The re-route would be for on-lease activity and administrative use only, and would not be available for public use. Total miles of new road in IRA would be 2.3 miles.
- Per decisions issued in 2002 and 2006 Long Draw Saddle life of mine road will be decommissioned to an ATV trail.
- At the end of the project, Poison Gulch Road (NFSR 711.2C) the majority of the route except the very northern end would change from a full sized system road to a System ATV trail (which is the current primary use of the route).

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 additional mitigation measures added 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

Ventilation shaft construction[1] time is estimated at less than 12 months and would be constructed prior to underground mine operations reaching the shaft location. The Proposed Action Alternative includes granting relief from Winter Range Restrictions on lease C-1362 (December 1, 2007-April 30, 2008) to allow these structures to be installed before mining operations reach the area. 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. Relief from the riparian stipulation would require specific authorization.

Proposed Activities in Inventoried Roadless Area

The Proposed Action Alternative includes construction of MDW locations and temporary road construction the West Elk IRA. Approximately 2.3 miles of temporary road construction is proposed on these leases in the West Elk IRA. The road construction is necessary to access to 24 sites for methane drainage wells, 21 of which 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 (see full lease descriptions on page 6):

C-1362

- Proposed on IRA portion of lease (including the 160-acre modification): 13 methane

[1] 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.

drainage well drill sites with 2.3 miles of temporary road construction.

- Proposed on 160-acre modification: Two methane drainage well drill sites with one-tenth mile of road construction.

COC-56447

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

COC-67232

- Proposed on IRA portion of lease: MDWs on 8 locations.

Road construction activities associated with methane drainage wells proposed in the West Elk IRA may be constructed or reconstructed because they are excepted from the prohibitions of the RACR under Exception No. 7.

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

Exception No. 7 – A road is needed in conjunction with the continuation, extension, renewal of a mineral lease on lands that were under lease as of January 12, 2001…Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance and complies with all lease requirements, land and resource management plan direction, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease….

- 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.

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 which are 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 "tailgate" side of the longwall panel where the fresh air traveling across the longwall face is drawn in to the return 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 tailgate for each panel will lie. The alignment of the longwall panels and need to place MDWs near the tailgate 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 design criteria to be used as part of the action alternatives with the objective of protecting resources. The design criteria are detailed in Table 2-1 of the FEIS and address the following resource areas: transportation and IRAs; water resources; wildlife; vegetation; threatened, endangered and sensitive species; visuals; geology, soils, and minerals; air quality; recreation' cultural resources' construction activities' drilling and completion of MDWs' reclamation activities' and, compliance requirements.

Alternative 3 – No Activity in Roadless

Alternative 3 was developed to address public concerns about additional development in the West Elk IRA. This alternative includes all of the design criteria those made unnecessary by the location of road construction activities.

Figure S-3 displays activities that would occur in this alternative. Please note that small pieces of road appear to be accessing MDWs from the IRA. This alternative would require further field fitting of roads to avoid IRA to access MDWs outside the IRA. This alternative is the same as the Proposed Action except that it assumes no new activity in the West Elk IRA. Differences in the MDWs and Access Roads are discussed below.

<u>E Seam Methane Drainage Wells (MDW) Different From Proposed Action Include:</u>

- Drilling and casing of up to 139 MDW located on up to 135 drill locations over 12 years on NFS lands. Drilling and casing of up to 19 MDWs at up to 11 sites on private land.
- Constructing 14.1 miles of new access road over 12 years. Constructing an estimated 0.6 miles of road on private land.

- Upgrading 1.3 miles of existing ATV routes on NFS lands.
- Using and performing maintenance on approximately 4.8 miles of existing National Forest System Roads (NFSR);

Access and Road Construction

This is the same as the Proposed Action except there would be no road construction or reconstruction or upgrades in the West Elk IRA.

Relative to road construction, Alternative would authorize construction and use of about 19.9 miles of roads necessary for these operations. About 14.1 of the 19.9 miles would be new road construction, 4.8 miles of upgrades to existing NFSRs, and 2.0 miles of ATV trail upgrades.

Relief from Lease Stipulation

Relief requested would be the same as Proposed Action.

Activities in Inventoried Roadless Area

There would be no activities in IRAs under this alternative.

Reclamation

Same as Proposed Action.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives to the Proposed Action 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 provide 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.

MSHA indicates that additional research and development on this technology would have to occur before MSHA would consider flaring a reasonable option (personal communication B Reitze, MSHA, to Liane Mattson, FS, June 2006).

Capture/Use of Methane and Leasing of Coal Mine Methane

This was not carried forward as an alternative analyzed in detail because of complexities and legal limitations stemming from the leasing processes and regulations of two separate mineral resources, uncertainty with relation to quality and quantity of gas resource, and economic concerns related to additional facilities do not support detailed analysis in this EIS. The reasons for this include: 1) an alternative to capture the gas would not satisfy the specific purpose and need for the project which is to ensure health and safety of the underground mine and facilitate efficient recovery of leased federal coal reserves, 2) such an alternative would not be legal because the gas is not under lease, and 3) capturing the gas was not forwarded as part of the proposal made to meet mine ventilation needs to satisfy MSHA requirements. A discussion of each situation is given in Chapter 2.

Further, some of the components of the capture/use of methane concept are outside of the FS control as they are tied to national policy or direction.

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 (analyzed in 2004-2005 in an EIS) 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.

MCC has analyzed the use of directional drilling to achieve degasification goals from sites outside the IRA and has noted the following:

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.

MCC expended a tremendous effort over a three-year period in an attempt to find a means to successfully accomplish degas drainage using the in-mine horizontal drilling system. These holes were drilled in the gateroads of the 14-17 panels and connected to a massive collection system to exhaust the gases from the mine. The conclusion of this effort was that the holes could not be drilled large enough, or stay open long enough, to allow safe mining of the coal (due to resulting high methane concentrations). They were simply very inefficient collectors of minimal quality gas, due to the limits of the drilling equipment in this application and the location of the gas-producing zones within the overlying strata. In MCC's previous experience in the B Seam approximately 13 percent of total mine methane was able to be vented horizontally (extracted from BLM analysis, 2007). Any attempt to degas the E seam via the horizontal drilling system would have the same issues and possibly more due to constraints of the overlying strata.

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

Helicopter Drilling of IRA Sites

For safety reasons, in addition to, technical reasons regarding weight limits, this alternative was not carried forward for detailed analysis.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative considered in detail (**Table S-1**). 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.

Agency Preferred Alternative

Alternative 2 – Proposed Action, including the design criteria is the Forest Service’s preferred alternative.

Table S-1 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
Workforce	Maintain current level of employment at West Elk Mine through 2008.	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** Maintain current level of employment at West Elk Mine through about 2015.	**Shaft/ Escapeway:** Same as No Action **E Seam MDWs:** Maintain current level of employment at West Elk Mine through about 2015, however approximately 2 years less than Alternative 2.
Revenues Generated (includes royalties)	No revenue or royalties received if coal not mined	**Shaft/Escapeway**: Same as No Action **E Seam MDWs**: $ 729 million	**Shaft/ Escapeway:** Same as No Action **E Seam MDWs:** $ 622 million
Coal Supplied	0 tons after 2008	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 75 million tons	Shaft/ Escapeway: Same as No Action **E Seam MDWs:** Perhaps as low as 65 million tons
Safety of mine workers	Mine worker safety protected through mine closure	**Shaft/Escapeway & E Seam MDWs:** Mine worker safety protected through adequate ventilation and escapeway.	Same as Alternative 2.
Threatened, Endangered, Sensitive Species	No effect	**Shaft/Escapeway:** Short-term loss of winter habitat for bald eagles. **E Seam MDWs**: Short-term loss and temporary disturbance of Canada lynx habitat. Mitigation measures would ensure that species would not be adversely affected.	Same as Alternative 2.
Management Indicator Species	No effect	**Shaft/Escapeway**: Same as No Action as disturbance already exists **E Seam MDWs**: 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.	Same as Alternative 2.

Table S-1 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
General Wildlife	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs**: 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	Same as Alternative 2.
Winter Range	No effect	**Shaft/Escapeway:** 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. **E Seam MDWs:** Same as No Action as MDWs would not be constructed in winter.	Same as Alternative 2.
Topographic surface	No change	**Shaft/Escapeway & E Seam MDWs:** Subsidence above the mined area	Same as Alternative 2
Land Stability	No effect	**Shaft/Escapeway & E Seam MDWs:** Minimal risk of destabilizing slopes	Same as Alternative 2
Soils	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 276 acres disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 160 acres disturbed
Geologic hazards	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal risk of hazards due to slope, landslide and mass wasting	Same as Alternative 2

Table S-1 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
Minerals	No additional coal removed	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 75 million tons of coal removed	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 65 million tons of coal removed
Range Resources	0 acres disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 185 acres of Gambel oak, and 13 acres of grass/shrub disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 165 acres of Gambel oak, and 13 acres of grass/shrub disturbed
Wetlands	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal risk of vegetation disturbance	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Same as Alternative 2
Forest	0 acres disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 108.5 acres of aspen and 2.4 acres of spruce-fir disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** 88.5 acres of aspen disturbed 0.8 acres of spruce-fir disturbed
Recreation	No impact	**Shaft/Escapeway & E Seam MDWs:** Minor seasonal modification of recreational user's activity (such as hunting in adjacent area) and access during the construction and operation of the methane drainage.	**Shaft/Escapeway & E Seam MDWs:** Minimal risk of vegetation disturbance Impacts on dispersed recreational opportunities would generally be similar to Alternative 2.
Inventoried Roadless Area	Road use associated with the previously approved methane drainage activities would continue	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 0.4 miles of upgraded OHV temporary access, 0.6 miles of temporary road reroute to mitigate resource degradation (no net gain of roads from reroute), and ~1.7 miles of new temporary road construction within IRA	Same as Alternative 1.

Table S-1
Comparison of Alternatives

Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No Activity in Roadless
Grazing	No impact	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Short term decreases in available AUMs and potential long term increase in forage at reclamation sites in Gambel oak types	Same as Alternative 2.
Roads	No impact	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** 4.8 miles of upgraded roads and 15.8 miles of new temporary road, of short term and periodic access restrictions on NFSR 711 due to the movement of over-size/over-length vehicles (Shaft construction: additional 7 round trips per *day* for cement trucks, MDW construction/reclamation: additional 5 round trips per *year* for drill rigs and transport of large equipment on trailers)	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** 4.8 miles of upgraded roads and 14.1 miles of new road, short term and periodic access restrictions on NFSR 711 due to the movement of over-size/over-length vehicles (Shaft construction: additional 7 round trips per *day* for cement trucks, MDW construction/reclamation: additional 5 round trips per *year* for drill rigs and transport of large equipment on trailers)
Impacts on Visual Quality Objectives	No impact	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Effects are consistent with partial retention VQO	Same as Alternative 2.
Impacts to Class I Airsheds	No impact	Shaft/Escapeway & E Seam MDWs: No impact	Shaft/Escapeway & E Seam MDWs: No Impact
Gaseous emissions (NO_2, SO_2, and CO)	No effect beyond current levels	Shaft/Escapeway & E Seam MDWs: 36,000 pounds per year	**Shaft/Escapeway & E Seam MDWs:** Same as Alternative 2, for a slightly shorter duration
Greenhouse gas (methane) emissions	No additional emissions	**Shaft/Escapeway & E Seam MDWs:** Less than 0.1% concentrations 50 meters from the source, would increase potential greenhouse gas emissions in Colorado from fossil fuel combustion by approximately 1.3 percent	**Shaft/Escapeway & E Seam MDWs:** Less than 0.1% concentrations 50 meters from the source, would increase potential greenhouse gas emissions in Colorado from fossil fuel combustion by approximately 1.1 percent

Table S-1 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
Fugitive dust	No impact	**Shaft/Escapeway & E Seam MDWs:** 32,000 pounds per year or less	**Shaft/Escapeway & E Seam MDWs:** Same as Alternative 2, for a slightly shorter duration
Impacts to surface water flows and surface water quality, and riparian habitat	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal effect on surface water quality, 6 new intermittent stream crossings and one new perennial stream crossing, ~75 acres of new and upgraded road disturbance in water influence zone with a maximum of 5.6 acres of riparian vegetation disturbance	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal effect on surface water quality, 6 new intermittent stream crossings and one new perennial stream crossing, ~66 acres of new and upgraded road disturbance in water influence zone with a maximum of 4.8 acres of riparian vegetation disturbance
Impacts to ground water levels and ground water quality	No effect	**Shaft/Escapeway & E Seam MDWs:** No effects on ground water quality or quantity	Same as Alternative 2.

Table of Contents

List of Tables

List of Figures

CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

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.

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 an angle (i.e. 'directionally drilled') are also effective. Therefore, MCC 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 Vicinity of 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 and the MSHA required ventilation plan also call 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 considered in this EIS.

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 respond, via its concurrence role in the state coal mine permitting process, to a mine permit action and future mine permit action handled by the Colorado DRMS (and further resulting in an Office of Surface Mining Reclamation and Enforcement mining plan modification due to the preparation of this EIS 30 CFR § 746.18(d)(5)) that would approve MCC (operator of the West Elk underground coal mine) to construct, operate, and reclaim up to 146 methane drainage well sites that would support 168 individual MDWs, one ventilation and escapeway facility, and use or construction of approximately 22.6 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].

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. In addition, the agency's action allows the lease-holder to exercise their lease rights.

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 to concur with Colorado DRMS mine permitting action and impending permitting actions and Office of Surface Mining Reclamation and Enforcement's (OSM) mine plan modification(s) that would authorize MCC to conduct surface operations associated with accessing, drilling, constructing, operating, and reclaiming 168 methane drainage wells on 146 drilling locations, and one ventilation and escapeway shaft on the National Forest System (NFS) lands described below. These operations are associated with the West Elk Mine. Five of the drilling locations would also serve as staging areas. An additional six staging areas may be used, two of which are currently

1 Standard terms of a federal coal lease include the following rights and responsibilities conveyed to the Lessee by the coal lease.

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).

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).

Lessee shall…maintain a safe working environment in accordance with standard industry practices (Section 8).

reclaimed areas. The proposed action includes construction and use of about 22.6 miles of roads (15.8 miles of new and 6.8 miles existing road and ATV trail upgrade) necessary for these operations, which includes a 0.6 mile re-routing of an existing life of mine access road. Operations related to these authorizations are expected to begin in summer 2007. The Forest Service 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 and 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 1**).

Summary Description of the Proposed Action Activity in Inventoried Roadless Areas

Portions of the Proposed Action would occur on federal coal leases[2] that are in the West Elk IRA. Approximately 2.3 miles of road construction (including a 0.6 mile re-route of an existing life of mine road) is proposed on these leases within the West Elk IRA. The road construction is necessary for access to 24 sites for methane drainage wells. Twenty-one of these sites would be located in the IRA.

The Proposed Action includes 17 methane drainage well sites in the IRA (Figure 3).

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

- 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.

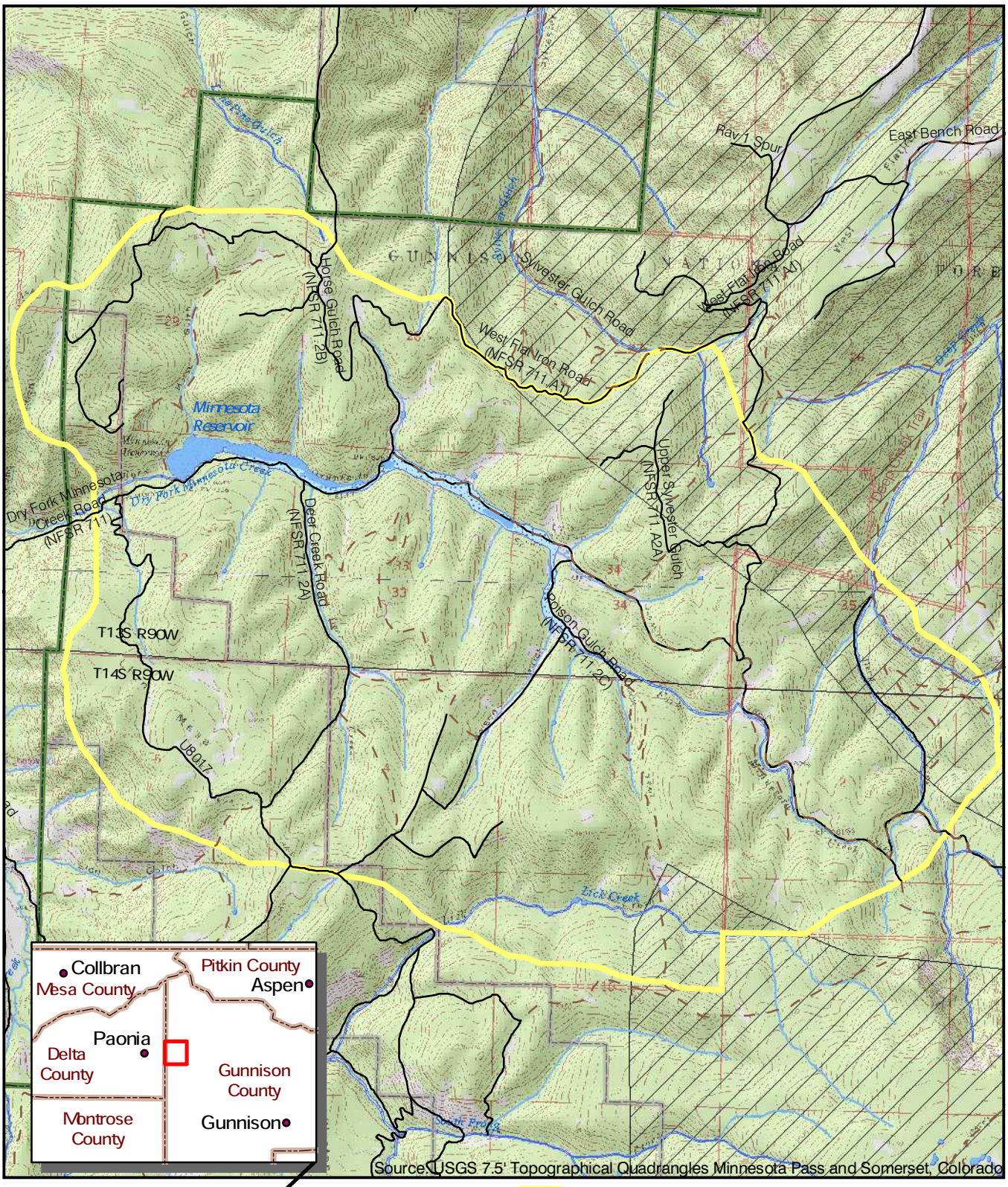
Additional details regarding the use of this exception are -given in Chapter 2.

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 (**Table 2-1**).

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

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



Project Location Map
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 1

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 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 below:

Lease C-1362

- 1967 issue date;
- Modified with a 160-acre extension in October 2001[3];
- 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,

[3] While each of these modifications occurred after the adoption of the RACR, by their terms, a coal lease modification acquires an effective date of the parent lease that is being modified. All such coal lease modifications are administered by the BLM accordingly. Consequently, these coal lease modifications have an effective date that pre-dates the 2001 RACR and as such, are considered to be valid existing rights as of the date of the RACR. Because temporary roads within the West Elk IRA are needed to install temporary surface wells that are needed to exercise those valid existing rights, they can be authorized pursuant to Exception 7 of the RACR.

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[3];
- 2,919 acres total (including modification[3]), 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

- March 1st, 2007 effective date;
- 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 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 Reclamation and Enforcement 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. 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 compliance 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 action 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 action.

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.

At the initiation of this project, the Forest Service management of IRAs was guided by Interim Directive No. 1920-2006-1. The interim directive guided where decision authority lay 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 has lain 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 required approval by the Regional Forester. On January 18, 2007 the Regional Forester for the Rocky Mountain Region approved the Purpose of and Need for this Proposed Action. The interim Direction expired on July 16, 2007. However, since the NEPA process was already initiated, the process described in the Interim Direction was followed.

Based on comments received on the DEIS, the GMUG sought to clarify the Regional Forester's approval of the project Purpose and Need and requested amendment of the January 2007 approval. In Response to the amendment request, the Regional Forester forwarded needed revisions for the FEIS pertaining to the

applicability if exceptions to the RACR for this project (project file).

Based on these legal requirements, consideration must be given to MCC's request for mine-related operations in an IRA, and the Forest Service must decide 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 of 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.

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 (EO 13148)

USDA-FS directives and EO 13148 require 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) 14001 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 July 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 safeguards. Specifically, companies or individuals conducting work on the agency's 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 environ-

mental 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, and to support providing concurrence to DRMS permitting action(s) to the existing mine permit, 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 stipulation for the 2007-2008 season for Big Game Winter Range during shaft construction should be approved.
- Whether relief from lease stipulation for surface occupancy in wetlands, floodplains, or riparian areas should be approved.
- Whether, at the end of the project, Poison Gulch Road (711.2C) the majority of the route except the very northern end would change from a full size System Road to a System ATV trail (which is the current primary use of the route).

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 the 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, and April 10, and July 10, 2007. An additional article was published in the *Delta County Independent* on November 1, 2006 from 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.

The DEIS Notice of Availability was published in the *Federal Register* on March 23, 2007. Notices of Opportunity to Comment were published in the *Delta County Independent* on April 4, 2007 and *Grand Junction Daily Sentinel* on April 5, 2007 as papers of record.

Seven comments were received on the DEIS. Comments and their corresponding responses can be found in Chapter 5.

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 are analyzed in detail in the EIS. In most cases, a design criteria has been developed to minimize impacts (**Table 2-1**), the remainder were addressed through effects 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 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 erosion and sedimentation in surface waters.

The addition of roads and pads may 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 the 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 and road use, and venting of hydrocarbon gasses and 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 and management, recreational activities, and irrigation projects which all contribute to issues such as erosion and sedimentation.

Reasonably foreseeable actions 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 on the West Elk Wilderness.
- Wilderness access may be curtailed by construction activities. Public access to the Wilderness does not exist in the project area as there are no System routes or trailheads present.
- Primary use of non-public project area access roads may reduce conflicts with recreational users. Most of the routes in the project area are user-created (illegal) or permitted resource extraction or management routes not open to the public.
- Global warming - methane is a greenhouse gas. The FEIS has added analysis of methane as a greenhouse gas to Air Quality analysis. Due to the immeasurable quantity of methane released on a global scale from this project, global warming or climate change are considered outside the scope of this document, and while the greenhouse gas component is addressed, global warming is a non-significant issue because no methodology or models exist to measure the effect of this project at a scale of that magnitude.

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 and 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, 2005

10) Dry Fork Coal Lease-by-Application 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 (MCC 2007a), including various consultants' reports on subsidence, vegetation, riparian resources, ground water, and Annual Hydrologic Reports on water monitoring (MCC 2007b).

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

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 of 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. Authorizing actions are summarized and the decision framework is described. This section details how the Forest Service informed the public of the proposal and the public 's response.

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. This discussion also includes mitigation measures. Finally, this section provides a table summarizing 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.

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

References: Full references used in the analysis and cited in the EIS are presented here.

Acronyms: Because this is a government document, this EIS uses many acronyms. They are all spelled out in this section, starting on page 207.

Index: The index provides page numbers by document topic.

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

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.

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), and No Activities in Roadless (Alternative 3), 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. Due to public concern, the alternative that eliminated activities within IRA is now considered in detail. In the Draft EIS, it was considered but eliminated from detailed study.

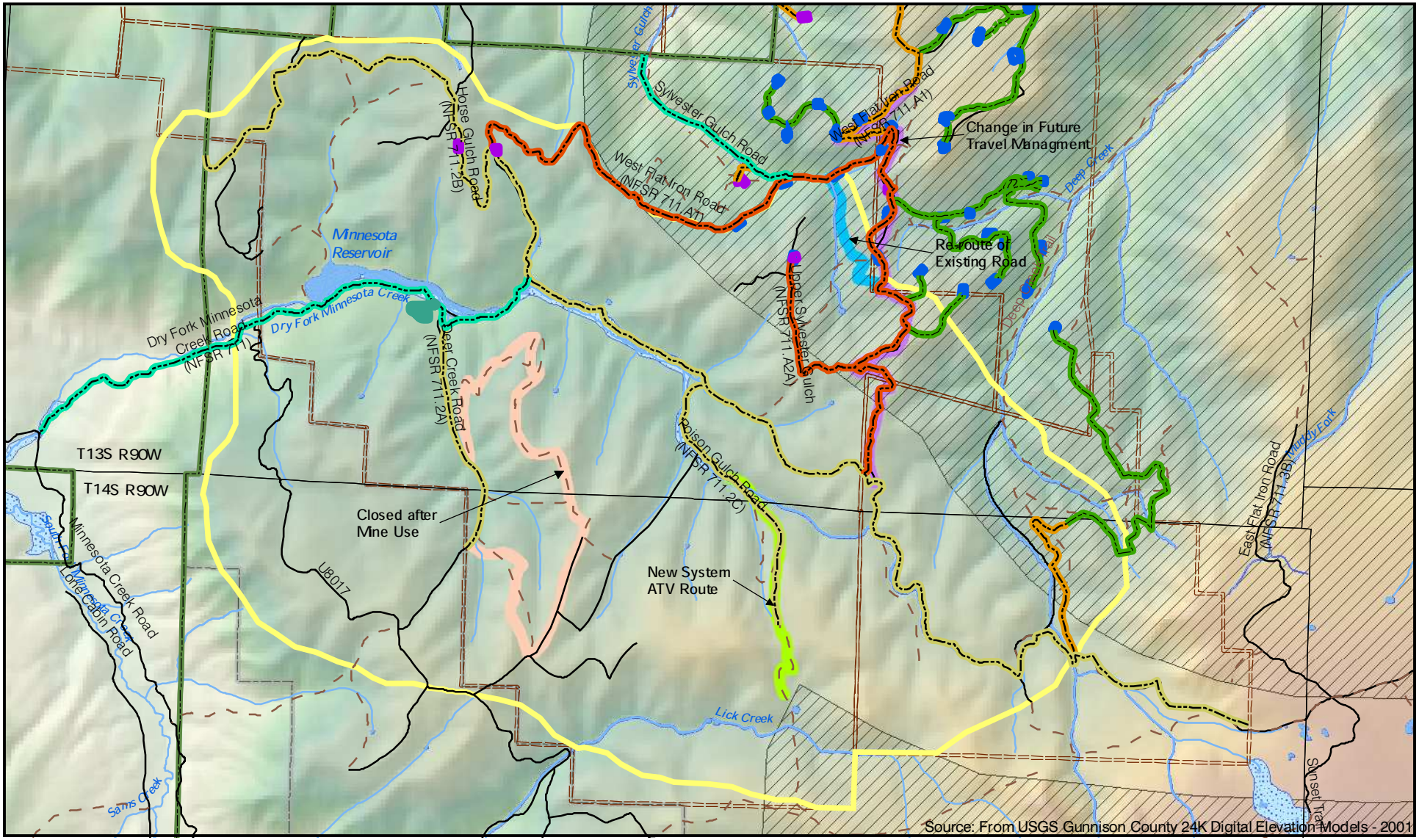
Alternative 1 - No Action

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. These actions include continued implementation of existing approvals and permitted activities held by MCC for development of leased coal reserves, and are:

- Drilling and installing methane drainage wells on panels 20 and 21 over the B Seam (to the northeast of the Deer Creek/E Seam project area;
- Reclamation of methane drainage well sites for the B Seam when they are no longer needed;
- Construction of the Sylvester Gulch Road;
- Operation of existing E Seam MDWs on Horse Gulch Road;
- On-going monitoring of ground water wells along the Dry Fork of Minnesota Creek, and other required monitoring; and
- Drilling geotechnical boreholes.
- Conducting seismic studies and surveys.

Construction of the Deer Creek Shaft would not occur. The existing pad location would be reclaimed and the access road obliterated. The E Seam methane drainage wells and associated road construction would not be approved, and would therefore not be constructed. The 2.3 miles of temporary road construction and drilling pads in the West Elk IRA would likewise not be constructed.

Mining-related surface disturbance would not occur with regard to the E seam methane drainage wills and associated access roads, or would be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, subsidence and related effects, etc. 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.



No Action Alternative
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 2

Alternative 2- The Proposed Action

Under the proposed action operations associated with accessing, drilling, constructing, operating, and reclaiming 168 MDWs on 146 drilling locations, and one ventilation/escapeway shaft, and associated road construction or reconstruction would occur. A portion of these activities is proposed in the West Elk IRA. Operations related to these authorizations are expected to begin late 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 which are currently reclaimed areas.

The proposed action alternative 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. Additionally, it would grant relief from a least stipulation limiting occupancy in riparian areas, wetlands and floodplains specifically any riparian crossing with a road (this would primarily occur near the Dry Fork of Minnesota Creek and involve approximately 10 acres of riparian vegetation and <1 acre of wetland vegetation, See Chapter 3 *Vegetation* for further discussion of effects).

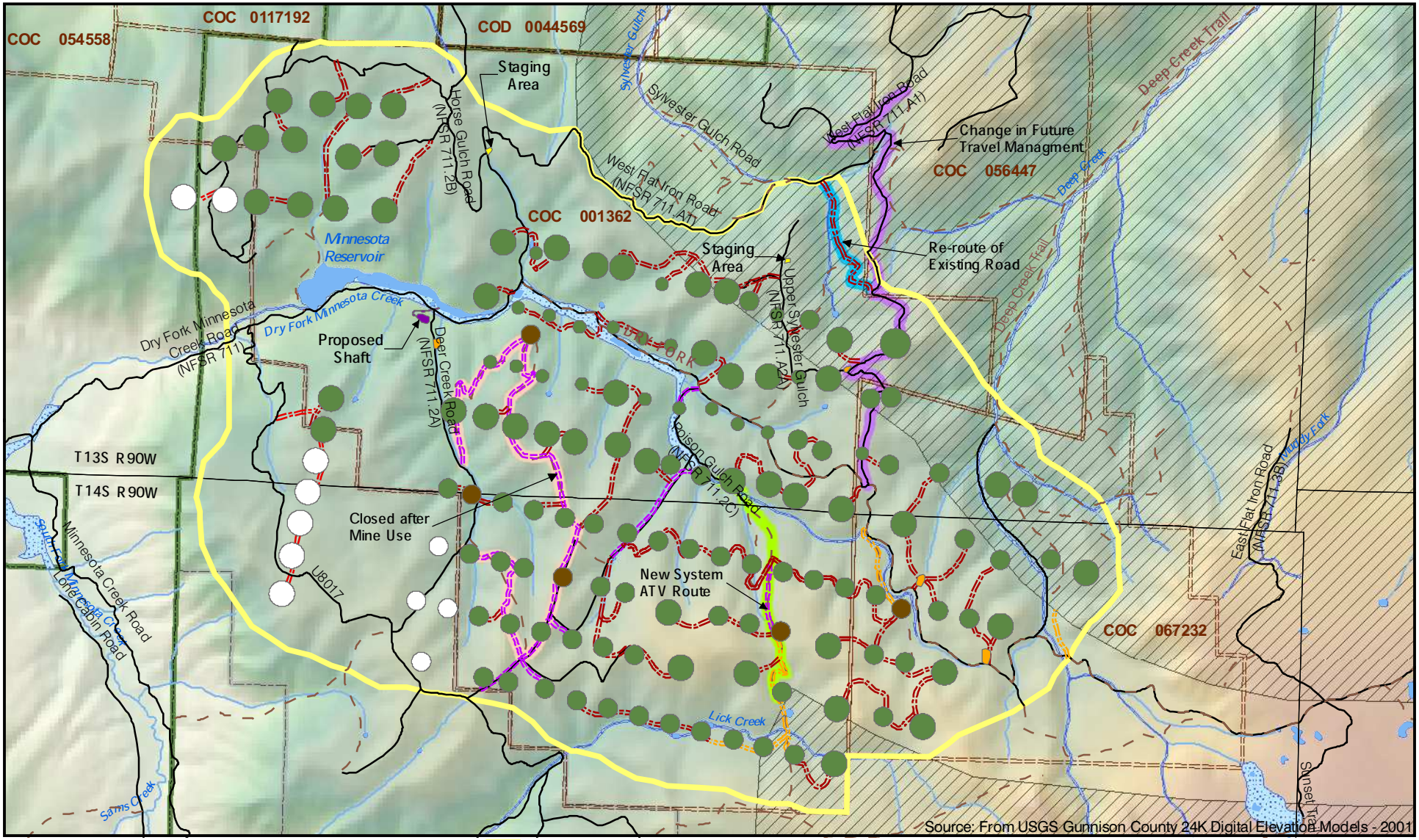
Development of the Proposed Action

The proposed action was developed through several coordination meetings between the Forest Service Interdisciplinary Team (IDT) and MCC. During development of the proposed action for the FEIS, the scope of surface use needed for development of the E Seam reserves, it was found that both the shaft and methane drainage wells would be needed to meet ventilation requirements. Thus, it was assessed that the shaft and methane drainage wells for the E Seam were connected actions according to NEPA, and were therefore analyzed in one analysis to meet NEPA obligations and effectively address cumulative effects. 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. The Design Criteria of the proposed Action are shown on Table 2-1. Initial proposals by MCC included the shaft area only and evolved to include other surface use needs (i.e. methane drainage wells) on 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 DEIS forwarded that temporary road construction in the West Elk IRA portions of the project were allowable under Exception No.1 of the RACR. Further interpretation of the RACR and Judge LaPorte's clarifications prompted revising the Proposed Action Alternative for the FEIS to include only temporary road construction that would be allowable under Exception No. 7 of the RACR.

Therefore, based on direction from the USDA Forest Service's Rocky Mountain Regional Office in June 2007, the Proposed Action was



Proposed Action
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 3

further refined to eliminate 1 mile of road associated with the Dry Fork Lease (COC-67232) in the West Elk IRA. The rationale for this change was to ensure consistency with the Roadless Area Conservation Rule of 2001.

Methane drainage well locations are still analyzed in the West Elk IRA Proposed Action Alternative. Some of the proposed locations were moved adjacent to existing life of mine roads to avoid road construction in IRA. Other locations are still analyzed as the need exists to continue mining operations in those areas and other technology may become available which allows construction of locations and drilling of wells without the construction of roads to access them.

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-sized road which was duplicative in purpose to another existing full size road (Poison Gulch, 711.2C). The Paonia Ranger District, also in the process of a Travel Management Plan EIS, proposed to close the Poison Gulch Road to full-size traffic and maintain it on the system as an ATV trail which would allow more public access than it currently gets as a system road behind a locked gate for much of the year.

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 6 to 6.5 feet in diameter by 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; and

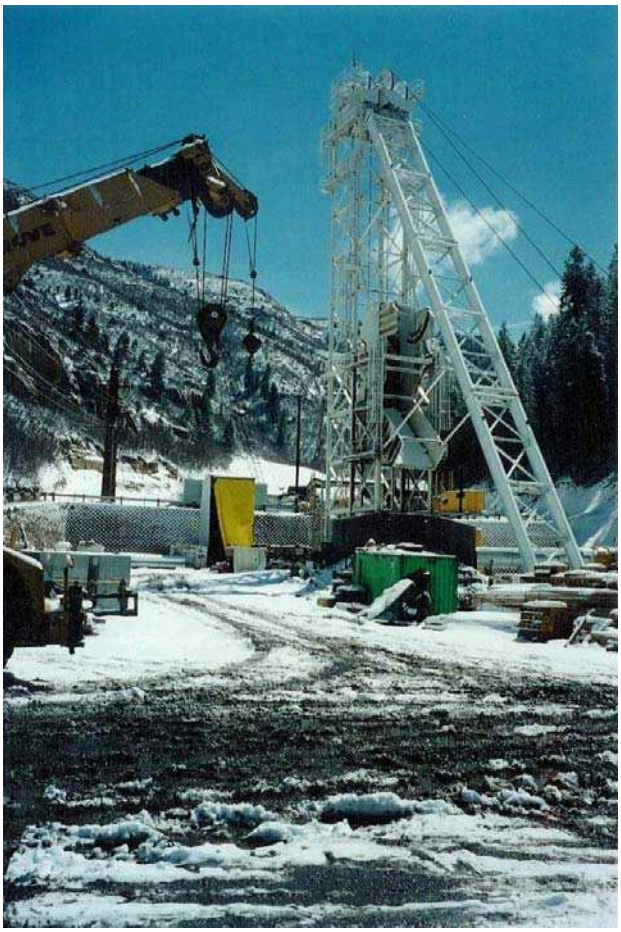


Figure 4. Typical Shaft Construction

- 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).

The Proposed Action includes analysis of the most surface disturbing method of shaft construction (conventional methods). However, construction activities, as planned, may be significantly less disturbing to to the use of differing technology.

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.

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 146 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 which are currently reclaimed areas. For analysis purposes, road corridors and drill pad window locations were used to facilitate optimal placement of facilities in the field. Therefore, the NEPA analysis over-estimated the amount of ground disturbance. The actual on-the-ground disturbance for roads in the corridor and on MDWs 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**).
- Constructing approximately 15.8 miles of new access road, over 12 years;
- Using and performing maintenance (upgrading) on approximately 4.8 miles of existing National Forest System Roads (NFSR) and approximately 2.0 miles of existing ATV trails on NFS lands;
- 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, surface preparation would occur before seeding;
- 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 all new access roads and decommissioning existing roads to desired service level or obliterating at end of needed project use.

Access and Road Construction

Relative to road construction, the Proposed Action would authorize construction and use of about 22.6 miles of roads necessary for these operations. About 15.8 of the 22.6 miles would be new road construction, about 4.8 miles of upgrades to existing NFSRs, and about 2.0 miles of upgrades to ATV trails on NFS lands. 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 hazards, sedimentation control and maintenance issues.

The Proposed Action includes approving construction of approximately 2.3 miles of new roads (including the 0.6 mile re-route) in the West Elk IRA. The Purpose of and Need for these locations have been approved by the Regional Forester as they fit an exception 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/over-length 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 approximately 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 and anticipated to by completed September, 2007.

- Oversize/over-length vehicles such as the drill rig and semi trucks (large equipment transport) would access from the west through the town of Paonia, then via Minnesota Creek Road in Delta County, Gunnison County Road 710, and NFSRs 710, 711. The estimated traffic associated with use of county roads for oversized vehicles is estimated at 5 round trips per year until project completion. For shaft construction activities where cement hauling is required, an estimated 7 round trips per day with full-sized vehicles (not to exceed 20,000 pounds per axle) will use these routes. Estimated duration of cementing on shaft is fall 2007 through summer 2008. MCC has developed a maintenance agreement with Delta County to avoid any conflicts with road use.
- 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), in addition to NFSRs 710, 711, 711.2A and 711. 2B.
- About 22.6 miles of road construction or reconstruction between existing roads and new drill pads would occur. Approximately 2.3 of these miles are in the West Elk IRA. Approximate new road access disturbance is up to 62.6 acres (approximately 6.8 acres in the West Elk IRA; 6.6 acres associated with Lease COC-1362, 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 approximately 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. The re-route would be for on-lease activity and administrative use only, and would not be available for public use. Total miles of new road in IRA would be 2.3 miles.
- Per decisions issued in 2002 and 2006 Long Draw Saddle life of mine road will be decommissioned to an ATV trail.
- At the end of the project, Poison Gulch Road (NFSR 711.2C) the majority of the route except the very northern end would change from a full sized system road to a System ATV trail (which is the current primary use of the route).

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 additional mitigation measures added 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

Ventilation shaft construction[4] time is estimated at less than 12 months and would be constructed prior to underground mine operations reaching the shaft location. The Proposed Action Alternative includes granting relief from Winter Range Restrictions on lease C-1362 (December 1, 2007-April 30, 2008) to allow these structures to be installed before mining operations reach the area. 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. Relief from the riparian stipulation would require specific authorization.

Proposed Activities in Inventoried Roadless Area

The Proposed Action Alternative includes construction of MDW locations and temporary road construction the West Elk IRA. Approximately 2.3 miles of temporary road construction is proposed on these leases in the West Elk IRA. The road construction is necessary to access to 24 sites for methane drainage wells, 21 of which 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 (see full lease descriptions on page 6):

C-1362

- Proposed on IRA portion of lease (including the 160-acre modification): 13 methane drainage well drill sites with 2.3 miles of temporary road construction.
- Proposed on 160-acre modification: Two methane drainage well drill sites with one-tenth mile of road construction.

COC-56447

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

COC-67232

- Proposed on IRA portion of lease: MDWs on 8 locations.

Road construction activities associated with methane drainage wells proposed in the West Elk IRA may be constructed or reconstructed because they are excepted from the prohibitions of the RACR under Exception No. 7.

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

Exception No. 7 – A road is needed in conjunction with the continuation, extension, renewal of a mineral lease on lands that were under lease as of January 12, 2001…Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance and complies with all lease requirements, land and resource management plan direction, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease….

- 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.

[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.

- 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.

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 which are 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 "tailgate" side of the longwall panel where the fresh air traveling across the longwall face is drawn in to the return 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 tailgate for each panel will lie. The alignment of the longwall panels and need to place MDWs near the tailgate 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 2-1**) to be used as part of all action alternatives.

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
TRANSPORTATION SYSTEM		
Existing Roads	1. 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 engineer or permit administrator. 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.	Road Use Permit
	2. 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, oversized and full-sized vehicles may need to mobilize via the county portion Minnesota Creek Road, however use will be minimized.	MCC Project Plan, County Road Use Agreement

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	3. Roads will be kept clear of slides, fallen timber, and overhanging brush which obstructs visibility.*	Federal Coal Lease Stipulation
	4. Gravel or other selected surfacing material will not be bladed off of roads.	Road Use Permit
	5. Two segments of existing full-size road upgrades (totaling approximately ½ mile) in Poison Gulch connecting to Elijah Park will remain open after project completion to allow public hunting access as recommended by Colorado Division of Wildlife to Elijah Park (January 2007). The remainder of Poison Gulch will be decommissioned to a System ATV trail at the end of project use (primary current use).	Colorado Division of Wildlife, BMP, Paonia Ranger District
	6. 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 land will remain open to allow public hunting and private access without duplication of routes as recommended by Colorado Division of Wildlife.	Colorado Division of Wildlife, BMP
	7. 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)) for public roads (Service Levels 3, 4 and 5) or as approved by Forest Engineer, to be designed by a Colorado Registered	Forest Plan, AASHTO Design Standard, Road Use Permit (FSM 2733.04b and FSM 7730), 36 CFR 228 E
	8. Professional 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 FS Engineering/FS designee monitoring of road conditions resulting from project related traffic. Temporary roads that are not open to the public are not subject to AASHTO engineering standards for low volume roads.	Forest Plan, AASHTO Design Standard, Road Use Permit (FSM 2733.04b and FSM 7730), 36 CFR 228 E

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	9. 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.	Road Use Permit (FSM 2733.04b and FSM 7730) , BMP, GMUG Forest Standard
	10. 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. These limitations apply to any NFSR even if it is not included in the project area or transportation plan.	Road Use Permit (FSM 2733.04b and FSM 7730) , BMP, GMUG Forest Standard
	11. Previously approved ATV trails upgraded for project use would remain open following project completion and would be decommissioned to ATV trails.	Previous NEPA decision
New roads	12. Light-use or low-volume (Service Level 3, 4 & 5) public 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.	Road Use Permit (FSM 2733.04b and FSM 7730) , AASHTO Design Standard
	13. Although somewhat conflicting with direction regarding Lynx (LCAS), based on geologic instability and wet areas warrant that new project specific roads will be laid out on top of ridges (or the top one-third of hillside).	Water Conservation Practices Handbook (WCPH) (FSH 2509.25)
	14. 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.	Federal Coal Lease Stipulation

Table 2-1 Design Criteria		
Topic	**Design Criteria for the Proposed Action**	
	15. Cross slopes will be maintained on 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.	Road Use Permit(FSM 2733.04b and FSM 7730) , WCPH(FSH 2509.25)
	16. Ditches would be allowed to vegetate or include large rocks or stones to slow the velocity of drainage and allow sediment to settle out.	WCPH (FSH 2509.25)
	17. 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.	Project Plan, WCPH (FSH 2509.25)
	18. Road construction plans would identify specific locations of drainage features and BMPs for approval by the FS engineer/permit administrator prior to construction.	Road Use Permit (FSM 2733.04b and FSM 7730) , Forest Service Roads Policy
	19. Road design packages will be submitted to the FS for approval prior to any construction activity. Roads open to the public (Levels 3, 4 & 5) will require written approval prior to any construction activity.	Forest Plan
	20. 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.	RACR
	21. All new access roads constructed for the sole use of this project will be decommissioned by full obliteration when no longer needed for the project and reclaimed.	RACR, 36 CFR 228 E, Road Use Permit (FSM 2733.04b and FSM 7730)
	22. Road work will be performed only upon authorization of the District Ranger and comply with the terms of MCC's Road Use Permit. Roads will be designed and constructed to provide maximum stability and protect the surface resource. Best Management Practices will be used in designing the roads and during construction. All roads will be upgraded or constructed to USFS specified standards for either temporary or classified roads, as appropriate and approved by the USFS, with a design speed of 15 miles per hour.	Road Use Permit (FSM 2733.04b and FSM 7730), MCC Project Plan

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	23. Surface disturbance will be minimized to the extent reasonably feasible in order to limit potential impacts. Soil that is removed from all new disturbance areas will be windrowed or stockpiled for use in reclamation. Topsoil will be segregated from subsoil and stored at a depth no greater than that prescribed by the Paonia District Ranger. No soil generated from excavation, slide removal or other operations shall be deposited within the WIZ of any drainage with flowing water.	Forest Plan, 36 CFR 228 E, MCC Project Plan, Road Use Permit(FSM 2733.04b and FSM 7730) , WCPH (FSH 2509.25)
	24. All disturbed and inactive areas (cut/fill slopes) and soil stockpiles shall be seeded with a USFS approved temporary seed mixture within 7 days following disturbance to prevent noxious weed infestation and minimize erosion	BMP, WCPH (FSH 2509.25)
	25. All construction, reconstruction, and improvements will be stabilized by installation of drainage structures, where determined appropriate by the responsible USFS official, concurrently with construction or maintenance activities. These structures shall be maintained for the duration of the project and shall not be removed, without approval, prior to reclamation of the disturbance. Any culverts will be sized to safely pass the runoff from a 25-year event and to withstand flows from a 50-year event. The USFS will approve culvert sizes and lengths. Filter material will be installed below drainage outlets and down slope from rolling dips. Riprap will be installed below culvert outlets when directed by the USFS.	WCPH(FSH 2509.25) , Road Use Permit (FSM 2733.04b and FSM 7730)
	26. At road intersections with existing drainages, which cannot be easily carried by use of a temporary culvert, crossings will be established. The approaches to any crossing shall be armored by placing a minimum 8-inch depth of 1- to 3-inch clean crushed rock, 14 feet wide for a distance of 20 feet on each side of the drainage to minimize siltation, bank rutting, and erosion. Crossings will be constructed perpendicular to the flow line. When access is no longer needed, any temporary culverts, associated fill, and crushed rock shall be removed. Silt fences or appropriate sediment control devices shall be utilized to prevent siltation into existing drainages, ponds, or associated riparian areas.	Road Use Permit (FSM 2733.04b and FSM 7730) , WCPH (FSH 2509.25),
	27. The road surface will be constructed with an in-slope of 2 percent and the surface width shall not exceed 14 feet except in locations that require curve widening, or those designated for turnouts. These locations must be identified on the ground and approved by the responsible USFS official. Side-casting will not be permitted where side slopes exceed 40 percent.	Road Use Permit (FSM 2733.04b and FSM 7730)

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	28. Sections of temporary roads with roadway gradient in excess of 12 percent or soft areas, which exhibit rutting in excess of 3 inches, shall be stabilized by placing an adequate depth of 3-inch minus clean crushed rock. The surface of the road shall be maintained to minimize ruts and provide for sheet drainage across the roadway.	Road Use Permit (FSM 2733.04b and FSM 7730)
	29. The USFS officer may require surfacing of temporary roads where justified by conditions or traffic volumes. Roads constructed within 660 feet of a riparian area will be surfaced with 3-inch minus clean crushed rock.	Road Use Permit (FSM 2733.04b and FSM 7730), WCPH (FSH 2509.25)
	30. To minimize resource impacts, road design and location	Forest Plan, MCC Project Plan, WCPH (FSH 2509.25)
	31. Should avoid wetlands, moist sites; avoid construction in saddles and low divides; maintain frequent dense cover areas next to roads; construct roads to minimum road standard that will meet management objectives (without large cut slopes, fills, or straight stretches); and facilitate eventual closure (especially where roads enter drainage headwaters areas).	Road Use Permit (FSM 2733.04b and FSM 7730), WCPH
	32. Road construction, drilling, and MDW installation activities are not allowed from December 1 to April 30 to protect big game winter range. Federal Coal Lease Stipulation	Federal Coal Lease Stipulation
	33. Special design, construction, and mitigation measures jointly developed by a USFS Interdisciplinary Team and MCC will be applied to project construction activities proposed in steep slope, moderate slope, or geologic hazard areas to minimize and control the potential for slope de-stabilization and erosion. These measures may include but will not be limited to site-specific drainage measures, limitations on slope cut/fill angles, slope construction measures (benching or slope reinforcement such as temporary gabions or barricades), and slope stabilization measures (such as geotextile or jute matting or hydromulching).	Forest Plan

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	34. Where construction in or immediately adjacent to WIZ cannot be avoided, specific protection and mitigation measures designed to protect or restore riparian values will be implemented. These may include, but would not be limited to: use of silt fence, berms, straw bales, or other measures to minimize sediment contributions to the riparian area; use of geotextiles as a base for road fills to avoid disturbance of riparian soils; placement of appropriate drainage structures to maintain effective flows through the riparian area, stabilize slopes, and minimize erosion; recovery, stockpiling, and replacement of riparian soils by horizon where soil disturbance is unavoidable; and use of a USFS approved riparian seed mix and riparian plantings. Sediment filters and traps must be used, unless waived in writing by a USFS representative. Silt fencing alone will generally not be considered adequate. All sediment control structures must be routinely inspected and maintained until their function has been replaced by adequate reclamation practices.	BMP
Road Operations	35. Minnesota Creek, Dry Fork, and Horse Gulch roads will continue to be open for public full size vehicle and ATV use throughout the project. MCC will sign roads warning the public of heavy truck traffic during the active drilling season.	BMP
	36. All project temporary roads will be closed to public motorized vehicle use during the active drilling season and during the winter months. Motorized will be restricted to administratively approved traffic during this closure period. Locked gates and signs meeting USFS MUTCD requirements will be provided, installed, and maintained by MCC at the intersections of the Horse Gulch and West Flatiron roads, the Dry Fork Road and Long Draw Saddle ATV Trail, the Dry Fork and Upper Deep Creek roads, and any other locations designated by the USFS official. The drilling season is expected to end each year in September, at which time certain temporary roads will be open for public motorized use until snow conditions preclude use. The roads that will be open to public motorized use in the fall include West Flatiron, Long Draw Saddle, and West Bench Roads.	BMP
	37. By September 1, MCC will post warning signs, at locations designated by the USFS, to warn hunters of dangers associated with increased traffic on roads resulting from project activities, drilling operations, and methane-venting. Depending on the location of drill rigs during the big game seasons (typically only during early seasons), additional temporary gates may need to be installed to prevent public ATV access to active drill sites. Roads closed to public motorized use due to drilling or methane-venting operations shall be clearly posted as "closed" using signs with maps of the closure area and the reasons for closure. At each closure location Manual of Uniform Traffic Control Devices (MUTCD) approved road closure devices must be used. To minimize conflicts with hunters, project traffic will not be allowed on the Minnesota Creek, Horse Gulch, and Dry Fork roads (except for emergency use)	BMP

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	during the periods of one hour before sunrise and two hours after sunset during the big game rifle hunting seasons. Additional security and public safety measures may be considered and approved or directed by the District Ranger.	
	38. Cross country motorized vehicle travel is prohibited. Mine related traffic is permitted on approved roads and designated trails only.	Road Use Permit (FSM 2733.04b and FSM 7730), Gunnison Interim Travel Restrictions
	39. If snow is removed from the Minnesota Creek and Dry Fork Roads, removal must be performed in compliance with MCC's Road Use Permit, and must be pre-approved by the District Ranger. If snow is plowed, public snowmobile traffic will not be permitted on this road. Snow shall be compacted to 4 inches, and then allowed to freeze before hauling loads where GVW would exceed 10,000 pounds. MCC will be responsible for erecting a temporary closure device on snowplowed roads to prevent public motorized access on the road. This closure must meet MUTCD requirements.	Road Use Permit (FSM 2733.04b and FSM 7730)
	40. On all roads used for project activities, road maintenance activities will be performed by MCC as directed by the responsible USFS official, and shall consist of maintenance needed to preserve, repair and protect the roadbed, surface, and all structures and appurtenances including but not limited to periodic grading, and inspection, clean-out, and repair of any drainage structures, as appropriate. Dust suppression would be used, as necessary, to control dust emissions from project construction and reclamation activities, as well as project roads. Use of anything other than water for dust suppression in any WIZ will not be allowed.	Road Use Permit (FSM 2733.04b and FSM 7730) , WCPH
	41. Silt fences or appropriate sediment control devices shall be utilized to prevent sedimentation into the existing willow riparian area adjacent to Dry Fork Minnesota Creek Road 711 from the junction with Horse Gulch Road to the lower Cow Camp. Dust control measures will be applied to reduce dust along this section of road.	WCPH (FSH 2509.25), Road Use Permit (FSM 2733.04b and FSM 7730)

Table 2-1 Design Criteria		
Topic	**Design Criteria for the Proposed Action**	
	42. Drainage maintenance on roads will be critical for the duration of use. Existing rolling dips shall be maintained and may need to be hardened. The USFS representative will inspect roads used for project activities to identify any additional drainage structures to be constructed prior to or during use.	BMP
	43. MCC is responsible for using appropriate MUTCD traffic control devices when any heavy equipment is moved on Forest Roads.	Road Use Permit (FSM 2733.04b and FSM 7730)
	44. Traffic counters will be provided and installed by MCC, at designated locations to record vehicle and ATV passes. The counters will be monitored and data recorded on a monthly basis. The counter totals will be submitted to the District Ranger monthly in both tabular form and graph form. The USFS Engineering Staff will provide specifications to MCC on installation of the traffic counters.	Road Use Permit (FSM 2733.04b and FSM 7730)
	45. Harassment of livestock is prohibited. While stock is in the project area, extra precautions must be taken by MCC and their contractors to ensure that stock are not pushed out of the currently occupied grazing unit.	BMP
	46. Livestock access will be maintained during active operations. Cattleguards and access gates to the side of each cattleguard will be installed in a timely fashion at any place where MCC uses or builds roads as directed by the District Range Management Specialist. Project personnel will cooperate with the grazing permit holders to avoid or minimize conflicts with grazing operations.	BMP
	47. MCC would be required to maintain stock ponds adjacent to project roads to assure their continued effective use. This would involve pond clean out on an as-needed basis	BMP
Roads in Inventoried Roadless	48. 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.	BMP, RACR
	49. 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.	Road Use Permit (FSM 2733.04b and FSM 7730) , RACR
Staging Areas	50. 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.	BMP

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
Maintenance	51. Roads will be maintained with water bars and appropriate sedimentation controls. Water bar placement and design will be approved by the authorized FS Officer.	Road Use Permit(FSM 2733.04b and FSM 7730) , BMP
	52. 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.	FSM 2733.04b and FSM 7730
WATER RESOURCES		
Ground Water	53. Any aquifers encountered in the shaft will be sealed by a grout curtain wall extending 20 feet above and below aquifer.	BMP
	54. 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.	BMP
Surface Water	55. Lease stipulations limit occupancy in riparian areas, wetlands and floodplains. Surface use in wetlands, floodplains or riparian areas will be avoided unless specially authorized.	Federal Coal Lease Stipulation
	56. Streams will not be paralleled by roads other than that needed for crossings.	Federal Coal Lease Stipulation
	57. Wetland areas would be avoided wherever possible and BMPs would be implemented for all activities to occur adjacent to or within these aquatic features.	WCPH (FSH 2509.25) , Federal Coal Lease Stipulation
Water Quality	58. Material from slides or other sources on roads will not be deposited in streams or other locations where it will wash into streams.	WCPH (FSH 2509.25) , Federal Coal Lease Stipulation
	59. 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;	State Law
	• 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;	State and Federal Law (33 U.S.C.A §§ 1251 to 1387)
	• compliance with applicable federal and Colorado dredge and fill	

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	requirements; and • removing temporary or large siltation structures from drainways after disturbed areas are revegetated and stabilized, if required by the Reclamation Plan.	State and Federal Law MCC Project Plan, BMP
Drilling Water	60. 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. 61. Water will be pumped from portable tanks using a high-pressure hose or transported to the site with mobile water carriers.	US Fish and Wildlife Service (USFWS), Forest Plan BMP, MCC Project Plan
Water Influence Zone (WIZ)	62. 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. 63. All disturbed areas within 100 feet of a WIZ would be protected with sediment control materials specified by the FS.	WCPH (FSH 2509.25), BMP WCPH (FSH 2509.25), BMP
Drill Holes as Water Monitoring Wells	64. MCC does not anticipate encountering any significant aquifers during drilling. However, if it is decided that groundwater monitoring is required by the State permit, drill holes may be used as monitoring wells.	MCC Project Plan
WETLANDS		
	65. Surface use or disturbances (except for surface subsidence and resource monitoring purposes defined in the approved mining permit) will not be permitted in riparian, wetland or floodplain areas, or within a buffer zone surrounding these areas (the definition of riparian areas and appropriate buffer zone will be consistent with that defined in the Forest Service Manual and Water Conservation Practices Handbook, unless specifically approved by the Authorized Officer. Wetland definition will follow Army Corps of Engineers guidelines) unless no practical alternatives exist.	Forest Service Manual, Lease Stipulation and WCPH (FSH 2509.25)
WILDLIFE		
Threatened, Endangered and Sensitive Faunal Species	66. 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.	Federal Coal Lease Stipulation

Table 2-1 Design Criteria		
Topic	**Design Criteria for the Proposed Action**	
	67. 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.	USFWS
	68. Avoid or minimize impacts to lynx habitat.	Canada Lynx Conservation Assessment and Strategy (LCAS)
	69. Restrict use to designated routes where over-snow access is required to protect lynx.	LCAS
	70. Minimize snow compaction during MDW monitoring to protect lynx. Use remote monitoring of sites if possible.	LCAS
	71. Restore suitable lynx habitat during reclamation activities.	LCAS
	72. Reclaim and obliterate temporary roads at project completion.	LCAS, 36 CFR 228 E, Road Use Permit (FSM 2733.04b and FSM 7730) , WCPH (FSH 2509.25), GMUG Coal Lease EIS
	73. Close project-created roads to public access in lynx habitat.	LCAS
	74. 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 frog 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).	MCC Project Plan, Forest Plan

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	75. For the Dry Fork Lease area, include the following for lynx (Dry Fork Federal Coal Lease-by-Application (COC-67232) Record of Decision): • Winter Access will be limited to designated routes • Establish an education program for MCC's employees about presence of lynx and safe driving practices; • Report lynx sightings or lynx carcass findings to the USFWS within 24 hours; and, • Provide an annual report of all activities which may affect lynx to the USDA-FS and USFWS.	Dry Fork Federal Coal Lease (COC-67232) using USFWS language
	76. Further, for the Dry Fork Lease area, should post-lease operations be proposed on the lease in lynx habitat, the following special constraints may apply, depending on site-specific circumstances: • Remote monitoring of the development sites and facilities may be required to reduce snow compaction. • A reclamation plan (e.g. road reclamation and vegetation rehabilitation) for sites and facilities that promotes the restoration of lynx habitat may be required. • Public motorized use on new roads constructed for project-specific purposes will be restricted. • Access roads will be designed to provide for effective closures and will be reclaimed or decommissioned at project completion if they are no longer needed for other management objectives. • New permanent roads will not be built on ridge tops or in saddles, or in areas identified as important for lynx habitat connectivity. New roads will be situated away from forested stringers.	Dry Fork Federal Coal Lease (COC-67232) using USFWS language
	77. For surface use occurring in lynx habitat, the Lessee will be required to submit an annual report to the USDA-FS and USFWS of all activities having occurred in lynx habitat.	Dry Fork Federal Coal Lease (COC-67232)
	78. If there is reason to believe that Sensitive, Threatened or Endangered species of plants or animals, or migratory bird species of high Federal interest are present, or become present in the lease area, the Lessee/Operator shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist, and a report of findings prepared. A plan will be made that recommends protection for these species or action necessary to mitigate the disturbance. The cost of conducting such inventory, preparing reports and carrying out mitigation measures shall be borne by the Lessee/Operator.	Dry Fork Federal Coal Lease (COC-67232)

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	79. In order to protect big game wintering areas, elk calving areas, and other key wildlife habitat and/or activities, specific surface use may be curtailed during specific times of year. Specific time restrictions for specific species will be evaluated by the Forest Service at the individual project stage, and any additional site specific conditions of use developed at that time.	Dry Fork Federal Coal Lease (COC-67232)
	80. In the future, if water to be used for mine related activities is 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.	Dry Fork Federal Coal Lease (COC-67232)
Deer & Elk Winter Range	81. Irregular-shaped pads will be used to increase effectiveness of reclamation and natural seed establishment.	BMP
	82. Minimize disturbance and access during crucial winter months to avoid stressing animals.	BMP
	83. Exploration, drilling and development will not occur between December 1 and April 30, unless specifically approved.*	Federal Coal Lease Stipulation
	84. 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.	Forest Plan
	85. To avoid collisions with game, MCC is encouraged to consider shift changes outside of dawn/dusk.	BMP
Raptors (including Goshawks)	86. 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.	Forest Plan
	87. 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.	Forest Plan
Breeding/Migratory Birds	88. 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.	FS

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	89. If surface disturbance is proposed on the lease, the lessee/operators will be required to conduct breeding bird surveys prior to surface disturbance.	FS
VEGETATION RESOURCES		
Threatened, Endangered and Sensitive Plant Species	90. 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.	Federal Coal Lease Stipulation
Brush Removal/Tree Removal	91. Payment will be made to the Forest Service for any merchantable trees removed under a timber contract.	FSH 2409
Fire Prevention	92. All equipment, including welding trucks, would be equipped with fire extinguishers and other fire fighting equipment as required by the Forest Service.	R2 RFO #R2-2007-01
	93. 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)	R2 RFO #R2-2007-01
Noxious weeds	94. Power-wash all construction equipment and vehicles prior to the start of construction off-forest at a privately owned or commercial facility.	BMP, FS
	95. Any construction or operational vehicles traveling between the Project Area and outside areas would be power-washed on a weekly basis.	BMP
	96. Weed control would be conducted through an Approved Pesticide Use and Weed Control Plan approved by the Authorized Officer.	FS Weed Maintenance Agreement with Counties, DRMS
	97. 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.	FS Weed Maintenance Agreement with Counties, DRMS
	98. 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.	FS

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
VISUALS		
Visuals	99. 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.	BLM/FS
	100. Contours will be followed during construction, to the extent possible, so visual line and form is undisturbed.	Forest Plan
	101. Vegetation removal will be minimized to prevent disruption of color.	Forest Plan
	102. Irregular shaped pads will be used to minimize visual disturbance.	FS
GEOLOGY, SOILS, MINERALS		
Topsoil	103. Where it is necessary to remove topsoil in order to construct MDW pads or access roads, 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.	DRMS, FS
	104. 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.	Reclamation Plan, FS
	105. Topsoil stockpiles shall be stored and configured to minimize erosion 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.	DRMS, FS
	106. Immediate seeding of topsoil stockpiles for the purpose of stabilization may be required.	Reclamation Plan, FS, BMP
	107. Once stockpiled, the topsoil shall be handled as little as possible until replacement on the regraded, disturbed area.	Reclamation Plan, FS
	108. The Operator shall take measures necessary to assure the stability of replaced topsoil on graded slopes such as roughening in final grading to eliminate slippage zones that may develop between the deposited topsoil and heavy textured spoil surfaces.	Reclamation Plan, FS
	109. When growth 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.	Reclamation Plan
Subsoil	110. Minimize footprint of stockpile to limit disturbance. Use for regrading and contouring.	FS

Table 2-1 Design Criteria		
Topic	**Design Criteria for the Proposed Action**	
Erosion & Sediment Control	111. Erosion will be minimized through interim reclamation including, but not limited to, contouring, seeding and mulching.	BMP
	112. Sediment control measures such as, but not limited to, silt fence, straw mulch, site containment and sediment control ponds will be utilized as needed.	BMP
	113. Construction on steep slopes (>60%) would be fully designed and engineered according to Forest Service standards and design criteria and should include an erosion control and maintenance plan.	Forest Plan
Geologic Hazard	114. Leases contain stipulations restricting surface 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.	Federal Coal Lease Stipulation
	115. 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.	Federal Coal Lease Stipulation
	116. 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.	Federal Coal Lease Stipulation
	117. 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.	Federal Coal Lease Stipulation
Incidental Coal Recovery	118. Any coal recovered incidental to project will be taken back to the mine site or disposed of in the mud pits.	MCC Project Plan
AIR QUALITY		
Surface Air Quality	119. 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.	BMP

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	120. To the extent feasible, project workers would car pool to and from the project area to minimize vehicle-related emissions and fugitive dust emissions.	BMP
RECREATION		
Recreation	121. 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. If use is required for operations using over-sized vehicles during any period of public use, then MCC will use appropriate active traffic control measures.	CDOW suggestion
CULTURAL RESOURCES		
Cultural Surveys/ Paleontological Resources	122. 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.	43 CFR 7 Subtitle A and 36 CFR Part 296
	123. 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 will be left intact until directed to proceed. All data and materials recovered will remain under the jurisdiction of the U.S. Government	43 CFR 7 and 36 CFR Part 296
CONSTRUCTION ACTIVITIES		
Interim reclamation	124. Interim reclamation will be done through seeding of ungraveled areas.	BMP, State
	125. Stabilization of steep cut slopes that will remain unreclaimed over a winter or longer will be stabilized through placement of native boulders or other reclamation.	BMP
	126. 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.	BMP
	127. All areas not necessary for the continued operation of the wells would be reclaimed after drilling is complete.	MCC Project Plan, FS
	128. 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.	BMP, State
	129. Post-construction seeding applications would continue until determined successful by the Forest Service.	Forest Plan, CO DRMS

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
Onsite Inspections	130. Prior to any construction, onsite inspections with appropriate regulatory agencies will be held to discuss site-specific concerns.	36 CFR 228 E
DRILLING & COMPLETION OF MDWS		
Mud Pits	131. When the mud pits are sufficiently dry they will be filled with stored sub-soil material and compacted to minimize any settling.	36 CFR 228 E
Water use	132. Drilling water will be reused as available.	MCC Project Plan
OPERATIONS & MAINTENANCE ACTIVITIES		
Emergency Shaft	133. Hoist and generator will be tested weekly per MSHA requirements to assure functionality.	MSHA, MCC Project Plan
	134. A 1,000 gallon propane tank for generator will be buried in pad.	MCC Project Plan
	135. The generator for shaft will be muffled to reduce noise during the testing periods.	MCC Project Plan, State
Site Security	136. A 6-foot high, locked, chain-link fence topped with barbed wire will surround shaft escapeway to preclude wildlife and public.	MCC Project Plan
	137. Underground mine workings will supply power to light the shaft and emergency escapeway instead of solar power to avoid installation of a powerline. Back-up power will be provided by a generator.	MCC Project Plan
De-gas installation	138. Degassing trailer will be enclosed with a fence with a locking gate to preclude public, livestock, and wildlife entry.	MCC Project Plan
	139. Equipment will be inspected by MSHA prior to installation.	
Monitoring of MDWs	140. Twice daily initial inspections of active de-gas installation then decreasing to weekly.	MCC Project Plan
RECLAMATION ACTIVITIES		
Closure	141. 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.	30 CFR 75.1711
Revegetation	142. Subsurface ripping would be used to reduce compaction prior to replacement of the topsoil and seeding.	BMP
	143. Successful revegetation (measured by 75 percent cover of adjacent undisturbed ground after 2 growing seasons in upland areas and 80 percent ground cover in riparian areas) of disturbed ground with native vegetation.	Forest Plan

Table 2-1
Design Criteria

Topic	Design Criteria for the Proposed Action	
	144. Surface will be left roughened ("pocking") as part of the seed bed preparation. 145. 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. 146. A seed mix palatable for both wildlife and livestock would be used for revegetation to support the post-mining land uses.	FS
Reclamation Plan	147. 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.	DRMS
COMPLIANCE REQUIREMENTS		
SMA Requirements	148. Operator shall comply with applicable requirements of surface management agency (30 CFR 815.15) or approved State program.	30 CFR 815.15
Plugging Requirements	149. 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. 150. 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. 151. 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. 152. A surface plug shall be placed in accordance with 4.07.3(1) and the hole shall be marked.	30 CFR 75.1711

[1]Canada Lynx Conservation Assessment and Strategy

Developments Associated with Project Proposal

Constructing an estimated 0.64 miles of road on private land and drilling and casing of up to 19 MDWs at up to 11 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 Plan;
- 404 Permit-Proposed crossing of jurisdictional drainages to follow the permit conditions identified by the Army Corps of Engineers in the 404 permit;
- Road Use Permit issued by the Forest Service (required). MCC has an existing road use permit, however additional mileage will need to be added and performance bond will need adjustment;
- Forest Service timber contract for any merchantable timber removed;
- County road use agreement;
- Approved Pesticide Use and Weed Control Plan; and
- Mine permit action through DRMS.

Alternative 3 – No Activity in Roadless

Alternative 3 was developed to address public concerns about additional development in the West Elk IRA. This alternative includes all of the design criteria in **Table 2-1** except 48 and 49, which are made unnecessary by the location of road construction activities.

Figure 5 displays activities that would occur in this alternative. Please note that small pieces of road appear to be accessing MDWs from the IRA. This alternative would require further field fitting of roads to avoid IRA to access MDWs outside the IRA. This alternative is the same as the Proposed Action except that it assumes no new activity in the West Elk IRA. Differences in the MDWs and Access Roads are discussed below.

E Seam Methane Drainage Wells (MDW) Different From Proposed Action Include:

- Drilling and casing of up to 139 MDW located on up to 135 drill locations over 12 years on NFS lands. Drilling and casing of up to 19 MDWs at up to 11 sites on private land.
- Constructing 14.1 miles of new access road over 12 years. Constructing an estimated 0.6 miles of road on private land.
- Upgrading 1.3 miles of existing ATV routes on NFS lands.
- Using and performing maintenance on approximately 4.8 miles of existing National Forest System Roads (NFSR);

Access and Road Construction

This is the same as the Proposed Action except there would be no road construction or reconstruction or upgrades in the West Elk IRA.

Relative to road construction, Alternative would authorize construction and use of about 19.9 miles of roads necessary for these operations. About 14.1 of the 19.9 miles would be new road construction, 4.8 miles of upgrades to existing NFSRs, and 2.0 miles of ATV trail upgrades.

Relief from Lease Stipulation

Relief requested would be the same as Proposed Action.

Activities in Inventoried Roadless Area

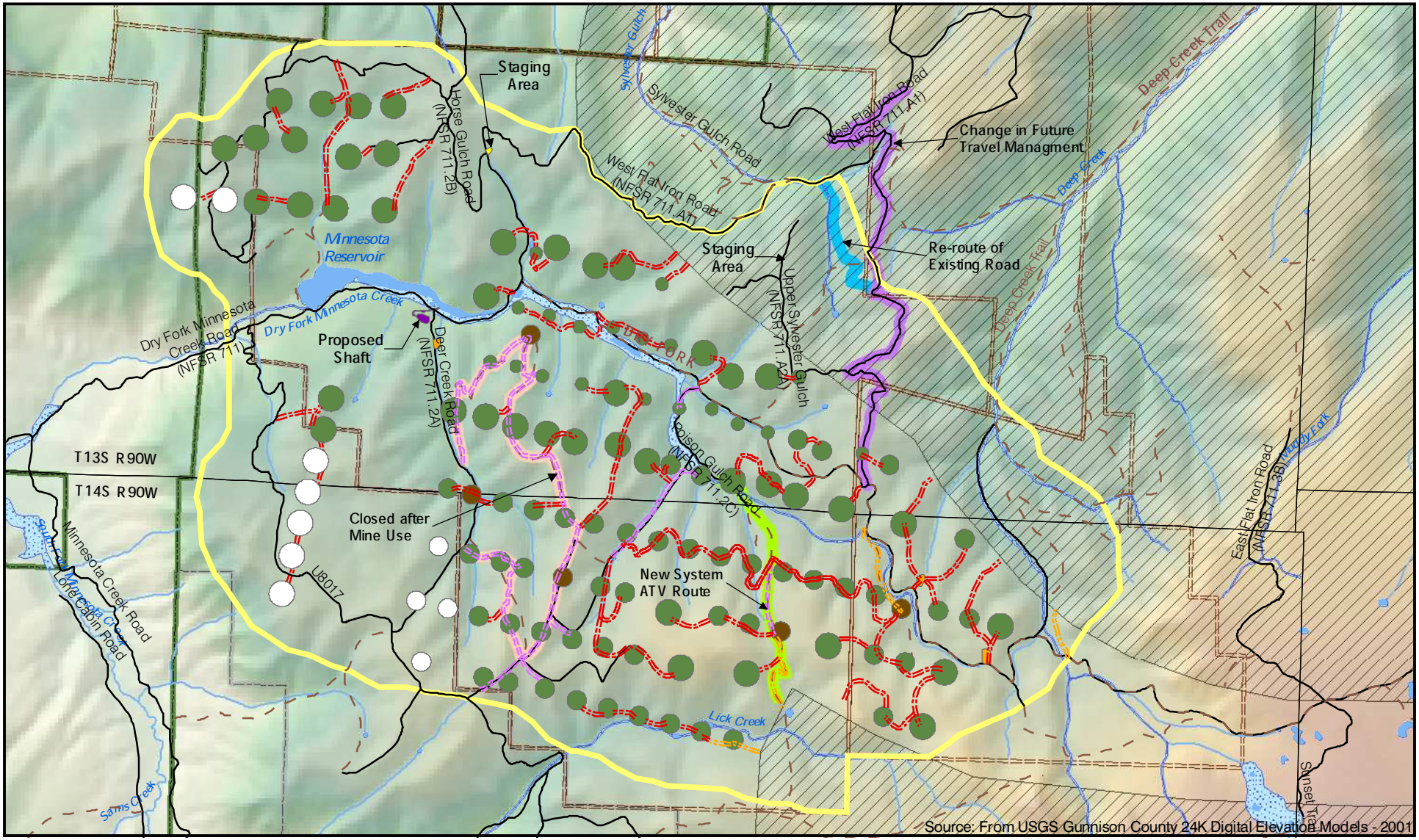
There would be no activities in IRAs under this alternative.

Reclamation

Same as Proposed Action.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives to the Proposed Action 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 provide suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been



Alternative would require further field fitting of roads to avoid IRA to access MDWs outside the IRA such as those near NFSR 711.A1 and Lick Creek.

Alternative 3
No Activity in Roadless
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 5

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.

Flaring of methane gas was brought forward as a way to mitigate venting of methane, a potent green house gas, to the atmosphere. It is acknowledged that flaring may be used to reduce green house gas emissions; however, the FS understands from the MSHA District Office in Lakewood, CO that this activity is not approved by MSHA due to the potential safety hazard to the underground mine. MSHA indicates that additional research and development on this technology would have to occur before MSHA would consider flaring a reasonable option (personal communication B Reitze, MSHA, to Liane Mattson, FS, June 2006).

Capture/Use of Methane and Leasing of Coal Mine Methane

Several comments were received during project scoping and on the Draft EIS related to capturing the natural gas encountered during mining operations, and putting it to beneficial use rather than allowing it to vent as a way to avoid wasting the gas resource and to mitigate potential contribution to greenhouse gas emissions. It was also suggested that this concept be analyzed as an alternative to the Proposed Action. This was not carried forward as an alternative analyzed in detail because of complexities and legal limitations stemming from the leasing processes and regulations of two separate mineral resources, uncertainty with relation to quality and quantity of gas resource, and economic concerns related to additional facilities do not support detailed analysis in this EIS. The reasons for this include: 1) an alternative to capture the gas would not satisfy the specific purpose and need for the project which is to ensure health and safety of the underground mine and facilitate efficient recovery of leased federal coal reserves, 2) such an alternative would not be legal because the gas is not under lease, and 3) capturing the gas was not forwarded as part of the proposal made to meet mine ventilation needs to satisfy MSHA requirements. A discussion of each situation is given below.

Further, some of the components of the capture/use of methane concept are outside of the FS control as they are tied to national policy or direction.

Mineral Leasing Situation

As coal, and oil and gas, resources are managed under separate programs by the BLM, and fall under differing regulations (43 CFR 3400 for coal, and 43 CFR 3100 for oil and gas), they have specific management needs. For example, the federal coal lease grants the lessee the exclusive right and privilege to drill for, mine, extract, remove or other wise process and dispose of the coal deposits in the lease (see also Purpose and Need), the coal lease does not grant the right to the coal lessee to capture gas released incident to mining. Further, the coal lease reserves the right of the Lessor (BLM) to lease other mineral deposits contained on the leased coal lands including other leaseable minerals (BLM Form 3400-12, Section 7), which includes oil and gas.

The natural gas occurring in the coal seams and adjacent strata that could be encountered while mining the E seam coal reserves is considered a federal resource that is managed by BLM. The basic premise related to capturing the coal mine natural gas is that, as a federal resource, the gas must first be duly under lease in order for capture and use to occur. According to BLM, absent an oil and gas lease, the natural gas encountered as a byproduct of the mining cannot be captured and put to beneficial use, as

it would be illegal to do so without an oil and gas lease.

Having the gas under lease is a desirable condition for the FS and one the agency has pursued with BLM (project file). The FS and BLM have discussed placing the gas under lease, and have explored the gas leasing process, including opportunity for non-competitive leasing (project file). BLM, in consultation with their solicitors have assessed that the agency has no authority to offer gas leases non-competitively. Therefore, any gas leases would have to be let through BLMs established competitive leasing process.

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 were made available and authorized for oil and gas leasing in the Record of Decision. Gas lease nominations were made for the project area in approximately 2002; however, the FS has been unable to act upon them because changes in various legal requirements have prevented processing them for sale. First, the listing of the *Canada lynx* as a threatened species created a situation in which Forest Management plans had to be updated. The lands in these nominations that are co-incident with the E Seam project area contain lynx habitat, and therefore, were deferred from processing until supplemental NEPA review regarding lynx could be completed. The FS Rocky Mountain Regional Office led this effort through preparation of a regional EIS. Due to lack of specificity in this analysis for oil and gas leasing, the GMUG undertook its own effort to update the 1993 oil and gas leasing analysis for lynx. This was completed in 2005. Prior to that time, gas lease nominations containing lynx habitat could not be processed.

On-going litigation regarding the 2001 RACR has also prevented placing these nominated lands on a gas lease sale (see Chapter 1, Roadless Area Conservation Rule). Currently, the national forests are deferring processing gas lease nominations in inventoried roadless areas pending guidance on how to notice leases with IRA lands. Consequently, the lands in these nominations that are co-incident with the E Seam project area contain IRA lands that cannot currently be forwarded for to BLM for gas leasing. The FS is actively exploring mechanisms consistent with Judge Laporte's reinstatement of RACR that would permit BLM leasing of these gas parcels. Direction may include issuing oil & gas leases with a no surface occupancy stipulation.

To summarize, the natural gas that may be vented from the methane drainage wells cannot be captured until gas leases are in place. Forwarding gas lease nominations to BLM for competitive sale that contain IRA lands is currently limited because of on-going issues related to the 2001 RACR.

Gas Resource Information

Gas quantity and quality information from operations in B Seam reserves (to the north and northeast of the project area) were used to understand the feasibility of capturing the gas resource, should it be possible from a leasing standpoint. MCC provided information related to gas-in-place evaluation done for the E Seam.

BLM evaluated this data and provided technical information (project file) on what would be needed to capture the gas (if it were under lease) and take it to a pipeline, or use it in other ways. Their findings include that in order to send the gas from the methane vent wells to a pipeline for ultimate sale, a gas treatment facility would be necessary because the gas emitted from the mine does not meet basic pipeline quality. Primarily, the level of inert constituents in the gas (carbon dioxide, nitrogen, air, others) exceeds the pipeline standard limit of 3 percent for inert constituents. Based on gas emission data from mining the B Seam at the West Elk mine, inert constituents range from 6 percent to 77 percent. For the purposes of this analysis it is assumed that gas emissions from the E Seam would have a similar range of inert constituents.

There would also be a need for a gas compression facility. Typically pipelines need

to have gas pressures at 500 pounds per square inch. In order to achieve 500 pounds per square inch, the existing gas pressures at the MDWs would require three-stage compression to achieve the needed compression. In addition, pipelines would be needed to convey gas to treatment and compression facilities.

Economic Considerations

There are additional uncertainties regarding whether the volumes of methane being vented would warrant installation of compressors, gathering and transmission pipelines, and a gas treatment plant, since volumes vary so much with the mine operation, and are almost totally dependent upon the mine air circulation system. There are also issues related to permitting these facilities so not to interfere with mine operations.

BLM also researched using coal mine vent gas for electrical generation. There are numerous websites which show it being done, however none of them include any gas volume numbers or equipment requirement on which to base any analysis. No co-generation of electricity of data exists (gas quality needed, gas volumes, or equipment requirements) for coal mines as this is generally done specifically by electric companies.

Further, a consultant to EPA's Coal Mine Methane Outreach Program acknowledged that capture and use of methane from the West Elk Mine is complicated by the distance to an existing natural gas pipeline (over 10 miles), suggesting that the quantity of gas potentially available may not warrant the investment in a pipeline. It was also brought forward that using to coal mine methane for electrical cogeneration is generally not used in the USA because electricity is available at low wholesale rates. Additionally, it was acknowledged that feasibility of capture and use is uncertain based on issues of variability in quantity and quantity of gas (personal communication Mike Cote July 18, 2007).

If able to be put to beneficial use, the estimated amount of gas that may be released from the E Seam could heat approximately 34,800 to 39,500 homes (assuming a yearly output) based on EPA's methane converter, but does not include efficiency of homes.[5]

Given the above circumstances, the general speculative nature and legal uncertainties regarding capture and use of the coal mine natural gas do not provide enough detailed information to effectively meaningfully disclose effects of an alternative that would consider such. Therefore, this alternative is not analyzed in detail.

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 (analyzed in 2004-2005 in an EIS) 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.

MCC has analyzed the use of directional drilling to achieve degasification goals from sites outside the IRA and has noted the following:

[5] The number of homes referenced here is taken from EPA's comment letter on the Draft EIS. After consultation with EPA and MSHA, its was acknowledged that gas emission data used by EPA to make this estimate is a very coarse measurement, and that more refined emission data received from BLM is the best available data to use in the EIS analysis (See Chapter 3-Air Quality).

- It has been MCC's experience drilling directionally in the B seam that directional holes must be drilled such that the producing part of the well above the seam is vertical. This distance was approximately 250 feet in the B seam methane drainage wells and is projected to be 150 feet minimum in the E seam methane drainage wells. If such holes fail to achieve vertical in this portion of the well, they are subject to collapse and ineffective as degas holes.
- The maximum safe angle of drilling (above this minimum vertical section) that can be achieved by the drilling equipment available is 45 degrees.
- The drill mast is set at 45 degrees to begin the holes. This angle must be gradually corrected to vertical during the drilling process.
- The maximum allowable dog-leg in directional drilling is 4 percent, in order to be able to successfully install casing in the hole.
- Given the parameters of overburden depth, as it relates to physical constraints of directional drilling, MCC is unable to reach the required methane drainage targets from outside the roadless boundary.

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.

MCC expended a tremendous effort over a three-year period in an attempt to find a means to successfully accomplish degas drainage using the in-mine horizontal drilling system. These holes were drilled in the gateroads of the 14-17 panels and connected to a massive collection system to exhaust the gases from the mine. The conclusion of this effort was that the holes could not be drilled large enough, or stay open long enough, to allow safe mining of the coal (due to resulting high methane concentrations). They were simply very inefficient collectors of minimal quality gas, due to the limits of the drilling equipment in this application and the location of the gas-producing zones within the overlying strata. In MCC's previous experience in the B Seam approximately 13 percent of total mine methane was able to be vented horizontally (extracted from BLM analysis, 2007). Any attempt to degas the E seam via the horizontal drilling system would have the same issues and possibly more due to constraints of the overlying strata.

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

Helicopter Drilling of IRA Sites

Regardless of how they are accessed, drill pads still need to be constructed and large-diameter boreholes would still need to be completed to achieve effective methane drainage. Drill pad construction would require the use of heavy equipment such as a tracked dozer and a backhoe to dig mud pits. Depending on the terrain, a tracked backhoe may also be needed. Large diameter drill-holes cannot be drilled by the drill rigs typically flown in by helicopter. Such rigs are normally used for drilling exploration coreholes by an entirely different drilling method than the air-foam rotary used to drill large-diameter holes. Large-diameter holes are necessary for the effective removal of

methane as the vacuum exhausters used to accomplish degasification will not operate given the increased resistance of smaller diameter holes. The size and weight of the required equipment (95,000 to 136,000 pounds) is far beyond the lift capabilities of even the largest twin-rotor helicopters, which can only lift upwards of 30,000 pounds at sea level. The range of elevation for the collar sites of the proposed methane drainage wells is 6,800 to 8,500 feet. Higher elevations have a significant adverse impact to the lifting capacity of helicopters. For safety reasons, in addition to, technical reasons regarding weight limits, this alternative was not carried forward for detailed analysis.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative considered in detail (**Table 2-2**). 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.

Agency Preferred Alternative

Alternative 2 – Proposed Action, including the design criteria specified in **Table 2-1** is the Forest Service's preferred alternative.

Table 2-2
Comparison of Alternatives

Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No Activity in Roadless
Workforce	Maintain current level of employment at West Elk Mine through 2008.	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** Maintain current level of employment at West Elk Mine through about 2015.	**Shaft/ Escapeway:** Same as No Action **E Seam MDWs:** Maintain current level of employment at West Elk Mine through about 2015, however approximately 2 years less than Alternative 2.
Revenues Generated (includes royalties)	No revenue or royalties received if coal not mined	**Shaft/Escapeway**: Same as No Action **E Seam MDWs**: $ 729 million	**Shaft/ Escapeway:** Same as No Action **E Seam MDWs:** $ 622 million
Coal Supplied	0 tons after 2008	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 75 million tons	Shaft/ Escapeway: Same as No Action **E Seam MDWs:** Perhaps as low as 65 million tons
Safety of mine workers	Mine worker safety protected through mine closure	**Shaft/Escapeway & E Seam MDWs:** Mine worker safety protected through adequate ventilation and escapeway.	Same as Alternative 2.
Threatened, Endangered, Sensitive Species	No effect	**Shaft/Escapeway:** Short-term loss of winter habitat for bald eagles. **E Seam MDWs**: Short-term loss and temporary disturbance of Canada lynx habitat. Mitigation measures would ensure that species would not be adversely affected.	Same as Alternative 2.
Management Indicator Species	No effect	**Shaft/Escapeway**: Same as No Action as disturbance already exists **E Seam MDWs**: 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.	Same as Alternative 2.

Table 2-2 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
General Wildlife	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs**: 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	Same as Alternative 2.
Winter Range	No effect	**Shaft/Escapeway:** 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. **E Seam MDWs:** Same as No Action as MDWs would not be constructed in winter.	Same as Alternative 2.
Topographic surface	No change	**Shaft/Escapeway & E Seam MDWs:** Subsidence above the mined area	Same as Alternative 2
Land Stability	No effect	**Shaft/Escapeway & E Seam MDWs:** Minimal risk of destabilizing slopes	Same as Alternative 2
Soils	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 276 acres disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 160 acres disturbed
Geologic hazards	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal risk of hazards due to slope, landslide and mass wasting	Same as Alternative 2

Table 2-2 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
Minerals	No additional coal removed	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 75 million tons of coal removed	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 65 million tons of coal removed
Range Resources	0 acres disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 185 acres of Gambel oak, and 13 acres of grass/shrub disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 165 acres of Gambel oak, and 13 acres of grass/shrub disturbed
Wetlands	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal risk of vegetation disturbance	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Same as Alternative 2
Forest	0 acres disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Maximum of 108.5 acres of aspen and 2.4 acres of spruce-fir disturbed	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** 88.5 acres of aspen disturbed 0.8 acres of spruce-fir disturbed
Recreation	No impact	**Shaft/Escapeway & E Seam MDWs:** Minor seasonal modification of recreational user's activity (such as hunting in adjacent area) and access during the construction and operation of the methane drainage.	**Shaft/Escapeway & E Seam MDWs:** Minimal risk of vegetation disturbance Impacts on dispersed recreational opportunities would generally be similar to Alternative 2.

Table 2-2 Comparison of Alternatives			
Issue	**Alternative 1 No Action**	**Alternative 2 Proposed Action**	**Alternative 3 No Activity in Roadless**
Inventoried Roadless Area	Road use associated with the previously approved methane drainage activities would continue	**Shaft/Escapeway:** Same as No Action **E Seam MDWs:** 0.4 miles of upgraded OHV temporary access, 0.6 miles of temporary road reroute to mitigate resource degradation (no net gain of roads from reroute), and ~1.7 miles of new temporary road construction within IRA	Same as Alternative 1.
Grazing	No impact	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Short term decreases in available AUMs and potential long term increase in forage at reclamation sites in Gambel oak types	Same as Alternative 2.
Roads	No impact	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** 4.8 miles of upgraded roads and 15.8 miles of new temporary road, of short term and periodic access restrictions on NFSR 711 due to the movement of over-size/over-length vehicles (Shaft construction: additional 7 round trips per *day* for cement trucks, MDW construction/reclamation: additional 5 round trips per *year* for drill rigs and transport of large equipment on trailers)	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** 4.8 miles of upgraded roads and 14.1 miles of new road, short term and periodic access restrictions on NFSR 711 due to the movement of over-size/over-length vehicles (Shaft construction: additional 7 round trips per *day* for cement trucks, MDW construction/reclamation: additional 5 round trips per *year* for drill rigs and transport of large equipment on trailers)
Impacts on Visual Quality Objectives	No impact	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Effects are consistent with partial retention VQO	Same as Alternative 2.

Table 2-2
Comparison of Alternatives

Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No Activity in Roadless
Impacts to Class I Airsheds	No impact	Shaft/Escapeway & E Seam MDWs: No impact	Shaft/Escapeway & E Seam MDWs: No Impact
Gaseous emissions (NO_2, SO_2, and CO)	No effect beyond current levels	Shaft/Escapeway & E Seam MDWs: 36,000 pounds per year	**Shaft/Escapeway & E Seam MDWs:** Same as Alternative 2, for a slightly shorter duration
Greenhouse gas (methane) emissions	No additional emissions	**Shaft/Escapeway & E Seam MDWs:** Less than 0.1% concentrations 50 meters from the source, would increase potential greenhouse gas emissions in Colorado from fossil fuel combustion by approximately 1.3 percent	**Shaft/Escapeway & E Seam MDWs:** Less than 0.1% concentrations 50 meters from the source, would increase potential greenhouse gas emissions in Colorado from fossil fuel combustion by approximately 1.1 percent
Fugitive dust	No impact	**Shaft/Escapeway & E Seam MDWs:** 32,000 pounds per year or less	**Shaft/Escapeway & E Seam MDWs:** Same as Alternative 2, for a slightly shorter duration
Impacts to surface water flows and surface water quality, and riparian habitat	No effect	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal effect on surface water quality, 6 new intermittent stream crossings and one new perennial stream crossing, ~75 acres of new and upgraded road disturbance in water influence zone with a maximum of 5.6 acres of riparian vegetation disturbance	**Shaft/Escapeway:** Same as No Action as disturbance already exists **E Seam MDWs:** Minimal effect on surface water quality, 6 new intermittent stream crossings and one new perennial stream crossing, ~66 acres of new and upgraded road disturbance in water influence zone with a maximum of 4.8 acres of riparian vegetation disturbance
Impacts to ground water levels and ground water quality	No effect	**Shaft/Escapeway & E Seam MDWs:** No effects on ground water quality or quantity	Same as Alternative 2.

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter describes the existing condition of the physical, biological, and social resources in 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 2-1**, 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 over 10,000 acres of Federal coal leases. Subsidence on the GMUG and BLM lands has occurred in and immediately adjacent to the project area. 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 based on existing lease reserves.

MCC may submit a proposal to replace one mobile exhauster on an existing "jet hole" with approximately 1,700 feet of temporary surface pipeline (600 feet on NFS) to be able to vent from an exhauster building on MCC land. The temporary surface line is not anticipated to add any additional surface disturbance or impact air quality as methane is still being vented only from a short distance away. This lack of additional impacts is therefore not addressed in any cumulative effects analysis area for any resource.

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.

Current disturbance associated with MCC operations in the project area includes two

MDW pads (approximately 2 acres), 1.6 miles of access road, 3.5 miles of life of mine road, and less than 1 mile of temporary road (**Figure 1)**. MCC has reclaimed five MDW (approximately 4 acres) and 0.7 miles of road.

MCC maintains 11 surface water monitoring stations in the Minnesota Creek Drainage Basin (HydroGeo 2006). Routine monitoring occurs three times a year corresponding with rising limb (April 3 to May 13), peak flow (April 21 to June 26), and low flow (July 10 to October 8). Twenty-eight springs and seeps are also monitored under the program. MCC also monitors a network of 28 ground water monitoring wells throughout the West Elk Mine permit and lease areas. The casings on five wells: So. W-1, SOM -45-H1, SOM 2H, SOM -16H, and 96-27-1 collapsed in 2005 and were not monitored. In addition, four old wells were reinitiated into the well network in 2005 (HydroGeo 2006).

Subsidence monitoring has occurred since 1998 in support of previous West Elk Mine lease applications.

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 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

NFSR 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 the 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 at 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 the County of Gunnison (approximately a 40-mile

radius around the City of Gunnison-general area of nearest Class II sensitive viewshed). 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. It is estimated that 6 to 8 MDWs would be in operation at any given time and life of an MDW varies from one to 3 years depending on placement in the panel.

Baseline information for air resources in the study area was derived from the 2002 Coal Methane Drainage Project Panels 16-24 Mountain Coal Company, West Elk Mine Environmental Assessment (USDA FS 2002a), 2006 Supplement to Coal Methane Drainage Project Panels 16-24 Environmental Assessment for Sylvester Gulch Road Construction, Long Draw Saddle Extension Road Upgrade (USDA FS 2006a), and the 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.

Approximately 7.4% of US emissions of methane come from coal mining and approximately 75% (or 5.6% of US methane emissions) of that comes from underground coal mining activities.

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 (O_3), 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 particulate 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 of air quality necessary to protect public welfare from known or anticipated adverse effects of a regulated air pollutant.

The attainment status for pollutants in the project area is determined by monitoring levels of criteria pollutants (CO, Pb, SO_2, PM_{10}, O_3, and 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 in 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 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

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

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 2006a).

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. Because methane drainage is occurring in the project area due to previously approved projects, Coal Methane Drainage Project Decision Memos from 2001; Panel 15 Methane Drainage Wells, 2001; Panels 16 to 24, 2002; Sylvester Road Temporary Road Construction and Box Canyon Methane Drainage Wells, 2003, E-Seam Development Methane Drainage Wells, 2005; Box Canyon Methane Drainage Wells, 2005.

An average of 15 million cubic meters per year (5.5 billion cubic feet per year) or 2,211,900 tonnes CO_2 equivalent/year has been released from previous activities in the B seam at the West Elk Mine for the last 5 years. These emissions would continue under Alternative 1 for approximately one year. More information about greenhouse gases emitted is included in the effects of Alternative 2 discussion.

Alternative 2

Particulate Emissions

Potential sources of particulate such as smoke, soot, dust, and vehicle and industrial emissions (PM_{10}, $PM_{2.5}$ pollutants) 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. The Supplement to the Coal Methane Drainage Project Panels 16 to 24 Environmental Assessment (USDA FS 2006a) estimated vehicles would operate over 3,000 hours/year and generate an estimated 32,000 pounds per year of fugitive dust, which 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 (**Table 2-1**).

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 2006a) or approximately 99 pounds per day. These emissions would be from engines and would decrease in quantity when construction is complete.

Information on other potential gaseous emission including ethane, propane, pentane, hexane, alkenes, aldehydes, and benzene and benzene derivatives is not available for the West Elk Mine and therefore can not be assessed. However, when the information becomes available, effects would be analyzed under an air permit modification if the levels generated make a modification necessary.

Design criteria to reduce gaseous emissions (e.g. worker carpooling) would help decrease gaseous emissions during construction (**Table 2-1**). 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 of NO_2, SO_2, and CO although at about half the pounds per year as construction activities (~18,000 pounds per year).

Greenhouse Gases

Gaseous emissions in the form of methane from methane drainage wells and other ventilation

activities would occur during the project from all systems including: vertical (MDWs), horizontal, and main mine fans. Methane is over 20 times more effective in trapping heat in the atmosphere than CO_2 over a 100-year period. 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 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.

Quarterly reporting of methane emissions to BLM is considered confidential information and cannot be released by the Forest Service. However, the values used to estimate methane emissions included in the analysis were based on values associated with a 5 year average. As mining in the B Seam is completed, E seam coal will replace those values with the lower levels indicated below.

To assess the contribution to greenhouse gasses the following assumptions were used:

- Based on a Gas-In-Place Study that MCC had completed in 2006 by Slumberger, the E Seam methane is anticipated to be 50 to 60 percent of that in the B seam.
- Using official data provided to BLM by MCC for the B seam releases of methane, all systems vertical (MDWs), horizontal, and main mine fans released an average of 13 to 17 million cubic feet per day of methane.
- Horizontal systems are no longer used and are not expected to be used in the future. This reduces the releases by 2 million cubic feet per day associated with horizontal drainage, leaving an average of 11 to 15 million cubic feet per day to represent current conditions of the B seam. For the following calculations, the middle (13 million cubic feet per day) will be used.

Using the above assumptions, the following conclusions can be made:

As stated earlier, E seam methane is estimated to be 50 to 60 percent of the B seam average (13 million cubic feet per day), which amounts to 6.5 to 7.8 million cubic feet per day, or 2.4 to 2.8 billion cubic feet per year.

In order to calculate the contribution of the project to overall greenhouse gas emissions, this predicted methane release was converted to "CO_2 equivalent". This conversion results in approximately 960,960 to 1,131,200 metric tons (tonnes) of CO_2 equivalent released to the atmosphere per year by the proposed action.

Based on potential CO_2 equivalent emissions calculated above, the proposed action would increase potential greenhouse gas emissions in Colorado from fossil fuel combustion by approximately 1.3 percent (calculated as CO_2 equivalent). It should be noted that this percentage increase considers only emissions from fossil fuel combustion and the percentage would decrease if other sources of greenhouse gases (e.g., landfill gas, oil and natural gas operations, wastewater treatment, and ruminant livestock, etc.) were included in the calculation. Additionally, this calculation considers only emissions from fossil fuel combustion in Colorado, and not the US (as coal mine methane in the US accounts for approximately 5.5 percent of methane released) or worldwide emissions of all greenhouse gases (including water vapor which is the largest contributor to the "greenhouse effect" and comprises approximately 95 percent of all greenhouse gases) that theoretically affect global warming.

It is not possible to estimate or calculate the effect that methane emissions from this project would have on global warming. The CEQ regulations for implementing NEPA at 40 CFR 1502.22 discuss evaluating reasonably

foreseeable significant adverse effects when there is incomplete or unavailable information.

Based on the analysis above, the limited contribution of CO2 equivalent (1.3 percent of the emission in Colorado from fossil fuel combustion annually for 12 years (not considering the likely increase in statewide emissions over that period) would not be considered a significant effect on the human environment. However, the four factors that must be disclosed are discussed below.

1) Information to evaluate the impacts of this project on global warming is incomplete or unavailable. There are no models that can calculate the amount of global warming (if any) that would occur due to this alternative, nor is there scientific research that can be used to estimate the effects.
2) It is unlikely that the incomplete and unavailable information is relevant to evaluating reasonably foreseeable significant adverse impacts because the impacts would likely not be significant as stated above.
3) There is no credible scientific evidence with which to evaluate the potential impacts related to methane drainage associated with this project.

To quote this section (40 CFR 1502.22(b) (4) "For the purposes of this section, 'reasonably foreseeable' includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason."

Direct mitigation of the release of methane through either flaring or capturing methane and putting to beneficial use would be very effective in reducing greenhouse gas emissions. Flaring is not a method approved by MSHA. Methane is a federal mineral subject to gas lease terms and is not possible to put to beneficial use at the time this document is being prepared as the gas is not under lease. See *Alternatives Considered But Eliminated From Detailed Study* in Chapter 2 for further discussion of these concepts.

Offset mitigation of the release of methane is not reasonable. For example, to offset the CO_2 equivalent by carbon sequestering through tree planting would require planting 1.7 million trees over 6,000 acres of previously unforested land. Or perhaps replacing 545,000 100-watt light bulbs with 15-watt compact florescent bulbs, or replacing 165,000 gas-powered sport utility vehicle drivers with a hybrid vehicle. In 2002, there were 634,600 registered sport utility vehicles in Colorado, one for every 5 licensed drivers (US Census Bureau 2002)..

Class 1 Airshed

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.

Alternative 3

Gas quantity released may be slightly less (an estimate of perhaps 15% less than Proposed Action based on tons of coal that may not be mined) due to the shortened panels and fewer MDWs or relatively equal if venting is occurring in some other manner such as re-establishing a horizontal system and continued use of main mine fan if technological advances (which may not result in any additional FS concurrence or NEPA) to sufficiently to permit optimal venting without vertical vent holes (MDWs) in those areas. However, the effects would be the same as Alternative 2 with regard to not exceeding any current air quality standards and would increase potential greenhouse gas emissions in Colorado from fossil fuel combustion by approximately 1.1 percent (calculated as CO_2 equivalent).

Cumulative Effects

Alternative 1

An average of 15 million cubic meters per year (5.5 billion cubic feet per year) or 2,211,900 tonnes CO_2 equivalent/year has been released from previous activities in the B seam at the West Elk Mine for the last 5 years. Unknown quantities of methane have been vented from both of the other North Fork coal mines.

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.

Alternative 2 would contribute additional greenhouse gases, along with those produced from the other North Fork coal mines, and emission from every other man-made and natural source of greenhouse gas.

Alternative 3

Cumulative effects would be the same as Alternative 2 to a slightly lesser extent.

Consistency with Forest Plan and Other Laws

Alternative 2 and Alternative 3 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 6**).

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 5.6 miles of perennial and 9.0 miles of intermittent streams in the study area (USDA FS 2006d). With the 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).

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.

The Project File contains surface water quality data collected by MCC and others in the greater mine area from various tributaries of the North Fork. Water quality from the tributaries is generally consistent with North Fork water quality. 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,), there are approximately 6 perennial, one decreed, and 53 intermittent or historical springs in the project area (MCC 2007b).

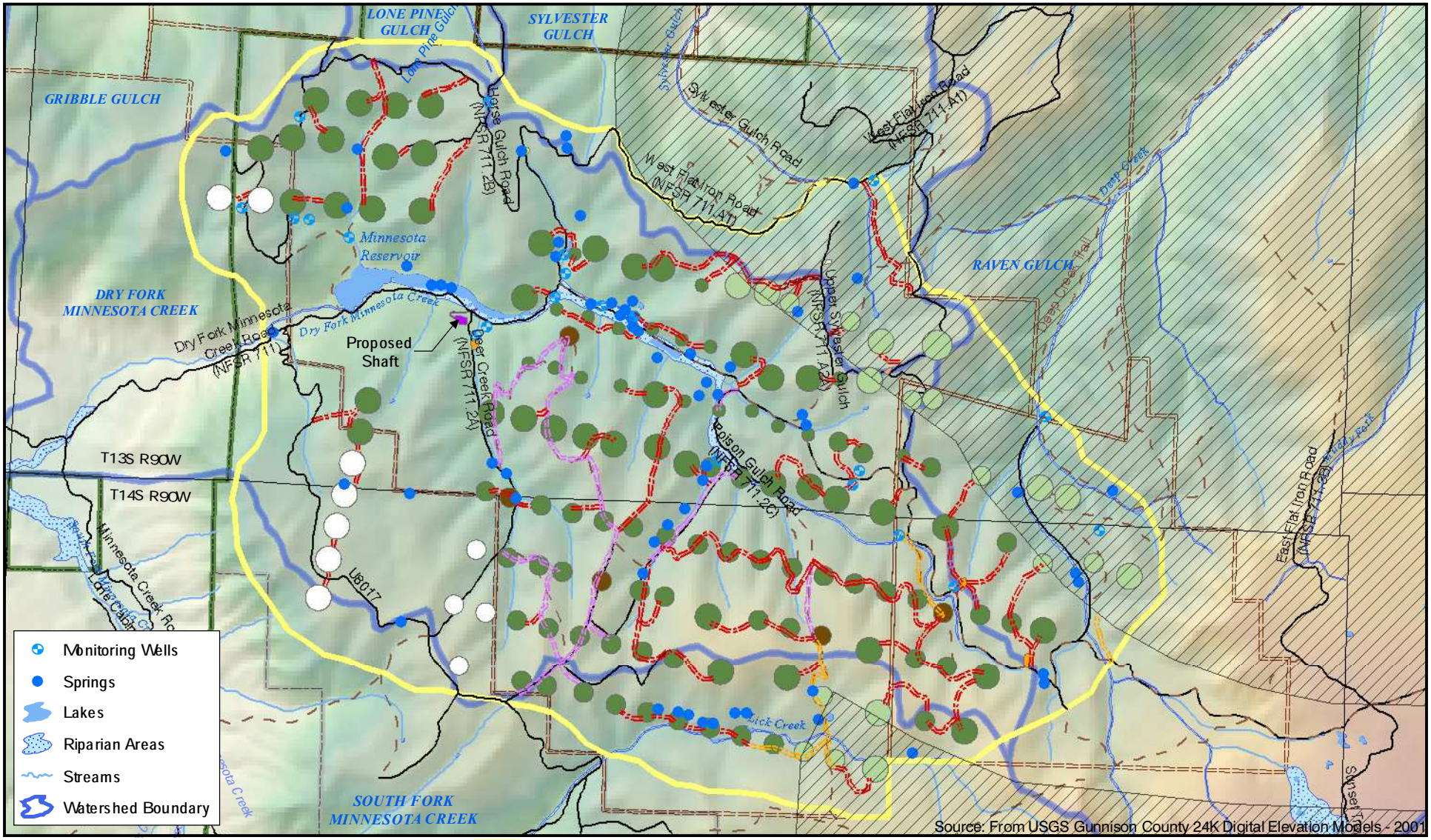
Bedrock springs in the project area originate in the Barren Member of the Mesa Verde Formation (USDA FS 2002a). Approximately 2/3 of the surveyed springs originate as bedrock springs based on their position relative to the bottom of the ephemeral and intermittent stream drainages. These springs exhibit seasonal fluctuation in flow, though not as 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 6**). The following monitoring wells have been affected by long wall mining subsidence resulting in collapsed 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). In 2005, four old wells (23H-1, 23H-2, 23H-3, and 23H-4) were reinitiated into the well network. Monitoring wells in 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



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N

Existing Trails
Existing Roads
Inventoried Roadless Area
Forest Boundary
Private Land Boundary
Coal Lease Boundary

Project Area Boundary
Proposed New Construction
Proposed Upgrade ATV
Proposed Upgrade Full-size
Proposed Shaft Location

Proposed Drill Pads
Proposed Drill Pads & Staging Areas
Proposed Staging Areas
Proposed Private Drill Pads
Existing Staging Area

IRA Existing Staging Areas
IRA Staging Areas
IRA Drill Pads

Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Project Area Surface Water and Wetland Features
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 6

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 F S 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 on 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 would continue to occur and/or guide management of the project area. Since additional mining-related surface disturbances would not occur, or would be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, etc., Alternative 1 would have no or negligible effects on surface water resources.

Ground Water

Under Alternative 1, current management plans and non-coal related activities would continue to occur and/or guide management of the project area. Since mining-related subsurface disturbances would not occur, or be limited to surface resource monitoring activities such as monitoring wells, surface water monitoring stations, etc., Alternative 1 would 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 would likely have minimal direct effects on surface water quality. If raisedbore or blindbore shaft construction is used, any overshot waste rock generated would be handled subsurface and would have minimal direct effect on soil erosion and sedimentation. If conventional sink/line construction is used, surplus waste rock would be temporarily stored on the drill pad and eventually hauled out of the project area. This second type of shaft construction could directly affect surface water by erosion and sedimentation; however the shaft would be nearly 300 feet from the nearest surface water, and surface disturbances would 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 31 drill pads would 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 6.5 acres of new or upgraded road would occur within these buffer zones including 6 intermittent creek crossings and one perennial stream crossing.

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

The design criteria including soil salvage and soil staging (**Table 2-1**), interim reclamation, drainage control measures for drill pads and road construction, road maintenance, engineered crossings, erosion control measures on steep slopes, etc. would generally be effective in preventing or limiting soil erosion, and sedimentation. Despite these practices, erosion, soil loss, and sediment transport from newly disturbed areas would still directly affect nearby drainages. The degree of impact caused by sediment runoff upon surface water quality (turbidity and suspended solids), would be largely dependant upon its proximity of the disturbed areas to streams and the magnitude of runoff. Approximately 75 percent of the project construction disturbances would be outside any WIZ or similar surface water body, and these disturbed areas not located proximal to surface drainages would likely have minimal impact on surface water and riparian resources.

The potential for indirect surface water impacts due to the drilling, well completion, and maintenance of the MDWs is minor. The potential for small accidental fluid spills exists from drill rigs and support vehicles. However, proper transportation and handling practices and the use of staging areas would help to minimize the potential for accidents. Since most equipment operations would occur in the drill pad areas, any minor spills would be contained by drainage control berms in these areas. All drilling fluid and circulation additives that would be used are either naturally occurring inorganic or organic materials or biodegradable compounds. Loss or spillage of these materials would not adversely impact water quality.

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 would 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 foreseeable long-term degradation. If substantial quantities of ground water were encountered in any borehole, high-density additives would be introduced with the circulation media to contain the water flows, and casing would 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 would not be expected. Boreholes would be stabilized using the same methods as drill holes during drilling, where necessary. These materials and other borehole stabilizing additives would 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 would be biodegradable materials, any changes in ground water quality from drilling operations would be temporary.

Based on spring and seep survey locations, several intermittent springs could be affected by drilling activities. Approximately 5 intermittent springs lie within or immediately adjacent to the proposed drill pad radii and are the most likely candidates for experiencing temporary effects. Possible indirect effects include temporarily modification of the shallow water table resulting in a decreased 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 would cease.

Drilling related activities could affect near-surface ground water quality, however design criteria, including the use of biodegradable compounds or 100 percent natural drill additives along with casing-off water bearing zones during construction would minimize this occurrence (**Table 2-1**).

Alternative 3

Surface Water

The effects of Alternative 3 would be the same as Alternative 2, except a total of 27 drill pads will be located in or adjacent to WIZ buffer zones. To access these drill pads, approximately 5.8 acres of new or upgraded road would occur within these buffer zones including 6 intermittent creek crossings and one perennial stream crossing. These locations are displayed on **Figure 5**.

Indirect effects on surface water identified in Alternative 2 would occur under Alternative 3.

Ground Water

Direct and indirect effects on ground water from Alternative 3 would be the same as Alternative 2.

Cumulative Effects

Because indirect and direct effects on 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 environmental analysis and permitting, thereby limiting any unforeseen future cumulative effects.

Consistency with Forest Plan and Other Laws

In Alternative 2 and Alternative 3, design criteria state "drilling water (less than 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 Alternative 2 and Alternative 3 after applying the unsuitability criteria stipulated in the amended LRMP dated September 1991 for the GMUG National Forests:

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

The stipulations for water resources in Alternative 2 and Alternative 3 are also consistent with the FS Region 2 Water Conservation Practices Handbook and Ground Water Management FSM: 2880.

Geology

Affected Environment

The analysis area includes the Deer Creek Shaft and MDWs, and lies within the Dry Fork of Minnesota Creek and portions of the Deep Creek watershed. 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). Lion Mesa is the predominant topographic feature in the area at just over 8,100 feet. Lion Mesa is located in the southwest corner of the project area and is drained by Deer Creek to the north. Topography consists of small mesas (less than 100 acres) dissected by drainage channels 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.

The Deer Creek Shaft and MDW area lies in the project areaonia-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.

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 7**). 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 8**.

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.

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 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.

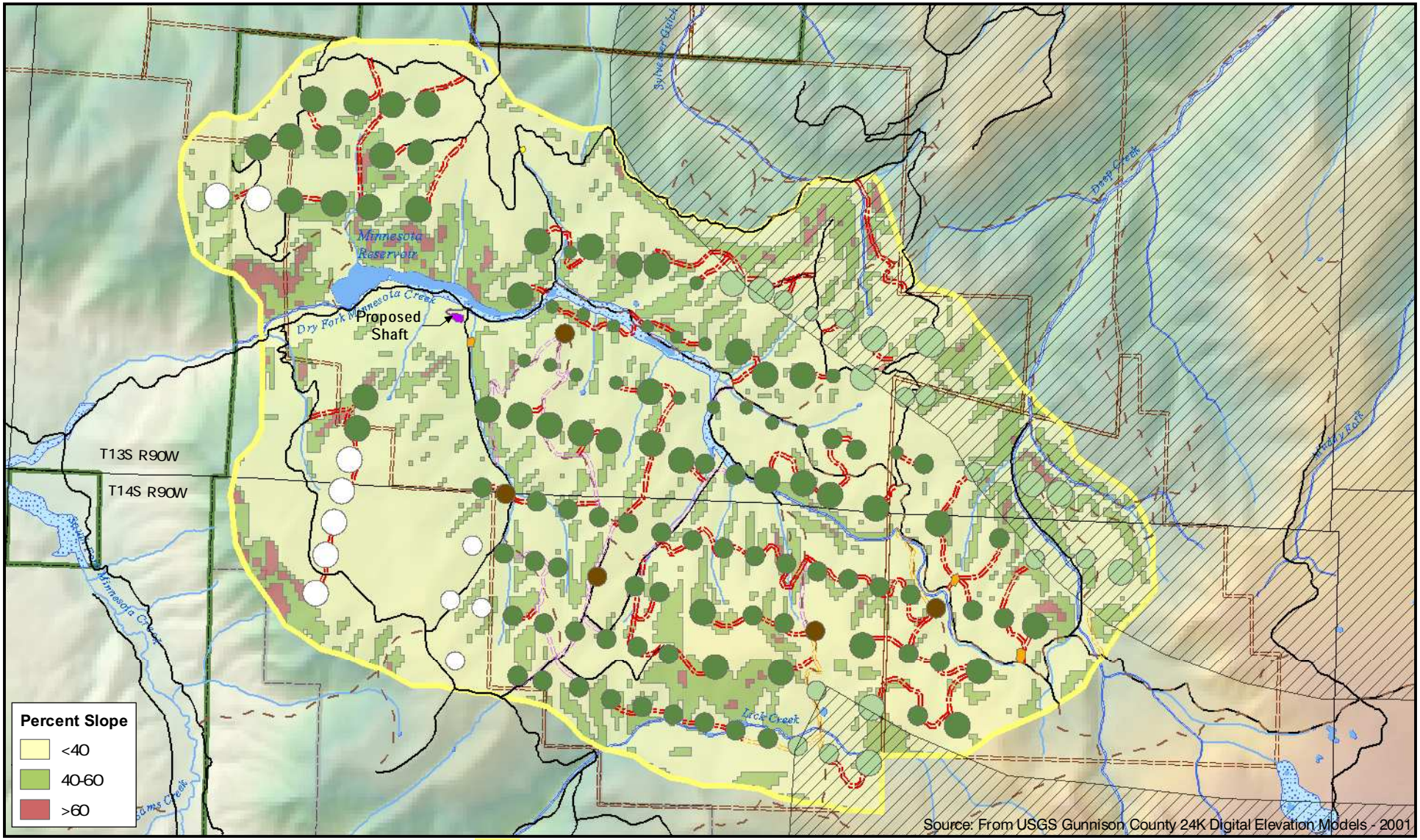
Alternative 2

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 would result in no permanent change to the topography.

Disturbance from constructing drill pads and staging areas for MDWs would be approximately 120 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 result in 90 acres of disturbed area.

The methane drainage wells have been located with enough latitude to allow their location on topographically favorable sites in order to minimize disturbance (**Table 2-1**). Analysis methods used for geology overestimates the amount of disturbance because it incorporates broad road corridors and drill pad windows. This method captures anticipated disturbance which could occur in all geologic conditions within the identified 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 geologic condition and is not representative of the actual acres that would be disturbed by the proposed action. This method allows flexibility to identify and avoid unstable geologic areas in the field to avoid potential landsides and unstable conditions.

A review of slopes calculated from the state digital elevation model (**Figure 7**) 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.



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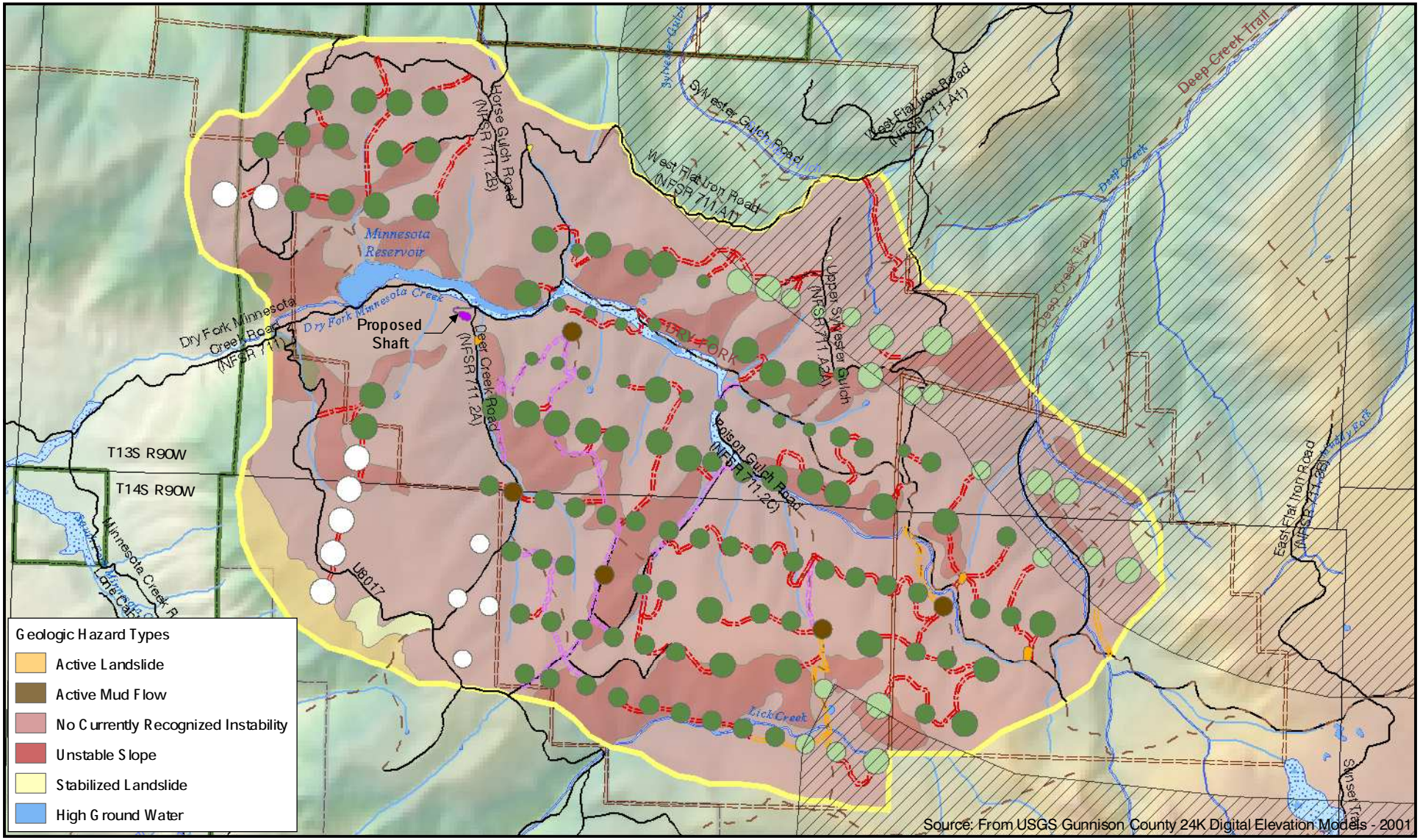
- Existing Trails
- Existing Roads
- Forest Boundary
- Private Land Boundary
- Inventoried Roadless Area
- Coal Lease Boundary
- Project Area Boundary
- Proposed New Construction
- Proposed Upgrade ATV
- Proposed Upgrade Full-size
- Proposed Shaft Location
- Proposed Drill Pads
- Proposed Drill Pads & Staging Areas
- Proposed Staging Areas
- Proposed Private Drill Pads
- Existing Staging Area
- IRA Existing Staging Areas
- IRA Staging Areas
- IRA Drill Pads
- Streams
- Lakes
- Riparian Areas

Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Slope
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 7



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Existing Trails
Existing Roads
Forest Boundary
Private Land Boundary
Inventoried Roadless Area
Coal Lease Boundary

Project Area Boundary
Proposed New Construction
Proposed Upgrade ATV
Proposed Upgrade Full-size
Proposed Shaft Location

Proposed Drill Pads
Proposed Drill Pads & Staging Areas
Proposed Staging Areas
Proposed Private Drill Pads
Existing Staging Area

IRA Existing Staging Areas
IRA Staging Areas
IRA Drill Pads
Streams
Lakes
Riparian Areas

Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Geologic Hazards
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 8

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

Leases contain stipulations restricting occupancy in areas of geologic hazards and steep slope which are included in the design criteria (**Table 2-1)**.

Alternative 3

Effects from installation of the Deer Creek shaft would be the same as under Alternative 2.

Disturbance from installation of MDWs would be the same as described for Alternative 2, although approximately 103 acres. Access roads for the methane drainage wells would cause a total disturbed area of 82 acres.

Effects on topography would be the same as described for Alternative 2.

Cumulative Effects

Alternative 1 – No Action

The cumulative effects analysis area for geologic resources is the project area. Under the No Action alternative, 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. Mining of coal reserves approved in the 2002 Coal Methane Drainage Project Panels 16-24 Mountain Coal Company, West Elk Mine Environmental Assessment (USDA FS 2002a) would continue until 2008 (USDA FS 2006a). Subsidence is likely to occur from mining in the north end of the project area.

Current disturbance associated with MCC operations in the project area includes 2 MDW pads (approximately 2 acres), 1.6 miles of access road, 3.5 miles of life of mine road, and less than one mile of temporary road (**Figure 1)**. MCC has reclaimed five MDW (approximately 4 acres) and seven tenths of a mile of road. Concurrent reclamation will continue through the life of the mine as Panel 16 to 24 Coal Methane Drainage Project (USDA FS 2006a) concludes.

Although no active landslides are mapped in 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).

Alternative 3

Cumulative effects from Alternative 3 would be the same as described for Alternative 2.

Consistency with Forest Plan and Other Laws

Alternative 2 and Alternative 3 are 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 CDRMS with

oversight from the OSM, which govern all direct effects of coal mining, including those that may impact geology. 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 geologic 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

The analysis area for soil resources is the project area. Soils in the project area developed from a combination of residual, colluvial, and alluvial materials derived from local bedrock (**Figure 9**). 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 9**.

Table 3-2
Summary of Soil Resources

Soil Map Unit Name / Number	Dominant Soil Series	% of Map Unit	Depth Class	Hazard			Soil Map Unit Name / Number
				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.
	Falcon, dry and similar soils	40	S	L	L	L	Root limiting layer in Falcon dry soils.
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

Table 3-2
Summary of Soil Resources

Soil Map Unit Name / Number	Dominant Soil Series	% of Map Unit	Depth Class	Hazard			Soil Map Unit Name / Number
				Water Erosion	Shrink Swell	Mass Movement	
							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	
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 soil and similar soils	35	VD	L - H	L	L	

Table 3-2
Summary of Soil Resources

Soil Map Unit Name / Number	Dominant Soil Series	% of Map Unit	Depth Class	Hazard			Soil Map Unit Name / Number
				Water Erosion	Shrink Swell	Mass Movement	
							Papaspila soils.
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.

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 potential hazard, with Wetopa and Wesdy soil types slopes have slower infiltration rates, resulting having the highest potential hazard rating in the project area. Fine textures and high activity clays result in moderate to high shrink-swell hazard ratings for most soil types.

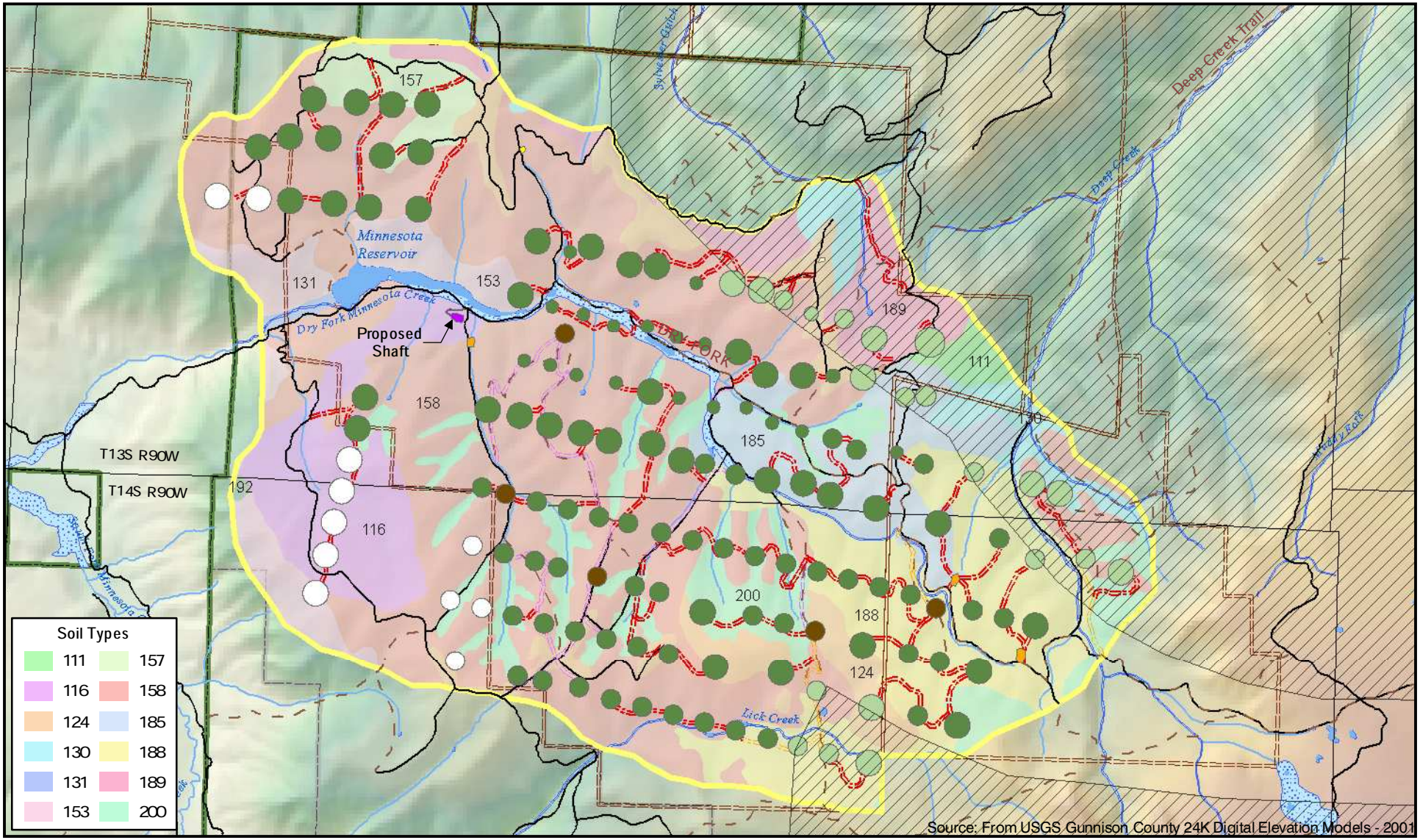
Analysis methods used for soils overestimates the amount of disturbance in each soil type because it incorporates broad road corridors and drill pad windows. This method captures anticipated disturbance which could occur in all possible soil types identified by road corridors and MDW buffers. The actual 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 an over-estimate that would likely be reduced when road and drill pad locations were identified on the ground.

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



0 Feet 3,300

N

Existing Trails
Existing Roads
Forest Boundary
Private Land Boundary
Inventoried Roadless Area
Coal Lease Boundary

Project Area Boundary
Proposed New Construction
Proposed Upgrade ATV
Proposed Upgrade Full-size
Proposed Shaft Location

Proposed Drill Pads
Proposed Drill Pads & Staging Areas
Proposed Staging Areas
Proposed Private Drill Pads
Existing Staging Area

IRA Existing Staging Areas
IRA Staging Areas
IRA Drill Pads
Riparian Areas
Lakes
Streams

Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Soils
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 9

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

	Alternative 2				Alternative 3			
Soil Map Unit Number	Road Construction[1]	MDW Drilling	Ventilation Shaft Construction[1]	Staging Areas[2]	Road Construction	MDW Drilling	Ventilation Shaft Construction[1]	Staging Areas[2]
111	0	0.8	0	0	0	0	0	0
116	2.5	4.8	4	.63	2.51	4.8	4	0.63
124	5.4	18.4	0	0.38	4.03	12.8	0	0
130	0.51	1.6	0	0	0	0	0	0
131	0.08	0	0	0	0.08	0	0	0
153	0.06	3.2	0	0	0.06	3.2	0	0
157	2.6	4.8	0	0	2.56	4.8	0	0
158	44.2	78.4	0	0.47	43.21	70.4	0	0.47
185	5.9	15.2	0	0.99	5.82	12.8	0	0.99
188	18.1	24	0	1.4	16.73	17.6	0	1.4
189	2.7	3.2	0	0.25	07	0	0	0
200	8.3	27.2	0	0	8.31	25.6	0	0

Notes
Acres can not be totaled because they are double counted. Numbers reflect the maximum for each soil map unit, depending on the final location of the roads and well pads.
[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 based on leases.

Alternative 2

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. **Figure 7** identifies limited areas were road corridors and MDW pad windows intersect areas with slopes greater than 60 percent. Lease stipulations and design criteria (**Table 2-1**) specifically state no surface occupancy will occur in areas with slopes greater than or equal to 60 percent and areas with moderate geologic hazard (i.e., unstable slopes) would require site analysis and mitigation plans. Furthermore, sediment control measures including interim revegetation would decrease the soil erosion potential on disturbed areas. Due to the aforementioned stipulations and criteria, and the latitude of facility placement within the identified road corridors and MDW pad windows, placement of facilities would not be expected in areas with slopes greater than 60 percent or in areas of high geologic hazard, despite the potential for small scale, short term slope instability and limited soil erosion.

Subsidence could aggravate existing landslides and stimulate 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 could also trigger additional slope movement. Landslides are a form of erosion, if project related activities resulted in

landslides, then the erosion process would 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 2-1**).

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 would be evidence of these disturbances for more than 50 years on steep slopes, especially on steeper slopes and south and southwest aspects, where deep cuts such as roads and shallow soils exist. (USFS personal communication with Terry Hughes, 2007).

Alternative 3

Effects of Alternative 3 would be the same as Alternative 2, except installation of methane drainage wells and associated pads and access roads would physically disturb up to 42 fewer acres over 12 years.

Cumulative Effects

The cumulative effects analysis area for soils is the project area. Cumulative effects 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.

Current disturbance associated with MCC operations in the project area includes two MDW pads (approximately 2 acre), 1.6 miles of access road, 3.5 miles of life of mine road, and less than one mile of temporary road (**Figure 1)**. MCC has reclaimed five MDW (approximately 4 acres) and seven tenths of a mile of road. Concurrent reclamation will continue through the life of the mine as Panel 16 to 24 Coal Methane Drainage Project (USDA FS 2006a) concludes. Continued mine operation in the project area increase the potential for subsidence and soil erosion.

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). Alternative 2 and Alternative 3 are 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.

Alternative 2 and Alternative 3 also comply with 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 CDRMS 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 analysis area for vegetation resources is the project area. Dominant vegetation types in the 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 1,754 acres (**Table 3-4**) (**Figure** 10). 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 of each cover type found in the potential well pad window, ventilation shaft location, and staging area sites are presented in **Table 3-4.** MDW pad windows over estimate the disturbance associated with pad construction and provide a way to analyze all possible vegetation types potentially impacted by MDW construction.

Table 3-4
Acres of Vegetation Cover Types In The Project Area

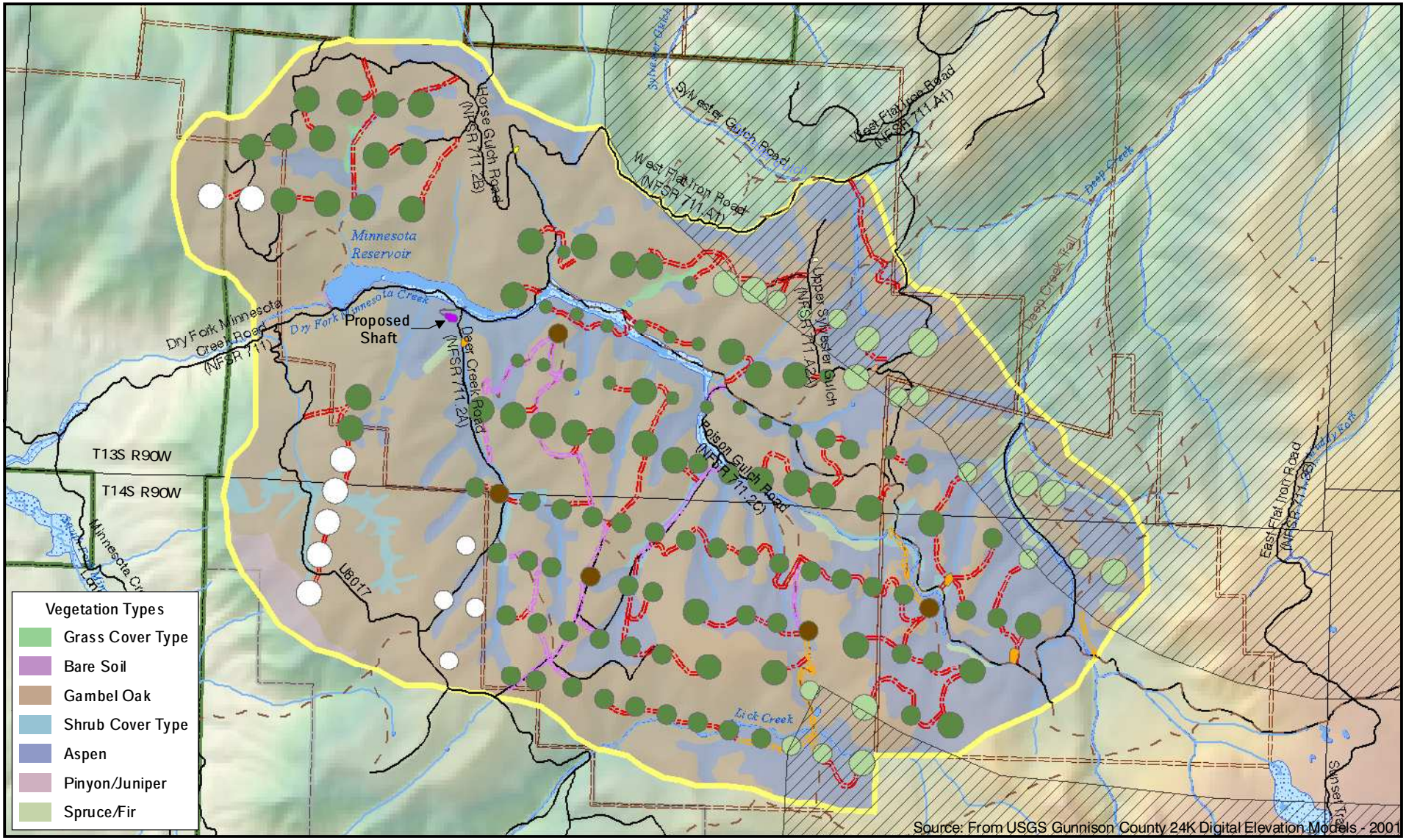
Cover Type	Project Area Acres
Barren	2
Herbaceous	15
Gambel oak	3,903
Shrub	115
Willow	55
Quaking aspen	1,754
Pinyon and juniper	64
Spruce and subalpine fir	74
Water	18

Source: GIS derived acres based on CVU vegetation layer.

Riparian Vegetation

Forest Service Manuals on Watershed Protection 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 (Cowardin and others 1979). Approximately seven 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 Poison Gulch; combined, the lakes account for 1 acre of possible wetland habitat. These lakes are fed by snowmelt and monsoon rainfall. Wetland



Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Vegetation Types
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 10

vegetation is limited in extent due to the short duration of soil saturation. Historic range management practices may have enhanced these features (USFS personal communication with Doug Marah, 2007

The water influence zone (WIZ) is 100 feet on either side of a stream. This vegetation buffer zone filters runoff and erosion, provides valuable fish and wildlife habitat, and is critical for maintaining stream function and water quality by filtering out pollutants, stabilizing streambanks, dissipating energy during high flow events, and moderating water temperature.

Development of access roads is currently restricted by a no surface occupancy lease stipulation (USDA FS 2006a). The Forest Service would need to grant relief from this lease stipulation before disturbance could occur in riparian, wetland, or floodplain areas. The Dry Fork of Minnesota Creek bisects the center of the project area (Figure 10), 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 (Wang 2004).

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 Plants

The Uinta Basin hookless cactus (*Sclerocactus glaucus*) is the only federally listed, threatened plant occurring near the GMUG, but it has not been documented in the project area or on the Forests (USDA FS 2006b). 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 (USFWS 2006). Occurrences have been documented in Delta County on alluvial terraces along the Gunnison River (USFWS 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 6 miles to the west of the project area. All known populations on or near the Paonia Ranger District have been found below 7,700 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 BLM 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 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).

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]**
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. Elev. 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.
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.

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]**
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 2006b). 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 Ranger District and MCC. 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

Analysis methods used for vegetation overestimates the amount of disturbance in each vegetation type because it incorporates broad road corridors and drill pad windows. This method captures anticipated disturbance which could occur in all possible vegetation 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 vegetation type and is not representative of the actual acres that would be disturbed.

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 vegetation removed 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.

Disturbance associated with the Deer Creek Shaft would occur throughout the life of the project (13 to 15 years) (**Table 3-6**). 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

Up to 58 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 would 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 would be delayed, but these species would eventually recolonize the site.

In the project area, nearly 98 percent of Gambel oak stands are mature. Mature oak stands often

Table 3-6
Maximum Acres of Cover Type Disturbance Under the Action Alternatives

Cover Types	Forest Service Road Disturbance		Well Pad Disturbance[1]		Deer Creek Shaft Disturbance		Staging Area Disturbance[2]	
	Alt. 2	Alt. 3	Alt. 2	Alt. 3	Alt. 2	Alt. 3	Alt. 2	Alt. 3
Herbaceous	1	1	1	1	0	0	0	0
Shrub	4	4	6	6	0	0	<1	<1
Gambel oak	51	47	133	117	0	0	1	<1
Willow	<1	<1	3	3	<1	<1	0	0
Quaking aspen	31	26	75	60	4	4	3	2
Pinyon-juniper	0	0	1	1	0	0	0	0
Spruce-subalpine fir	<1	<1	2	1	0	0	0	0
Total	87	78	221	189	4	4	4	3

Notes

Acres can not be totaled because they are double counted. Numbers reflect the maximum for each vegetation cover type, depending on the final location of the roads and well pads.

[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.

shade out understory species, thus limiting species and structural diversity. In some cases removal of mature Gambel oak would increase stand diversity, and is consistent with the 1991 GMUG Forest Plan which sets standards for forest diversity. Removal of mature Gambel oak also stimulates additional forage plant growth for wildlife and livestock, enhancing wildlife habitat, 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 on public and private lands (**Table 3-6**). These disturbances would be on a small scale and are a small portion of the cover types in the project area.

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

Table 3-7
Approved Mountain Shrub Habitat Seed Mix

Common Name[1]	Scientific Name
Mountain bromegrass	*Bromus marginatus*
Prairie junegrass	*Koeleria macrantha*
Western wheatgrass	*Pascopyrum smithii*
Indian ricegrass	*Achnatherum hymenoides*
Sandberg bluegrass	*Poa secunda*
Bluebunch wheatgrass	*Pseudoroegneria spicata*
Aspen fleabane	*Erigeron speciosus*
Lanceleaf tickseed	*Coreopsis lanceolata*
Slender goldenbanner	*Thermopsis montana*

[1] Names are based on the USDA Plants database.

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/acre 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.

The proposed reclamation methods adhere to Forest Plan directives which require 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 approved grass/forb seed mix (**Table 3-7**) would establish quickly in prepared soils, providing adequate cover to limit soil erosion within a few years after seeding.

Additionally, the mountain brush seed mix provides valuable forage for both wildlife and livestock; providing increased foraging opportunities for up to 10 to 20 years in Gambel oak types (see *Fish and Wildlife* and *Livestock Management* sections). This would increase plant species diversity and community edge and contrast to improve wildlife habitat, in line with Forest Plan goals for vegetation and wildlife management.

These 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 slowing 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 4 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

If the Forest Service grants relief to the no surface occupancy lease stipulation, 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 10 acres of riparian vegetation fall within potential road corridor in the project area (**Table 3-8**). Design criteria state riparian vegetation would be avoided wherever possible; however, the potential exists for some road building effects on riparian vegetation. These areas are primarily associated with stream crossings and roads located along the Dry Fork of Minnesota Creek. Where riparian habitats could not be avoided, road building would result in vegetation loss and disturbance. Soil erosion would be mitigated by use of silt fences or other erosion control devices in the 100-foot WIZ. Disturbed vegetation would recover quickly due to favorable site conditions such as highly productive soils and available water found in riparian habitats. Riparian vegetation loss would be short-term; lasting the life of the project as riparian habitat would recover relatively quickly following road decommissioning and revegetation. Long-term loss of riparian habitat is not expected.

Approximately three acres of willow and alder cover types fall within MDW pad windows. These windows are located along the upper Dry Fork of Minnesota Creek in the proximity of the Poison Gulch confluence, and along Lick Creek in the southern end of the project area.

Table 3-8
Acres of Riparian Cover Types in Road Disturbance Buffers and Potential Methane Drainage Well Locations

Cover Types	Alternatives 2 and 3	
	Riparian within Road Buffer	Riparian within Methane Drainage Well Locations
Marsh	<1	0
Willow and alder	8	3
Aspen	1	0
Herbaceous	<1	0
Total	10	3

Design criteria stipulate MDW would not be located in riparian areas unless specifically authorized. 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.

Less than one acre of wetland vegetation is located within proposed road corridors and MDW windows (**Table 3-8**). Due to the limited and sensitive nature of these habitats the proposed action would avoid any impacts on wetland 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 from drilling and associated surface disturbance by the creation of 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 affected 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 2-1**). Surveys for sensitive plants would 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 3-9** displays the summary determination

Table 3-9 Summary Determination of Impacts on Forest Service Sensitive Plants				
Common Name	**Scientific Name**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Whitebristle cottongrass	*Eriophorum altaicum var. neogaeum*	No Impact	No Impact	No Impact
Slender cottongrass	*Eriophorum gracile*	No Impact	No Impact	No Impact
Lesser panicled sedge	*Carex diandra*	No Impact	No Impact	No Impact
Lesser yellow lady's slipper	*Cypripedium parviflorum*	No Impact	No Impact	No Impact
Simple bog sedge	*Kobresia simpliciuscula*	No Impact	No Impact	No Impact
Wetherill milkvetch	*Astragalus wetherillii*	No Impact	No Impact	No Impact
Arctic braya	*Braya glabella*	No Impact	No Impact	No Impact
Rocky Mountain thistle	*Cirsium perplexans*	No Impact	Beneficial impact	Beneficial impact
Roundleaf sundew	*Drosera rotundifolia*	No Impact	No Impact	No Impact
Stonecrop gilia	*Gilia sedifolia*	No Impact	No Impact	No Impact
Colorado tansyaster	*Machaeranthera coloradoensis*	No Impact	No Impact	No Impact
Kotzebue grass-of-parnassus	*Parnassia kotzebuei*	No Impact	No Impact	No Impact
Tundra buttercup	*Ranunculus karelinii (R. gelidus ssp. grayi)*	No Impact	No Impact	No Impact
Hoary or silver willow	*Salix candida*	No Impact	No Impact	No Impact
Autumn willow	*Salix serissima*	No Impact	No Impact	No Impact
Sun-loving meadowrue	*Thalictrum heliophilum*	No Impact	No Impact	No Impact
Lesser bladderwort	*Utricularia minor*	No Impact	No Impact	No Impact
Park milkvetch	*Astragalus leptaleus*	No Impact	No Impact	No Impact
Arizona willow	*Salix arizonica*	No Impact	No Impact	No Impact

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 noxious weed establishment would increase over current infestation rates with increased travel in the area and ground disturbance affecting 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 weeds do enter an 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.

Alternative 3

Effects of Alternative 3 would be the same as those described for Alternative 2 except new access road construction, existing road upgrades, installation of MDW, and use of staging areas would affect 42 fewer acres using the windows analysis method (**Table 3-6**).

Cumulative Effects

Alternative 1

The cumulative effects study area for vegetation resources is the project area. Historic, present, and future vegetation disturbance in the region is associated with fire, livestock grazing, and mining. Wildland fire will continue to influence vegetation community structure and extent throughout the area. In addition, historic livestock grazing in the area is a major land use and will continue after current mine operations cease.

Subsidence may occur in the northern portion of the project area damaging some vegetation and creating areas of bare ground for noxious weed colonization as a result of current mine activity.

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

Alternatives 2 and 3

Historic disturbance factors in the area including fire and grazing will continue. As the land use is converted from grazing to mining livestock may change their grazing patterns and overuse of some areas could occur, damaging vegetation in these areas (see *Livestock Management* section).

The fire return interval for Gambel oak is from 40 to 75 years depending on associated vegetation and available fuels (Simonin 2000). Clearing small windows of Gambel oak for MDW pads and subsequent revegetation with herbaceous species would provide fuels for wildland fire, however, these small scattered openings would not resulting in increased fire hazard in the area.

As mentioned above, 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 11 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.

Figure 11. Reclaimed Methane Drainage Well

Consistency with Forest Plan and other Regulations

Alternative 2 and Alternative 3 are 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.

Fish and Wildlife

Affected Environment

The project 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 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 in the project area. There have been no old-growth surveys conducted in the project area.

Two perennial streams occur in 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).

In May 2005 the GMUG Forest Supervisor issued an amendment that, in part, revised the list of Management Indictor Species (MIS). This list revision was completed under the authority and guidance provided in 36 CFR 219.19 (1982 Rule). Also as part of this amendment, the GMUG used authority provided in 36 CFR 219.14(f) in the 2005 Planning Rule (2005 Rule) to make monitoring of MIS populations discretionary. However, on March 30, 2007 the Forest Service was enjoined by the 9th Circuit District Court from implementation of the 2005 Rule. That ruling invalidated the authority provided by 36 CRF 219.14(f).

Revising the GMUG list of MIS was completed under authorities provided in the 1982 Rule and, therefore, remains valid and in effect. However, since the 2005 Rule has been enjoined and, therefore, authority granted in 36 CFR 219.14(f) invalidated, the GMUG has reinstated MIS requirements per the 1982 planning regulations to monitor both habitat and populations. Regardless of the planning rule in effect, the GMUG has considered and will continue to consider the "best available science" in forest and project level planning, including data and analysis needs for MIS.

The scope of analysis for MIS is determined by forest plan management direction, specifically, its standards and guidelines (Chapter II) and monitoring direction (Chapter IV). The GMUG Forest Plan establishes monitoring and evaluation requirements that employ both habitat capability relationships and, at the appropriate scale, population data. The analysis completed for this project examined how the project directly, indirectly, and cumulatively affects selected MIS habitat and populations and how these local effects could influence Forest-wide habitat and population trends. Further, the analysis indicates that the project contributes to meeting Forest Plan direction as it relates to MIS.

In March 2005, an EA/DN was prepared to amend the GMUG Forest Plan to address MIS and monitoring (USDA FS 2005a). 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 3-10**). 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 in 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 in 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) in 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 percent) and would receive minimal surface disturbance, the proposed

Table 3-10
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 in 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

project will not affect pine marten; therefore, this species will not be discussed further.

MIS Species Potentially to Occur in 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 approximately 6,000 acres of habitat suitable to elk in the project area or 0.2 percent of the habitat Forest-wide. Approximately 2,600 acres of the suitable elk habitat in 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 and receives moderate use (Madariaga 2007b). Elk typically use the winter range in the project area during mild to

moderate winters and the area has not been identified as 'critical' winter range by the CDOW (Madariaga 2007b).

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 temporary 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 2005a). 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 2005a). 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 2005a).

Due to the diversity of habitats that turkeys utilize, all communities in the project area could potentially provide habitat for turkeys depending on the season. Approximately five years ago, the CDOW released 25 turkeys in 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 to 40 turkeys (Madariaga 2007a).

Red-naped Sapsuckers

Red-naped sapsuckers are associated with aspen forests or conifer forests mixed with aspen. However, 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 to 12 acres. In Colorado, nest trees average 9.2 inches diameter and 3 to 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 Bird 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 2000e). 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 1,753 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 in the Paonia District. Although nest sites have not been documented in 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 in 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 3-11 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, rodents 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 5 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 at least 40 nests annually, 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. The project area has approximately 85 acres of bald eagle winter foraging habitat; although, no documented perch sites or roost sites occur. The only information regarding bald eagle use is that bald eagles occasionally use the North Fork of the Gunnison River, outside the breeding season, as a feeding site and that some adjacent areas are utilized during the winter or spring when carrion is available. The area is not of high importance to bald eagles.

Canada Lynx

The Canada lynx was listed as a threatened species under the Endangered Species Act in March of 2000 (USFWS 2000). The Southern Rockies has been identified as a Canada lynx "provisional" core area by the US Fish and Wildlife Service due to the re-introduced population (USFWS 2005). The provisional core area includes all of Colorado and southern Wyoming. Historically, Colorado supported a relatively small lynx population as populations have been limited due to naturally highly fragmented habitat (USFWS 2007a).

The CDOW has established a reintroduction program for Canada lynx in an effort to establish a viable population in Colorado. The

first release of lynx occurred in 1999 and as of 2006; there have been a total of 218 lynx reintroduced into southwestern Colorado (CDOW 2006). Both aerial and satellite surveys are conducted on a routine basis to document survival, movement patterns, reproduction and habitat use. The majority of the lynx have stayed within the core release area (CDOW 2006). The core area lies mostly in high elevation areas in the southwestern corner of Colorado bounded by Taylor Mesa on the west, the Gunnison basin on the north, Poncha Pass on the east and the New Mexico border on the south (CDOW 2005). The habitat within the core release area consists of mature Engelmann spruce/sub-alpine fir forest stands with 42 to 65 percent canopy cover and 15 to 20 percent conifer understory cover (CDOW 2006). There have been no sightings of lynx in 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 2007a). In addition, lynx have been observed in the West Elk Mountains adjacent to the project area (USFS 2003), and while the project area represents only fragmented lynx habitat, it is possible that lynx could use the area. Less than 2 percent of the project area contains the spruce-fir habitat that is important for snowshoe hares to exist.

The project area is located within the northeastern portion of the Mount Gunnison lynx analysis unit (LAU) (**Figure 12**) and contains a limited amount of denning habitat, winter foraging habitat and "other" habitat (capable but currently not denning or winter foraging habitat). The denning habitat within the Mount Gunnison LAU is comprised of high-elevation forests that contain large amounts of coarse woody debris on the forest floor, or other forest floor structural elements that constitute overhead cover and are close to foraging habitat. On the GMUG Forest, these conditions are usually found in mature spruce-fir, lodgepole pine and cold-wet or cool moist mixed-conifer forests (USFS 2005c). 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.

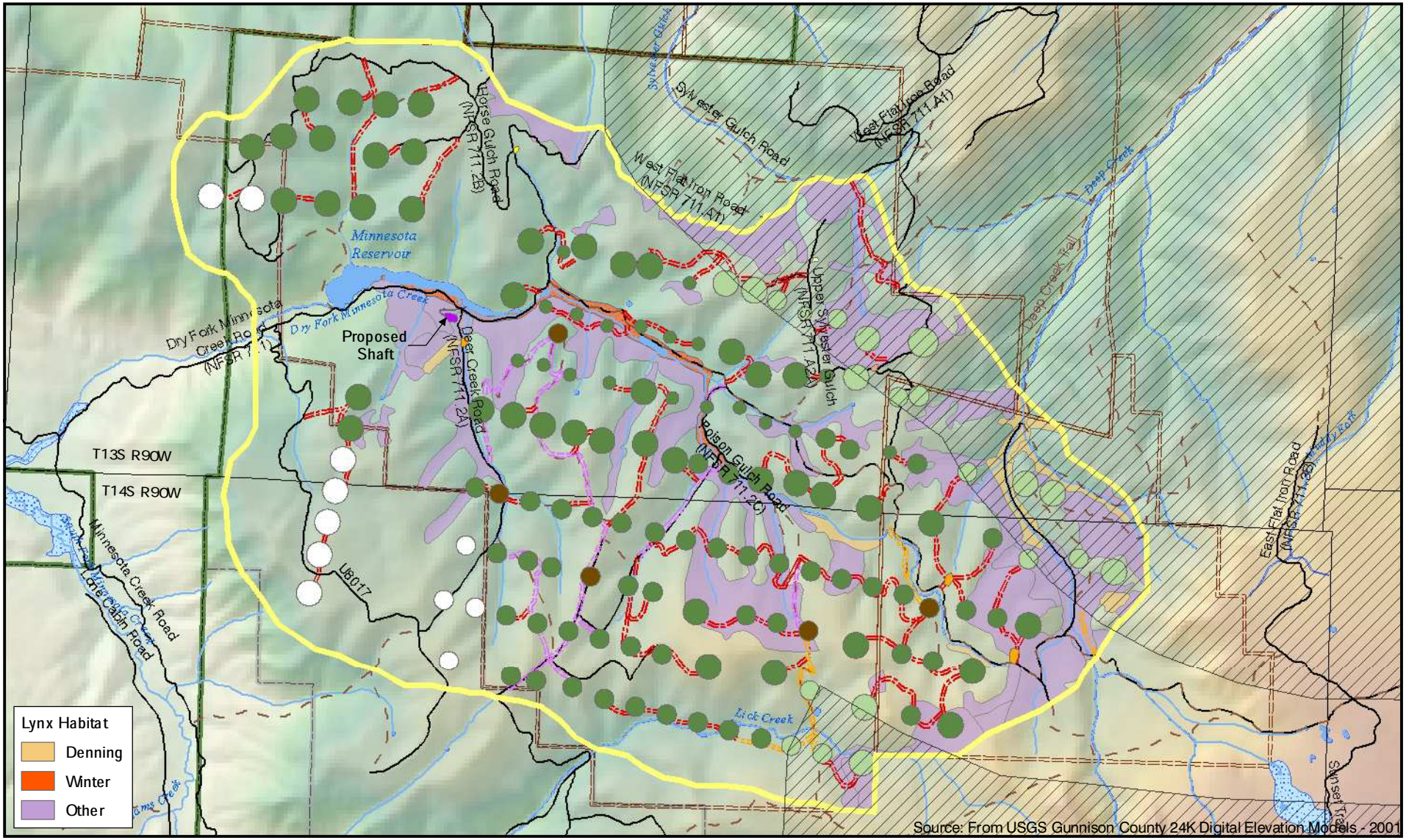
Lynx winter foraging habitat is typically stands with the potential to sustain populations of snowshoe hare and red squirrel populations throughout the winter. On the GMUG Forest, these types of stands are commonly found in high-elevation spruce-fir, cold-wet, and to a lesser extent, cool-moist mixed conifer and lodgepole pine, aspen mixed with significant amounts of conifer regeneration, and riparian shrub lands that are near higher-elevation, primarily conifer habitats (USFS 2005c). The winter foraging habitat in the project area is a spruce-fir community with canopy cover of more than 40 percent and all stands with small or medium trees.

In the project area, there are approximately 79 acres of suitable denning habitat which represents 1.4 percent of the habitat suitable for denning within the LAU, 55 acres of mapped winter foraging habitat which represents 13 percent of the winter foraging habitat in the LAU, and 1,172 acres of "other" habitat which represents 8 percent of the other habitat in the LAU. While the majority of the denning and winter foraging habitat within the LAU has no connectivity to the habitat in the project area, there is small amount of denning habitat within the eastern portion of the project area that has connectivity to a larger more contiguous area of denning habitat (**Figure 13**).

Snowshoe hares are the primary prey species for lynx. Snowshoe hare habitat in Colorado occurs in sub-alpine coniferous forests. Only 1 percent of the project area is representative snowshoe hare habitat.

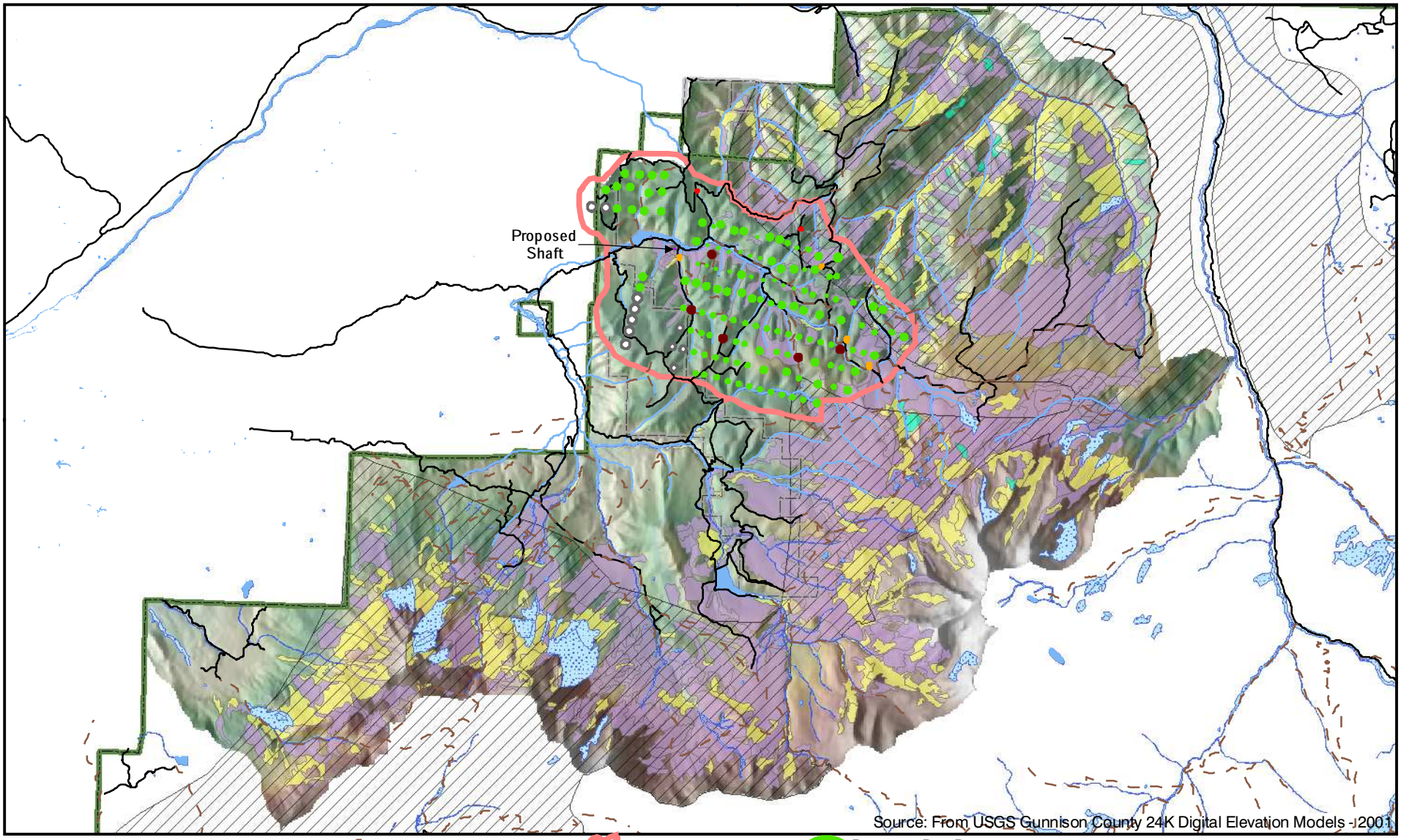
Northern Leopard Frogs

Northern leopard frogs have been declining in Colorado as a result of habitat alteration,



Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Lynx Analysis Areas and Habitat
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 12



Mount Gunnison LAU
and the Project Area
Gunnison County, Colorado
FIGURE 13

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 in the project areaonia 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 in the project area (see Vegetation Section).

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 2 percent of the project area is representative loggerhead shrike habitat. Loggerhead shrikes are assumed to utilize the suitable habitat available in 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 in 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.

Table 3-11
Threatened, Endangered and Sensitive Species With the Potential to Occur in 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 in the project area.

Table 3-11 Threatened, Endangered and Sensitive Species With the Potential to Occur in 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 in 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).
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 in 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).

Table 3-11
Threatened, Endangered and Sensitive Species With the Potential to Occur in the project area

Species	Status[1]	Habitat Description	Species/Habitat Present?
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.
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 in the project area.

Table 3-11
Threatened, Endangered and Sensitive Species With the Potential to Occur in the project area

Species	Status[1]	Habitat Description	Species/Habitat Present?
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).
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 in 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 in the project area.

Table 3-11
Threatened, Endangered and Sensitive Species With the Potential to Occur in the project area

Species	Status[1]	Habitat Description	Species/Habitat Present?
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 in 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 in the project area and there is the potential for occurrence.
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 in 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 in the project area.

Table 3-11
Threatened, Endangered and Sensitive Species With the Potential to Occur in the project area

Species	Status[1]	Habitat Description	Species/Habitat Present?
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 in 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.
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 in the project area.	Although the species and habitat are not found in the project area, water depletions could potentially impact Colorado River populations.

Table 3-11
Threatened, Endangered and Sensitive Species With the Potential to Occur in the project area

Species	Status[1]	Habitat Description	Species/Habitat Present?
Colorado Pikeminnow (*Ptychocheilus lucius*)	E	This species or critical habitat for this species is not present in the project area.	Although the species and habitat are not found in 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 in the project area.	Although the species and habitat are not found in 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 in the project area.	Although the species and habitat are not found in 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 in the project area.	No – Species does not occur.
Roundtail Chub (*Gila robusta*)	S	Neither the species nor their habitat occurs in the project area.	No – Species does not occur.
Bluehead Sucker (*Catostomus discobolus*)	S	Neither the species nor their habitat occurs in the project area.	No – Species does not occur.
Flannelmouth Sucker (*Catostomas latipinnis*)	S	Neither the species nor their habitat occurs in 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.

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 2000c). 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 (Taylor 1995). Nesting habitat for peregrine falcons is not present in the project area, as there are no cliffs or rock outcrops; however, foraging habitat is represented.

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 in 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 in the project area (see Vegetation Section).

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 2 percent of the project area is representative loggerhead shrike habitat. Loggerhead shrikes are assumed to utilize the suitable habitat available in 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 in 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 2000c). 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 (Taylor 1995). Nesting habitat for peregrine falcons is not present in 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 200d). 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 29 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 in 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 in 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.

Effects Common to Action Alternatives

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 121 acres potential habitat loss for species in the project area (117 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 90 acres). In addition, winter range lease stipulations would be released for one season 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 12 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 in 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 over time. 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.

Alternative 2

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 121 acres of suitable elk habitat, including 36 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. The pads would be irregular-shaped to increase the effectiveness of reclamation and the natural grass/forb seed mix would increase forage available to elk (**Table 2-1**). Roads (new, upgraded, and existing) would have short-term impacts on approximately 177 acres of suitable elk habitat, including 66 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 one 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 in 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 0.79 mi/mi^2. The average elk HE in the project area over the life of the project was 55 percent (65 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 in 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 in the project area would be 298 acres and this would result in approximately five percent of the elk habitat in the project area and a negligible percentage of the elk habitat within the elk habitat

available within the GMUG. While the elk in 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 12 years. Relative to the available habitat within the GMUG and areas surrounding the project area and through the implementation of Design Criteria **(Table 2-1**), implementation of the proposed action would not be expected to permanently displace the elk or impact the viability of the population.

The Proposed Action would be in compliance with the Forest Plan regarding management of the big game non-forested winter range management area (5A). The majority of the disturbance would take place within management area 5A and the reclamation of disturbed areas would enhance big game habitat within the 5A management area. Reclamation would utilize a grass/forb seed mix and would increase forage production which is within the management prescriptions for 5A. In addition, newly constructed project related roads would be temporary, closed to the public and reclaimed.

Merriam's Turkey

The proposed action is expected to disturb approximately 298 acres over a 10 year period in 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 in the project area. As roads are reclaimed in 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 94 MDW pads within aspen habitat which would result in approximately 75 acres of habitat temporarily unavailable to red-naped sapsuckers. In addition, roads would disturb approximately 30 acres of aspen habitat in the project area. Throughout the 10 year life of the project, approximately six percent of the aspen habitat in 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 minimal impacts on bald eagles as the project area represents only marginal winter habitat for bald eagles. Of the 85 acres of winter foraging habitat located in the project area, only 0.8 acres (approximately 0.9 percent of eagle habitat present in the project area) would be disturbed as a result of MDW drill pads and none of the proposed roads would be located in bald eagle habitat (**Figure 2)**. Bald eagles feeding on carrion in the project area could experience disturbance during construction of MDWs and roads. However, foraging eagles could easily avoid those disturbed areas and use adjacent suitable habitat. The habitat loss associated with the Proposed Action would be short term and would be reclaimed upon completion of the project. The Proposed Action would have minimal impacts on bald eagles as disturbance to winter habitat would be relatively minor and no breeding habitat would be impacted.

Canada Lynx

The implementation of the Proposed Action could affect lynx habitat in the project area. Drill pads would disturb approximately two acres of denning habitat, three acres of winter foraging habitat and 44 acres of 'other' habitat. New roads would affect an additional 0.03 acres of denning habitat, 0.5 acres of winter foraging habitat and 14 acres of 'other' habitat. Upgraded roads would affect an additional 0.2 acres of winter foraging habitat and 3.3 acres of 'other' habitat. Ultimately, the Proposed Action would impact 5.6 percent of the denning, 17 percent of winter foraging habitat, and 6.4 percent of the 'other' habitat available in the project area. On the LAU scale, the Proposed Action would impact approximately two percent of winter foraging, a negligible percentage of denning and 0.5 percent of 'other' habitat within the LAU. While some habitat would be disturbed and unavailable over the short term, this is a minimal amount of the available habitat in the project area and a very small percentage of the available habitat within the LAU.

The Proposed Action would also result in the temporary habitat loss for snowshoe hares, the primary prey species for lynx. As previously discussed, the project area is comprised of approximately 1 percent of total snowshoe hare habitat. The Proposed Action would result in 3 acres of snowshoe hare habitat to be temporarily disturbed as a result of drill pad installation and road construction. The short term loss of habitat would cause snowshoe hare displacement to adjacent, undisturbed areas. As previously stated, reclamation activities would occur throughout the life of the project. It would take at least three years after project implementation before the vegetation and habitat begins to resemble the pre-disturbance composition and structure.

The impacts on lynx would result from noise and other activity related disturbances that result from road construction or well installation. While there would be short-term habitat loss, it would be relatively minor given the amount of available habitat within the LAU. 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 12 years. All disturbed areas would be reclaimed to their pre-disturbance grade and vegetation. 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.

The operation of the MDWs would result in minor disturbances to lynx in the project area throughout the life of the project. The noise disturbance associated with the MDWs would be minimal. 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 Mine Safety and Health Administration. The vehicle traffic along roadways associated with these maintenance visits will result in noise disturbance to wildlife and may result in injury or death as a result of vehicle collisions. Additional impacts associated with regular maintenance visits may occur as winter access to MDWs for monitoring would occur with the use of snowmobiles. This would add to the number of over-the-snow routes within the region of the project area. Research has suggested that animals will use snow compacted trails for travel and dispersal as it reduces energy demands (Whiteman 2006). Snow compacted trails could provide easy access to competing predators, such as coyotes, and this would increase competition for prey and negatively impact lynx activity in the area. Currently there are no roads in the project area that are part of the Forest wide baseline for snow compacted routes identified in 2002. However, assuming snow compacted trails negatively affect potential lynx habitat, the Proposed Action would temporarily degrade a small amount of lynx habitat in the project area as approximately 6.3 acres of lynx winter foraging habitat could have a snow compacted trail over the life of the project. This would temporarily degrade winter habitat for lynx in approximately 11 percent of the winter foraging habitat in the project area and 1percent of the winter foraging habitat in the LAU.

Disturbance impacts associated with the construction of MDWs and associated roads could affect lynx by increasing the level of disturbance in the project area. The project area represents somewhat fragmented lynx habitat and lynx occurrence would probably a wandering individual, rather than a local population. Compliance with the Canada Lynx Conservation Assessment and Strategy (CLCAS) (Ruediger *et al.* 2000) would ensure that the Proposed Action would not adversely affect lynx in the project area or the LAU. The CLCAS recommends several project planning guidelines to minimize impacts to lynx and protect lynx from impacts related to mines. The Design Criteria, detailed in **Table 2-1**, has addressed and incorporated these guidelines:

- Winter access would be limited to designated routes;
- Remote monitoring of the development sites and facilities will be required to reduce snow compaction;
- A reclamation plan (e.g., road reclamation and vegetation rehabilitation) for sites and facilities that promote restoration of lynx habitat would be required;
- Public motorized use on new roads constructed for project-specific purposes would be prohibited;
- Access roads would be designed to provide for effective closures and would be reclaimed or decommissioned at project completion;
- Travel speed on roads should be kept to 25 MPH or less;
- Route travel would not be allowed at night or during twilight time periods. Recommended travel hours are from 9 am to 3 pm. This will result in the least amount of disturbance to wildlife and would minimize vehicle/wildlife collisions; and,
- No firearms would be allowed in company vehicles while working in the project area on roads that are closed to the public.

If there is any reason to believe that a new threatened or endangered animal may be present in the project area a new Biological Assessment (BA) must be written to protect the species. If the presence of lynx or bald eagle breeding activity becomes evident in the project area the lessee would be required to conduct an inventory of this species and mitigate any disturbances. An amendment to the BA would be required if breeding activity of one of these species is found in the project area. The inventory shall be conducted by a

qualified wildlife biologist, and a report of findings prepared. A plan will be made that recommends protection for these species or action necessary to mitigate the disturbance. The cost of conducting such inventory, preparing reports and carrying out mitigation measures shall be borne by the Lessee/Operator.

The implementation of these mitigation measures would ensure that the Proposed Action would not adversely impact lynx in the project area and LAU.

Fish Species

Project related water use could contribute to water depletions of the Colorado River and subsequently affect the four endangered fish of the Colorado River. However, most water use would be in-mine use and within the current MCC water right. In addition, the Forest Service has completed consultation with the US Fish and Wildlife Service for small water depletions specific for mineral developments on the GMUG National Forest (Biological Opinion ES/GJ-6-CO-99-F-033-CP062). Within this Biological Opinion is outlined that total water depletions would not exceed 100 acre-feet per year and any individual project would not exceed 50 acre-feet. As part of this agreement, the GMUG submits an annual report to the US Fish and Wildlife Service which summarizes the annual depletion amounts and the sub-total water depletion for each applicant and depletion for the entire year. The total depletion report by the GMUG for the year 2006 was 17.5 acre feet.

Table 3-12 outlines the water depletions that have occurred to date in the North Fork area

The water depletions associated with the Proposed Action would not exceed the depletion amounts agreed upon in the Biological Opinion (USFWS 2007b). The water depletions associated with the proposed activity would remain below the 50 acre-feet level. Impacts on these four endangered fish species would be minimized through compliance with the Biological Opinion

Table 3-12
Water Depletions associated with Mineral Activities in the North Fork Gunnison River, GMUG NF.

Forest: Grand Mesa, Uncompahgre and Gunnison National Forest		**Calendar Year: 2006**		
Project/Applicant Name	Permit/Special Use Number	Legal location down to section	River Basin	Depletion amount[1]
Sylvester Gulch Road Construction	Mountain Coal Company	T13S R90W Sections 28,29,32,33	Gunnison	0.5 acre-feet
Methane drainage wells drilling	Mountain Coal Company	T13S R90W Sections 28,29,32,33	Gunnison	1.0 acre-feet
Coal exploration/processed mine water	Oxbow Mining	T13S R91W Sections 2,3,35,36	Gunnison	0.5 acre-feet
Methane Drainage well drilling	Oxbow Mining	T13S R91W Sections 2,3,35,36	Gunnison	0.5 acre-feet
Iron Point Gulch Coal Exploration	Bowie Resource	T13S R91W Sections 2,3,35,36	Gunnison	0.5 acre-feet
TOTAL				3.0 acre-feet

[1]Report the actual amount of water depleted during implementation of the project. The amount depleted can be an estimate by the project administrator (e.g. estimated number of truck loads of water x average gallons per truck).

(USFWS 2007b) and are determined to be "may affect, likely to adversely affect". This language has been agreed up by the Forest Service and Fish and Wildlife Service's water depletion agreement.

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 four MDW drill pads and minimal roads would occur within the coniferous forest habitat, with a total of 3.5 acres of disturbance (3.2 acres associated with MDWs and 0.8 acres associated with roads).

Northern Leopard Frog

Minimal impacts would occur to northern leopard frog habitat as a result of the proposed action. Areas of open water or wetland habitat represent potential habitat for these amphibians and disturbance to these areas could impact these species. Disturbance would occur during the breeding season and disturbances to breeding areas could impact local populations. Pre-disturbance survey would be completed in potential breeding habitat, 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). 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 6 acres of habitat would be temporarily disturbed due to MDW drill pads and 4 acres due to associated roads. Ultimately, approximately 8.5 percent of the available loggerhead shrike habitat in 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 108 acres of goshawk habitat to be temporarily unavailable due to disturbance related directly to MDW drill pads and associated roads (75 acres due to MDWs, 3 due to staging areas and 31 acres due to road disturbance). Throughout the life of the project, approximately six percent of the goshawk habitat in 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 (Design Criteria **Table 2-1**). 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 4 MDW drill pad would occur within the coniferous forest (3 in spruce/fir habitat and 1 in pinyon/juniper habitat), with a total of 3 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 in 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 78 acres of habitat temporarily unavailable to purple martens due to MDWs and staging areas. In addition, roads would disturb approximately 30 acres of aspen habitat in the project area. Throughout the 10 year life of the project, approximately 6 percent of the aspen habitat in 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 in 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.

Alternative 3

The installation and development of the proposed ventilation shaft, MDWs, staging areas, and associated roads would result in less habitat loss and fragmentation than under Alternative 2. Construction activities such as site clearing and grading for installation of MDWs and staging areas would result in approximately 103 acres potential habitat loss for species in the project area (approximately

eight acres less than under Alternative 2). Loss of habitat and disturbance related to roads would occur on 82 acres as a result of newly constructed roads and upgraded existing roads (approximately eight acres less than under Alternative 2). Winter range lease stipulations would also be released for one season under Alternative 3 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.

Impacts to wildlife associated with Alternative 3 would be very similar to those impacts discussed under the Alternative 2 section. For most species, the impacts would be the same except that less habitat would be disturbed under Alternative 3. Impacts would not differ between alternatives for the following species: bald eagles, loggerhead shrikes, peregrine falcons, northern leopard frogs, spotted bats and big-eared Townsend bats. For a discussion of Alternative 3 impacts for these species, see the Alternative 2 discussion.

Management Indicator Species

Rocky Mountain Elk

Alternative 3 would have the same impacts on elk as Alternative 2 except that less habitat would be disturbed under Alternative 3. Alternative 3 would result in short-term impacts on elk due to direct habitat loss and disturbance related to construction activities and vehicle travel on roads. Approximately 104 acres of suitable elk habitat and 30 acres of elk winter habitat would be disturbed and temporarily unavailable due to the construction of drill pads and operation of MDWs. Roads would have short-term impacts on approximately 154 acres of suitable elk habitat and 53 acres of elk winter habitat.

The total impact on elk habitat in the project area under Alternative 3 would be 134 acres and this would result in approximately two percent of the elk habitat in the project area and a negligible percentage of the elk habitat within the elk habitat available within the GMUG. Relative to the available habitat within the GMUG and areas surrounding the project area, implementation of Alternative 3 would not be expected to permanently displace the elk or impact the viability of the population. In addition, Alternative 3 would not reduce the HE below those levels set by the Forest Plan and Alternative 3 would be in compliance with the Forest Plan regarding the management of elk. Under Alternative 3, the HE would be 65 percent for summer habitat and 45 percent for winter habitat.

Merriam's Turkey

Alternative 3 is expected to disturb approximately 192 acres over a 10 year period in the project area. Because the proposed activities between alternatives would be the same except that the project size would be reduced under Alternative 3, impacts would be similar with less habitat affected under Alternative 3. While the implementation of Alternative 3 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.

Red-naped Sapsucker

Alternative 3 would result in the placement of 75 MDW pads within aspen habitat which would result in approximately 63 acres of habitat temporarily unavailable to red-naped sapsuckers.. In addition, roads would disturb approximately 26 acres of aspen habitat in the project area. Throughout the 10 year life of the project, approximately five percent of the aspen habitat in the project area would be temporarily disturbed under Alternative 3. Disturbance activities would be the same under Alternative 3 as with Alternative 2; however, less habitat would be disturbed under Alternative 3.

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

Canada Lynx

Alternative 3 would disturb approximately 12 acres less of lynx habitat than Alternative 2; however, the activities and associated impacts would be the same for both alternatives. The implementation of Alternative 3 could affect lynx habitat in the project area. Drill pads would disturb approximately 0.8 acres of denning habitat, three acres of winter foraging habitat and 44 acres of other habitat. Roads would affect an additional 0.03 acres of denning habitat, 6.3 acres of winter foraging habitat and 24.5 acres of other habitat. Ultimately, Alternative 2 would impact one percent of the denning, 17 percent of winter foraging habitat and six percent of the other habitat in the project area. Alternative 3 would impact approximately two percent of the winter foraging habitat, 0.5 percent of the other habitat and a negligible amount of the denning habitat within the LAU. While some habitat would be disturbed and unavailable over the short-term, this is a minimal amount of the available habitat in the project area and a negligible percentage of the available habitat within the LAU. In addition, compliance with the Canada Lynx Conservation Assessment and Strategy (Ruediger *et al.* 2000) would ensure that Alternative 3 would not adversely impact lynx in the project area or the LAU (see Alternative 2 for more discussion of Design Criteria).

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 Alternative 3 as only two MDW drill pad would occur within the coniferous forest habitat (one in spruce/fir and one in pinyon/juniper), with a total of 1.6 acres of disturbance. The minimal amount of habitat impacted would impact the population viability of these species.

Northen Goshawk

Alternative 3 would result in approximately 63 acres of goshawk habitat to be temporarily unavailable due to disturbance related directly to MDW drill pads. In addition, roads would disturb approximately 26 acres of goshawk habitat in the project area. Throughout the life of the project, approximately five percent of the goshawk habitat in 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. Alternative 3 would disturb approximately 20 acres less of goshawk habitat than Alternative 2. Impacts would be similar to those previously discussed under Alternative 2. Design Criteria (**Table 2-1**) would be implemented to protect nesting goshawks. 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 raptor nest was located, no surface activities would be allowed within ½-mile radius of the active nest site between the dates of February 1 and August 15, 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 3 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.

Purple Marten

Alternative 3 would result in approximately 63 acres of habitat temporarily unavailable to purple martens. In addition, roads would disturb approximately 26 acres of aspen habitat in the project area. Throughout the 10 year life of the project, approximately five percent of the aspen habitat in 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.

Cumulative Effects

Alternative 1

Management of resources in 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 and 3

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 in 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 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 12 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. The footprint remaining after disturbance and prior to complete re-establishment of vegetation can influence how wildlife utilize the area (i.e. increase in foraging or creating travel corridors). The grass/forb seed mix that would be used during reclamation would provide forage and enhance summer habitat for big game species. This would be in compliance of

the management prescriptions for big game on non-forested winter range.

Summary of Impacts on Threatened, Endangered and Sensitive Species

Table 3-13 displays the summary of impacts for each species.

Table 3-13
Summary of Impacts on Threatened, Endangered and Sensitive Species

Species	Alternative 1	Alternative 2	Alternative 3
Bald Eagle (threatened)	No Effect	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Canada Lynx (threatened)	No Effect	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
American Marten (sensitive)	No Impact	No Impact	No Impact
Boreal Owl (sensitive)	No Impact	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	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	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	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	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	No Impact
Peregrine Falcon (sensitive)	No Impact	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or	May impact individuals or habitat, but would not likely contribute to a trend towards Federal listing or

Table 3-13 Summary of Impacts on Threatened, Endangered and Sensitive Species			
Species	**Alternative 1**	**Alternative 2**	**Alternative 3**
		cause a loss of viability to the population or species	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.	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	No Impact
Townsend's Big-eared Bat (sensitive)	No Impact	No Impact	No Impact
FISH			
Bony Tail Chub (Endangered)	No Effect	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Colorado Pikeminnow (Endangered)	No Effect	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Humpback Chub (Endangered)	No Effect	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Razorback Sucker (Endangered)	No Effect	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect

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 project file.

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.

In 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 (Sanders 1979, 1982, 1983, 1984, 1985).

Five resources are located in 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 on 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. Lease stipulations protect the ditch and require repair if necessary.

Alternative 3

Effects would be the same as described for Alternative 2.

Cumulative Effects

All Alternatives

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

Alternatives 2 and 3 are 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 recreation study area (done) the project area including 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. The existing conditions allow for recreation opportunities in the area including semi-primitive, non-motorized, semi-primitive motorized, and roaded natural. Adjacent lands also provide semi-primitive and natural recreational opportunities.

Recreational opportunities are primarily dispersed use in the project area. No developed recreational facilities are located in 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 in 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 in 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, and ATV access outside of drilling.

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 and additional noise from exhausters etc. 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. At project completion a ¼ mile section of another route (Poison Gulch) would be left upgraded to full-size, the remainder decommissioned to system ATV Trail to maintain hunter access to Elijah Park, therefore improving chances of hunter success.

The Long Draw Saddle Extension Upgrade decommissioning to an ATV trail (approved in May 2006) would preserve access for hunters and provide a recreational activity niche for ATV users

Alternative 3

Effects would be the same as those described for Alternative 2 except construction and upgrade on 4.83 miles of existing roads and construction of 13.43 miles of new access (including 1.3 miles of existing ATV routes) would intersect NFSR 711 would require closure and access limitations during the life of the methane drainage program.

Cumulative Effects

Road construction and coal-related activities have occurred in the area since the 1960s, 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 2006a) 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 133, adjacent rail

line, and coal production facilities on private lands, although not in the project area

Consistency with Forest Plan and Other Laws

Alternatives 2 and 3 are consistent with Forest Plan direction for recreation and special uses.

Inventoried Roadless Areas

Affected Environment

Approximately 892 acres of the 6,000-acre project area lay within the West Elk IRA, as shown on **Figure 1**. The proposed action includes constructing or upgrading about 2.3 miles of road and 21 well pads and one staging area 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 from Judge Laporte. , The temporary road construction would fit under Exception 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.

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 16-24 Methane Drainage Project DN/FONSI and Sylvester Gulch Road/Long Draw Saddle Extension Upgrade DN/FONSI (USDA FS 2002a and USDA FS 2006a).

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 were 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 when it was inventoried for its roadless character (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 projects currently being implemented will compromise the roadless character in places until approximately 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 NFs. 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. Further, the GMUG Forest Plan management direction allows for road construction in these areas.

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 project area also falls within the area defined by Colorado Roadless Petition (November 13, 2006) as North Fork Coal Mining Area. The Petition was amended by Governor Bill Ritter, Jr. in a letter to Department of Agriculture Undersecretary, Mark Rey, on April 11, 2007 with the following language: "The 2006 Petition identified portions of seven specific IRAs in the Grand Mesa, Uncompahgre, and Gunnison National Forests and removed these areas from the Roadless Inventory during the period of coal exploration and development. My preference in the 2007 Petition is to leave these areas in the Roadless Inventory but to make clear in the Colorado Rule that such areas may be managed in a way that permit roads and other activities associated with coal exploration and development. Any other non-coal related activities resulting in the use or development of new roads would not be allowed. Restrictions identical to those referenced in the 2006 Petition (see (A)(b) and (B) regarding restrictions on motorized access) would be retained. Once coal mining is complete, all roads would be reclaimed and all activities

within the area would be consistent with Roadless designation…." The Forest Service has committed to working on the State's Roadless Petition in future environmental analysis.

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 its 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 in 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 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 traditional cultural properties and sacred sites in the project area is low.

Other locally identified unique characteristics No other locally unique characteristics have been identified.

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. 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, temporary road construction and use associated with previously approved methane drainage activities and other coal-related 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. These effects would be reduced incrementally as temporary roads associated with earlier methane drainage projects continue to be decommissioned. 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 on IRA criteria, 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 22.6 miles of road construction, 15.8 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 22.6 miles of proposed road construction, 2.3 miles would occur in the IRA, which includes the 0.6-mile reroute. Additionally approximately 0.4 miles of ATV trail would be upgraded.

This proposed road construction and other disturbances are conservatively projected to temporarily affect approximately 28 acres of the 892 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 2.3 miles of new access road would be decommissioned by obliteration when no longer needed for purposes of the leases (Lease C-1362, Lease COC-56447). Because reclamation would occur throughout the 12 year life of the project, the effects of these roads would extend over approximately three years each. The West Flatiron and Long Draw Saddle Extension re-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 approximately 2030.

As stated in the affected environment, 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 roadless character. The long-term impact of proposed road and MDW pad development associated with this alternative would contribute to the negative trend on sustaining roadless character and associated land use management. Long-term effects toward a more roaded character would be anticipated to last until approximately 2030. As previously identified, roadless character criteria 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.

Alternative 3

This alternative would avoid further development including MDW location

construction and drilling and temporary road construction in the West Elk IRA related to methane drainage for the West Elk Mine. IRA effects would be the same as No Action.

Cumulative Effects

Reasonably foreseeable future on-lease coal exploration, mine development, methane drainage, grazing, and recreational activities in the area include the potential for construction and reclamation of additional roads in the IRA as would be consistent with any legal requirements for roadless area management. 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) 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 criteria/characteristics and values.

Consistency with Forest Plan and Other Laws

At the initiation of this project, the Forest Service management of IRAs was 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. A discussion of this project's consistency in provided in Chapter 1 *Authorizing Actions.*

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

- Exception No. 7 – portions of roads are needed for the continuation, extension, renewal of a mineral lease on lands that were under lease as of 1/12/2001.

Alternatives 2 and 3 are consistent with Forest Plan and direction for management of IRAs. See discussion of Federal Coal Leases in Chapter 1 (*Authorizing Actions*) of this document for clarification discussion of lease modifications.

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.

In the project area, NFSR have been constructed for National Forest visitor and commercial user access and are maintained for short-term and long-term vehicle use (**Table 3-14**). The system classified roads in the project area were built to be seasonal roads used during the dry periods of the year. Temporary roads that will not be open for public access will receive only the minimum improvement needed for structural capacity, safety and erosion control detailed in **Table 2-1,** and will be decommissioned by obliteration

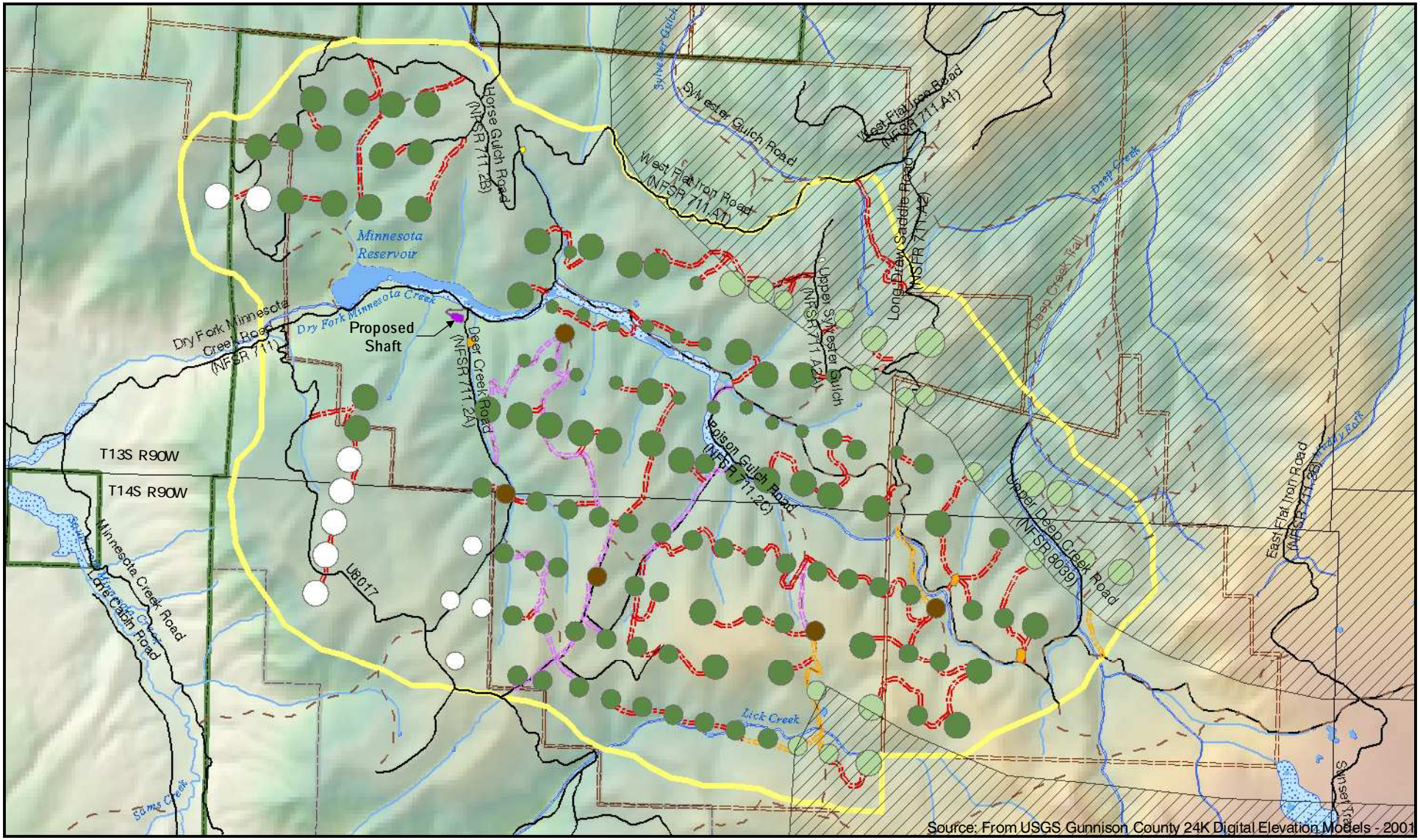
Table 3-14
Existing NFSRs Under RUP to MCC that will be Used to Access the Project Area

Road #/Name	Service/ Maintenance Level	Status	Purpose of Road & Type of Use
NFSR 711 (Dry Fork Road)	High Clearance Vehicles	Existing Classified Road	General use
NFSR 711.A1 (West Flat Iron Road)	High Clearance Vehicles	Existing Life of Mine Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a and USDA FS 2006c). To be converted to an ATV Trail upon completion of MCC operations.
NFSR 711.A2 (Long Draw Saddle Road)	High Clearance Vehicles	Existing Life of Mine Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a and USDA FS 2006c). To be converted to an ATV Trail upon completion of MCC operations.
NFSR 711.A2A (Upper Sylvester Gulch Road)	No info	Existing Life of Mine Road	Developed for Panels 16-24 MDWs Project (USDA FS 2002a and USDA FS 2006c). To be decommissioned by obliteration upon completion of MCC operations.
NFSR 711.2B (Horse Gulch Road)	High Clearance Vehicles	Existing Classified Road	General use.
NFSR 711.2A (Deer Creek Road)	High Clearance Vehicles	Existing Classified Road	General use
NFSR 711.2C (Poison Springs Road)	High Clearance Vehicles	Existing Classified Road	General use
Sylvester Gulch Road	No info	Approved Life of Mine Road (Construction in Spring 2007)	Developed for Panels 16-24 MDWs Project (USDA FS 2006c). To be decommissioned by obliteration upon completion of MCC operations.

upon completion of project. MCC under their existing road use permit (RUP) is responsible for maintenance of classified, temporary, and life of mine routes used for project activity.

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 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 14**).

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. Current access to methane drainage wells was



Note: New road construction in Inventoried Roadless Area and IRA Drill Pads/Staging Areas would not occur in Alternative 3.

Roads
Deer Creek FEIS
Gunnison County, Colorado
FIGURE 14

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 and summer to avoid winter wildlife use periods and fall hunting opportunity conflicts.

Until the Sylvester Gulch Road is completed, some mine traffic will 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, and special use permittee access.

Other existing NFSRs in the immediate project area include NFSR 711.2A (Deer Creek Road), NFSR 711.2C (Elijah Springs Road). NFSR 711 becomes more primitive past the Deep Creek crossing, 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 FS 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/escapeway shaft. Motorized and non-motorized access would continue to use the existing USFS transportation system in the project area. Use of the state and county transportation system to access managed open and restricted (gated) access on NFS 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. MCC would continue to use the existing county road system and NFSRs through the anticipated life of the West Elk Mine on previously approved routes, which would be up to ten years shorter than under the proposed action. 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 (estimated to last upto 12 months) for cement trucks (approximately 7 round trips per day) and for continued use for over-size and over-length vehicles such as MDW drill rig (resulting in approximately 5 round tips per year). 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. MCC has developed a use and maintenance agreement with the county for the use of these roads.

Development of new and upgraded, unpaved and ungraveled, dirt roads to access MDW locations and the area of the ventilation shaft are not likely to change the existing USFS transportation system, as the roads added are restricted-access. Upgrade of 4.8 miles of existing NFSRs and construction of 15.8 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 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 2-1**), 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 (**Table 2-1**). 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 roads are not open to public use and project traffic would be minimized on general use NFSRs except during shaft construction which is a very small increase in traffic levels and lasting less than one year.

Some short- and long-term modification of public use of the current USFS transportation system would occur because of previous NEPA decisions that will add a system ATV trail at the closure of a life-of-mine road. Though public use in 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 such as when a drill rig is moved in or out of the area annually. 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 monitoring access in winter. Area is open to the public to over-snow, cross- country travel. Other than life of mine roads and unless specified otherwise by prior NEPA decisions, 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.

Minnesota Creek, Dry Fork and Horse Gulch roads will continue to be open to the public as they are now.

NFSR 711 would need to be utilized for shaft construction for one season as identified by granting relief from big game winter range sti

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 on 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.

Alternative 3

Effects of Alternative 3 would be the same as Alternative 2 except road miles for construction and upgrade would be slightly less. Upgrade and maintenance would occur on 4.83 miles of existing FS roads and 1.3 miles of existing ATV routes and construction of 14.1 miles of new access on FS system lands.

Cumulative Effects

The cumulative effects analysis area is 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, natural gas operations, recreational users, commercial traffic, and residential traffic. 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.

Work on Monument Dam (Minnesota Creek Reservoir) would result in approximately 20 to 40 loads full-size vehicles per day (depending on size of truck and area) of gravel/aggregate for approximately three months (probably overlapping shaft construction). Additionally, approximately three oversized equipment transport vehicles per day for one week on either end of that three month period and crew vehicles (passenger/pick-up trucks) for the duration of the project would use the Minnesota Creek Road and county roads.

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 MDW 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 RUP.
- Temporary 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 project concurrence and RUP. Traffic related to this project would use only those travel routes specifically designated in the RUP or project concurrence. 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 in 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).

Alternatives 2 and 3 are consistent with road and trail direction under the GMUG Forest Plan, Gunnison National Forest Interim Travel Restrictions, and Forest Service Handbook (FSH) 7700.

Visual Quality

Affected Environment

Visual resource management is guided by the GMUG Forest Plan (USDA FS 1983 as amended 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 in 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 would 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.

Alternative 3

Impacts from Alternative 3 would be the same as Alternative 2.

Cumulative Effects

Long-term reasonably foreseeable ground disturbing activities associated with Alternative 2 and 3 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.

Consistency with Forest Plan and Other Laws

Alternatives 2 and 3 are consistent with VQOs defined in the Forest Plan and the SMS.

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 allow 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, 16 miles of new access road construction, existing road upgrades, and installation of 168 MDW is shown in **Table 3-15** using the windows method within the Deer Creek allotment. 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 3-15**). Disturbance associated with the Deer Creek Shaft would occur throughout the life of the project (13 to 15 years).

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, supporting the 1991 Forest Plan goals for forest diversity, and improving range resources for livestock. Nearly 58 percent (137 AUMs) of the project disturbance would occur in this type. Maximum disturbance could be as high 172 acres under the proposed action (**Table 3-15**). Disturbance in this cover type will stagger by pasture and implementation date. Short-term grazing resources could improve following reclamation in mature oak stands.

The approved grass/forbs seed mix provides valuable forage for both wildlife and livestock; providing increased foraging opportunities for 10 to 20 years in Gambel oak types (see *Vegetation* section). These areas would eventually convert to surrounding vegetation types, in most cases.

Aspen stands are highly productive and desired for summer grazing, thus the more aspen communities removed due to well development 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 38 percent (85 AUMs) of the disturbance could occur in aspen cover types under the proposed action. While this loss could be concentrated in a grazing unit where aspen is already limited, it is unlikely. Under this worst case scenario impacts on 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.

Table 3-15
Maximum Acres of Cover Type Disturbance

Cover Types	Alternatives 2 and 3	Alternative 2			Alternative 3		
	Deer Creek Shaft	Road	Well Pad[1]	Staging Area[2]	Road	Well Pad[1]	Staging Area[2]
Herbaceous	0	1	1	0	1	1	0
Shrub	0	4	3	<1	4	3	<1
Gambel oak	0	51	120	1	47	105	<1
Willow	<1	<1	3	0	<1	3	0
Quaking aspen	4	31	74	3	26	59	2
Spruce-subalpine fir	0	<1	2	0	<1	1	0

Notes
Acres can not be totaled because they are double counted. Numbers reflect the maximum for each vegetation cover type, depending on the final location of the roads and well pads.[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.

AUMs approximate the forage a 1,000 pound cow with a calf 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 1,000 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 3-16** presents the life of mine potential loss in AUMs under the proposed action if all development occurred at one time, not accounting for the staggered.

Table 3-16 assumes all disturbance associated with the proposed action would occur simultaneously. Using this method the total AUMs for the project area are 4,070, 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, 236 AUMs or 6 percent of the project area AUMs would be unavailable for grazing.

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. Approximately 155 AUMs would be allocated as a short term (four to five) loss of range resources, whereas 81 AUMs would be allocated to longer term disturbance such as road construction and staging areas.

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. Life of mine roads and the escape/ventilation shaft would likely be disturbed for the life of mine, thus eliminating those AUMs for up to 13 years.

Table 3-16
Life of Mine Potential Loss in AUMs

Disturbance Types[1]	Alternative 2	Alternative 3
	AUMs	
ROAD DISTURBANCE		
New construction	77	70
METHANE DRAINAGE WELLS		
Well footprint	155	128
STAGING AREAS[2]		
Existing areas	<1	<1
New areas	4	2
TOTAL	236	200

Notes
Acres can not be totaled because they are double counted.
Numbers reflect the maximum for each vegetation cover type, depending on the final location of the roads and well pads.[1]
Includes potential disturbance on private lands.
[2] Does not include staging areas that are located at MDW sites.

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.

Alternative 3

The effects of Alternative 3 would be the same as Alternative except in the acres of disturbance and the effects it would have on AUMs as displayed in **Table 3-16**.

Cumulative Effects

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

Alternative 1

MCC has active operations in the project area associated with the Panels 16 to 24 Coal Methane Drainage Project. Currently two active MDWs occupy approximately 1.6 acres, removing 1.3 AUM from the available forage. Reclamation of five MDWs currently contributes 4 acres and 5 AUMs to available forage in the area.

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.

Alternatives 2 and 3

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

Alternative 2 and Alternative 3 are 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 (30 CFR Part 75 - Safety Standards for Underground Coal Mine Ventilation). There have been no safety or health issues identified for surface activities to occur in the project area. The mine operates under a ventilation plan that was approved by the Mine Safety and Health Administration in June 2000.

Based on previous research and mining experience in the area, there is a 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 (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 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.

Alternatives 2 and 3

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

Alternative 2 is consistent with the Forest Plan and 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. Under Alternatives 3, MCC would need to forego mining the coal in IRA where methane drainage would not be allowed to be consistent with these acts.

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.

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 3-17 (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

Table 3-17
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.

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).

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).

Table 3-18 (population) presents basic population and demographic information for the Gunnison County compared to the state of Colorado.

Gunnison County comprises 3,260 square miles with 4 people per square mile and a total population of 13,956 people in 2000. Gunnison County's population grew by almost 36 percent between 1990 and 2000, slightly more than 3.1 percent rate of increase of the state population.

The median age in Delta County is 30.4 years with 24.0 percent of the population being under the age of 20 and 7 percent being 65 years or older. Over 94 percent of the people age 25 and older in Gunnison County have graduated from high school, and just over 76 percent have graduated from college (US Census Bureau 2006).

Gunnison is the largest town in Gunnison County and the county seat. Gunnison's population in 2000 was 5,490. Crested Butte is the other larger community in Gunnison County with a 2000 population of 1,529. Somerset, where the West Elk Mine is located, is an unincorporated town with a population in 2000 estimated at 190 and 201 estimated in

Table 3-18
Population by Category, 1990 and 2000, Gunnison County and the State of Colorado

	1990	2000	Percent Annual Change 1990-2000
Population			
Gunnison County	10,273	13,956	3.6
Colorado	3,294,394	4,301,261	3.1
Male			
Gunnison County	5,442	7,563	4.0
Colorado	1,631,295	2,165,983	3.3
Female			
Gunnison County	4,831	6393	3.2
Colorado	1,663,099	2,135,278	2.8
Under 20 years			
Gunnison County	2,998	3,308	1.0
Colorado	958,341	1,224,668	2.8
65 years and over			
Gunnison County	657	965	4.7
Colorado	329,443	416,073	2.6
Median Age			
Gunnison County	28.3	30.4	.7
Colorado	NA	34.3	NA

Source: Sonoran Institute 2004, US Census 2000.

2005. All three communities are increasing slightly in population.

The 2000 US Census reports that there were 9,135 housing units in Gunnison County with 5,649 occupied and 3,486 vacant. Nearly all the vacant units are seasonal, recreational, or for occasional use (3,125). Approximately 5.5 percent of rental units were classified as vacant. There was an average of 2.30 people per household. Gunnison County had a home ownership rate of 58.3 percent in 2000, below the state average of 67 percent. The median value of an owner occupied housing unit was $189,400, higher than 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 3-19**).

Table 3-19
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

Existing employment opportunities at the West Elk Mine would continue. 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) (**Table 3-20**). 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.

The previous paragraph assumes that all the E Seam coal can be safely accessed in the Dry Fork Lease (C-67232) without construction of access roads to the well pad within the West Elk IRA. If accessing the well pads without the road is not feasible, approximately 2,500 feet of panel E3 and 2,500 feet of panel E4 could not be safely accessed and therefore would be forgone. At an average 420 tons of coal per foot of the E Seam, this would result in 2.1 million tons of coal which could not be removed from this lease. This would shorten the mine life by approximately 4.2 months and reduce the economic contribution of the mine by $24.5 million (at $5.83 million per month).

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. Of royalties from the Federal coal, 50 percent returns to the Federal treasury in the general fund and 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.

Alternative 3

Effects would be the same as Alternative 2 except for the reduced economic contribution as displayed in **Table 3-20**.

Table 3-20 Summary of Economic Benefit from West Elk Mine by Alternative		
	Alt. 2	Alt 3
Tons of Coal removed per Month	600,000	600,000
Tons of Coal in the E Seam to Be Mined	75,000,000	64,000,000
Mine extension (months)	125.0	106.7
Mine extension (years)	10.4	8.9
Direct Economic Benefit ($million)	$728.75	$622.06
Royalty ($ million)	$ 58.30	$ 49.76

No construction of well pads or access roads in IRA would likely eliminate the opportunity to mine the coal underlying the IRA, and, because some methane drainage wells outside of IRA are only accessible from roads constructed within IRA, other coal resources may likewise be unmineable. This lack of access could result in foregoing approximately 10 million tons of coal with and economic value of $107 million, royalties of $8.5 million, and shorten the mine life by nearly two years compared to Alternative 2.

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 percent) 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. Cumulatively, the continued operation of the West Elk Mine for 12 years will contribute to the overall important, beneficial impact on Gunnison and Delta Counties from mining. The proposed action and other ongoing and reasonably foreseeable coal mining operation would continue to directly provide approximately 10 percent of the employment, pay the largest amount of property taxes and maintain a relatively high general salary for the area.

Alternative 3

The cumulative social and economic impacts from this alternative would be similar to Alternative 2 except continued operation would last 10 years (including current operations).

Consistency with Forest Plan and Other Laws

Alternative 2 and Alternative 3 are 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). This section describes these effects from Alternatives 2 and 3. With the exception of Health and Safety, Alternative 1 (no action) would not have these effects.

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 reduction of some cover types. In addition, it is possible noxious weed species would increase following disturbance and site productivity would decrease. Loss and damage of vegetation would also occur from road and MDW construction in previously undisturbed areas. However, utilizing the mitigation practices established, vegetation resources would recover over time, providing suitable forage and habitat, and noxious weeds would be controlled.

Recreation

Though road construction 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 and diminished the quality of essential criterions/characteristics and values.

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) would be considered long term, impacts to related recreational use would be considered short term. 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).

Unavoidable Adverse Effects

Water

Under Alternatives 2 and 3, mining related activities would 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 Alternatives 2 and 3, 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 Alternatives 2 or 3.

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

Past land use and development associated with any alternative would continue to have unavoidable adverse impacts on roadless character within the West Elk IRA beyond the life of the project.

Transportation

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

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 under Alternatives 2 and 3 would irreversibly release methane gas.

Soils

Under Alternatives 2 and 3, 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 or 3.

Vegetation

Irreversible or irretrievable commitment of resources would occur under Alternatives 2 and 3 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

A long-term, life of subsurface coal mining operations irretrievable impact on recreation experience with the presence of MDW and direct extremely limited short term project area access may occur in Alternative 2 and 3 during equipment mobilization or demobilization. This commitment would be minimized and eliminated upon completion of operations and concurrent site restoration and reclamation.

Roadless

Cumulative loss of roadless character in this portion of the IRA would result in the long term (extending beyond life of project estimated at 12 years) loss of manageability and planning consideration for this resource. Since roadless character effects currently exist and a long term negative trend would be anticipated, considerations of impacts as irretrievable are limited.

Transportation

A long-term (through approximately 2030) irretrievable impact to transportation system management and direct short term project area utilization would occur in Alternatives 2 and 3.

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.
- 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
- USDOI BLM WY State Office
- USDOI BLM Uncompahgre Field Office
- US Army Corps of Engineers
- MSHA
- US Fish and Wildlife Service
- USDI 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

Biodiversity Conservation Alliance

Bjork Lindley Little PC

Center for Native Ecosystems

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

Colorado Division of Reclamation, Mining and Safety

Colorado Division of Wildlife

Colorado Wild

Delta County Board of Commissioners

Great Old Broads for Wilderness

High Country Citizens' Alliance

Mine Safety and Health Administration

Mountain Coal Company

Natural Resources Defense Council

Rocky Mountain Clean Air Action

Southern Rockies Ecosystem Project

The Colorado Mining Association

The Wilderness Society

US Environmental Protection Agency

US Environmental Protection Agency, Region 8

USDA, National Agricultural Library Head, Acquisitions & Serials Branch

USDI Bureau of Land Management

USDI Fish and Wildlife Service

USDI Office of Surface Mining

USDI Office of the Secretary

USDI, Director, Office of Environmental Policy and Compliance

Western Slope Environmental Resource Council

Wilderness Workshop

CHAPTER 5
RESPONSE TO COMMENTS ON THE DRAFT EIS

This chapter contains responses to the comments received on the Draft EIS. The DEIS was sent to the mailing list found in Chapter 4 of the DEIS in March 2007. A notice of availability appeared in the *Federal Register* (Vol. 72,. No. 56, pg.13786) on March 23, 2007, initiating the public comment period. The comment period closed on May 7, 2005.

Table 5-1
DEIS Comments and Responses

Commenter	Comment #	Comment/Response
Mountain Coal Company	1-12, 14-28	Minor editorial/grammatical changes. **RESPONSE:** Appropriate changes have been made to the FEIS.
Mountain Coal Company	13	Clarification. Do ATV trails, upgraded to project roads, need to meet criterion 7 on page 22? RESPONSE: To clarify, to use the term trail implies that the feature on the ground is managed by the FS. The situation on the ground in the project area is that there are user-created ATV routes that are not facilities managed by the FS. The Proposed Action includes constructing temporary roads on the locations where existing user-created ATV routes exist. These will be project roads that will NOT be open to the public (Table 2-1, Design Criteria NR states that new project access roads will be gated and closed to the public year long). Further, under FS policy, these temporary roads are considered 'Level 2 resource extraction roads'. FS policy further guides that the AASHTO Engineering Standards for Low Volume Roads applies only to roads that are open to the public (for this project the AASHTO standards will apply to any construction on existing National Forest System Roads (NFSRs) that are open to the public. These segments are listed in the FEIS, Table 3-13). Therefore, the temporary road construction for the project will not fall under the AASHTO Standards, rather they will be designed and constructed according to the criteria and BMPs from the Forest Service Manual. Table 2-1 in the FEIS has been updated to reflect design and construction needs for Temporary Roads.
Mountain Coal Company	29	Page 102 DEIS, Statement beginning with "temporary project roads is contradictory to the information provided in Table 2-1 Design Criteria. RESPONSE: See MCC comment response #13 above. The FEIS has been changed to read: "Temporary roads that will not be open for public access, will receive only the minimum improvement needed for structural capacity, safety and erosion control as detailed in Table 2-1. These roads will be decommissioned by obliteration upon completion of project."
Mountain Coal Company	30	Page 105 DEIS, Statement beginning with "Development of new…" under the heading Alternative 2 is contradictory to the information provided in Table 2-1 Design Criteria.

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		RESPONSE: The referenced statement is disclosing a direct effect of constructing the temporary road mileage on the existing Forest transportation system (i.e. existing public use roads). As the temporary roads will not be a part of the Forest road system, and will not be open for public use, the construction of them will not have an appreciable effect on the existing public road system. The FEIS has been revised accordingly. Table 2-1 of the FEIS has been revised to clarify design and construction requirements for public and non-public roads.
Mountain Coal Company	31	Page 106 DEIS, Second bullet, second column, Reword paragraph to be correct or clarified. RESPONSE: This is language directly from the Forest Plan. If MCC uses a temporary waterline connected to a tank, this will apply wherever the pipeline crosses a road.
Western Slope Environmental Resource Council	1	WSERC believes that the project proposed would not cause significant, lasting harm to the environment. RESPONSE: Position statement. No response needed.
Western Slope Environmental Resource Council	2	WSERC's position is not to oppose expansion of North Fork coal mines into roadless areas provided such expansion a) is adjacent to existing mines, b) causes as little surface disturbance as possible, and c) is followed by obliteration of all roads and complete restoration to natural conditions. RESPONSE: Road construction in IRAs considered in this project is on federal coal leases that are contiguous with other lease holdings and the State permit area for the West Elk Mine (see FEIS Figure 1). Consistent with the RACR, FS policy and GMUG Forest Plan standards, any road construction in the IRA will be designed to cause the minimal amount of surface disturbance (see Table 2-1 and Chapter 3 Transportation Section in the FEIS). Under the RACR, roads must be obliterated when no longer needed for the purposes of the lease. Road construction in the IRA for this project has been designed to include this requirement (see Table 2-1). Reclamation efforts are designed to achieve Forest Plan standards, the post-mining land uses, and other land use needs (see Table 2-1).
Western Slope Environmental Resource Council	3	A great concern about surface disturbance is introduction of weeds through vehicle travel along the roads and on the well pads because such introduction could cause lasting harm within the project area. We note that the draft EIS contains provisions to prevent introduction of weeds (power washing of vehicles and equipment; pp. 66-67), to monitor weed infestations, and to control said infestations. We want to stress that this should be done conscientiously. RESPONSE: The FS acknowledges the importance of noxious weed management (see Chapter 1 Issues and Table 2-1). Noxious weed prevention, monitoring and treatment are conditions under Road Use Permits, issued by the Forest Service, with which MCC is required to comply. Paonia Ranger District maintains weed management agreements with both Gunnison and Delta Counties. State mine permit requirements also require weed treatment

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		and monitoring on disturbance areas within the MCC's permit area. The GMUG experience with noxious weed management in this particular area indicates that consistent application of approved herbicides is effective at controlling the noxious weed infestations.
Western Slope Environmental Resource Council	4	WSERC has had several conversations with mine managers about alternate methods of venting methane that would not require road construction, and we are aware that the mine has tried interior vent systems, which failed, considered directional drilling, which is not feasible because of the shallow overburden, and considered helicopter delivery of well-drilling equipment so as to avoid road construction. RESPONSE: The FEIS has been changed to reflect in more detail the various methods of methane management employed by the mine. See Chapter 2 Alternatives Considered but Eliminated from Detailed Study.
Western Slope Environmental Resource Council	5	For due diligence, we believe that the EIS should explicitly analyze these and other options that avoid road construction. RESPONSE: See WSERC Comment #4.
Western Slope Environmental Resource Council	6	In places, the draft EIS makes assertions that are not backed up by data or explanation. For example, there is a section on page 31 that states "in places the overburden is not thick enough that directional drilling either from outside the IRA is practical or possible" (sic). We would like to see more analysis presented, including numerical descriptions of the depth of overburden and an analysis of technical limitations on directional drilling that preclude its use given the depth of overburden. RESPONSE: According to MCC's experience drilling directionally in the B seam (project file); directional holes must be drilled such that the producing part of the well above the seam is vertical. This distance was approximately 250 feet in the B seam methane drainage wells and is projected to be 150 feet minimum in the E seam methane drainage wells. If such holes fail to achieve vertical in this portion of the well, they are subject to collapse and ineffective as degas holes. The maximum safe angle of drilling (above this minimum vertical section) that can be achieved by the drilling equipment available is 45 degrees. The drill mast is set at 45 degrees to begin the holes. This angle must be gradually corrected to vertical during the drilling process. The maximum allowable dog-leg in directional drilling is 4 percent, in order to be able to successfully install casing in the hole. Given the parameters of overburden depth (1,000 feet for the E Seam), as it relates to physical constraints of directional drilling, MCC is unable to reach the required methane drainage targets from outside the roadless boundary. Chapter 2, Alternatives Considered but Eliminated from Detailed Study of the FEIS includes this information.
Western Slope Environmental	7	In places the draft EIS makes assertions that are not backed up by data or explanation.... Another example is the statement on page 31 [DEIS] with respect to horizontal boreholes that "these types of boreholes alone are

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
Resource Council		inadequate for proper ventilation." We would like to see data or a description of MCC's prior efforts that substantiate this statement. RESPONSE: Examples of how these types of ventilation were inadequate have been included in the FEIS (Chapter 2, Alternatives Considered but Eliminated from Detailed Study).
Western Slope Environmental Resource Council	8	We note discussion of capture/use of methane on page 31 [DEIS], but this discussion is restricted to the potential for gas leasing. RESPONSE: Technology exists that would allow capture and use of methane instead of atmospheric venting. This is being done throughout the world on privately-owned coal reserves. Use of the methane, however is restricted as it is owned by the Federal Government until it is leased (i.e. a coal lease does not allow capture and use of gas). The FEIS has been updated to better explain this concept (See FEIS, Chapter 1, Alternatives Considered but Eliminated from Detailed Study).
Western Slope Environmental Resource Council	9	WSERC is concerned about how the large quantities of methane that would be vented to the atmosphere will affect global warming, and there should be analysis of this problem. RESPONSE: The FS identified global warming as an issue in the DEIS (see Chapter 1, Non- Significant Issues). The FEIS has added analysis of methane as a greenhouse gas. Due to the immeasurable quantity of methane released on a global scale from this project, global warming or climate change are considered outside the scope of this document.
Western Slope Environmental Resource Council	10	Include analysis of the technical and regulatory feasibility of using the methane for cogeneration of electricity. RESPONSE: See WSERC Comment #8. Additionally, electrical cogeneration and regulation are outside the scope of this document as the purpose and need for venting is for safety reasons and to facilitate recovery of leased coal reserves. Further, electrical cogeneration would not be regulated by the FS.
Western Slope Environmental Resource Council	11	We would like to see a quotation of the BLM regulations that prevent the mine from utilizing the waste methane. RESPONSE: According to the BLM, the rights granted in a particular mineral lease outline what exclusive rights the party (i.e. lessee) has. Coal and oil/gas are leased separately as brought forth in BLM regulations at 43 CFR Subparts 3000, 3100 & 3400. The separation of these mineral estates was further affirmed by the Supreme Court in its ruling on the *Southern Ute Indian Tribe vs. Amoco Production Company* case (1997). While that specific case involved who owned the coal bed methane; the court's ruling reaffirmed that coal belongs to the coal estate; and natural gas, irrespective of its geologic origin, belongs to the oil and gas estate. With respect to coal, the coal lease holder has the exclusive right to coal as brought forward on BLM Form 3400-12 Coal Lease (Sec. 2 states...[h]ereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon and under (sic). In addition, the coal lease holder has the right to remove

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		gas from the mine for safety reasons, but the not the right to beneficially use it without holding the oil and gas lease. Similarly, the oil and gas lease holder has the exclusive right to the oil and gas. BLM Form 3100-11 (Offer to Lease and Lease for Oil and Gas) is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) on the lands described in the lease.
Western Slope Environmental Resource Council	12a	"The dominant vegetation type that would be disturbed is oak brush, which forms dense, unproductive expanses as a result of historic fire suppression and logging. Wildlife habitat would be improved by oak brush clearing as a result of this project." and "It is our belief that the expanses of uniform oak brush in the project area were largely created by historic patterns of logging and fire suppression. Therefore, rather than assuming that the best restoration solution is to let the oak brush regenerate, we would like the Forest Service to analyze what the original native vegetation would have been prior to logging and fire suppression… RESPONSE: The Forest Service has research and information that disagree that logging and fire suppression created the oakbrush expanses (D. Bradford Specialist report, project file). There are no records that oak have ever been logged in the Dry Fork area. Oak brush has long been recognized as a major component of the vegetation on the Grand Mesa, Uncompahgre and Gunnison National Forests (GMUG NF). George B. Sudworth, an early forester, who surveyed the Battlement Mesa Forest Reserve from September 24 to October 30, 1898 noted that oak brush was widespread across the Forest Reserve (the Battlement Mesa Forest Reserve included Battlement Mesa and Grand Mesa, as well as the Muddy area of the Paonia Ranger District. Today these areas make up part of the White River N.F and GMUG N.F.). His specific comments regarding oak brush are as follows, (*Report on Battlement Mesa Forest Reserve* by George B. Sudworth, United States Geological Survey Twentieth Annual Report, Part 5 Report on Forest Reserves, Washington, Government Printing Office, 1898, p.205): “The Rocky Mountain oak, locally known as oak brush is of widespread occurrence, chiefly as a thicket-forming brush but also becoming a small tree to a greater extent in this reserve than in the White River Reserve. It has no commercial value. Its greatest importance is in checking the descent of mountain waters, and thus protecting lower treeless hills from violent washing. Large areas are densely covered with this growth, usually ranging from the low sage mesas, 7,000 feet, up to the aspen belt, 8,000 to 8,500 feet, patches of both oak and aspen often mingling. As a brush, which is the most common form, its dense thickets cover all the dry sandy and gravelly knolls and foothills below the forest-forming trees. As a tree it is confined to the deep rich soils of the bench lands and gentle slopes, mingling more or less with groves of aspen. Groups of this tree, with bent and twisted trunks occur at close intervals, forming a loose, low forest cover on

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		areas of 1 to 50 acres (PL LXVI, B, photo pairs for comparison of 1898 and 2003 are in the project file). The brushy forms are slender and from 2 to 12 feet high. Tree forms range from 4 to 10 inches in diameter, and frequently 14 to even 24 inches, while the common height is 12 to 25 feet. Growths of this kind were found only on the west slope of Hubbard Creek Basin and on the west side of the middle course of West Muddy Creek. Occasional thickets of much smaller trees occur on some of the rich, narrow benches in the region of Wallace Creek, on the north side of Battlement Mesa. While it is stated above, the brushy form of this species furnishes a generally conspicuous cover between the sage lands of the lower valleys and the lower levels at which the aspen occurs, it is becoming much more conspicuous in some of the broad interior basins. The high benches on the head waters of the Upper Gunnison River, West Muddy Creek, Hubbard Creek and Divide Creek are instances in which the vast areas covered by this brush deeply impress the observer." Even though this was written 109 years ago, Sudworth's comments pretty well characterize the status and condition of oak brush in this area today. However, it is now recognized that oak brush has more value than Sudworth mentioned. It does provide a variety of habitat for a variety of wildlife species, including big game and birds. Its value for wildlife is for cover, forage and browse. As a result a variety of age classes and structure provides the most benefits to wildlife. Sudworth also noted there were vast expanses of oakbrush in 1898, shortly after the Battlement Mesa Forest Reserve was established (December 24, 1892). Oak brush is probably located on the same sites on which they were located in 1898. However, as Paonia RD studies of historic photographs have shown, all woody vegetation on the GMUG NF is older, taller and denser; (Bradford et al. 2007) This has probably been caused primarily by fire suppression. Wildfire appears to have been a significant influence on the vegetation of the GMUG NF prior to American settlement. Sudworth noted in his *Report on Battlement Mesa Forest Reserve* p. 222 – 232, that "Forest fires have been very prevalent throughout the reserve." He noted that parts of the reserve appeared to have burned in 1878- 79, with less extensive burning taking place in 1883-85 and 1890-92. During the summer/fall of 1898 fires burned in August – October, with approximately 70,000 acres burning or 8 percent of the total reserve. In fact Sudworth photographed a number of sites that were actively burning or had burned earlier that season (Bradford *et al.* 2007). Analysis of over 300 historical photographs in the reference show that there is more woody vegetation today than at the time the GMUG MFs were established (1892, 1905 and 1905). This increase is due primarily to wildfire suppression. The Forest has used a variety of treatments to manage oak brush for various wildlife values, including prescribed fire and a variety of mechanical techniques including chaining, roller-chopping, and hydro-axing. In addition there has been other mechanical work, such as pushing rights-of-way for

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		fence-lines and building temporary roads for various mineral activities. All these activities have shown that oak brush regenerates aggressively by sprouting from the roots and stump. In general oak brush sites remain oak brush sites, with age and structure being the main characteristics that are affected by management. Therefore according to information held by the FS, we believe that oakbrush is representative of the native vegetation. Analysis in the FEIS duly discloses the effects of removal and reclamation needs.
Western Slope Environmental Resource Council	12b	We would like the Forest Service … [t]o consider requiring restoration of that original vegetation." RESPONSE: The FS obligation under the federal coal program rules (see Chapter 1, Authorities) is to prescribe conditions for use of the surface resources, and identify the post-mining land uses. As such, reclamation efforts have been designed to support the post-mining land uses of livestock grazing and big game winter range consistent with the GMUG Forest Plan, and lynx habitat as put forth in the LCAS (see Chapter 2, Reclamation, and Table 2-1). The FS incorporates these objectives into reclamation plans for the various minerals activities. Creating temporary openings and reducing shrub heights and canopy to provide younger, more productive browse is part of the revegetation objectives and support the forest plan management prescriptions. FS experience with mountain shrub communities on the Paonia Ranger District have shown that these shrubs always regenerate on their own, therefore reclamation design has focused on establishing a ground cover of desirable grasses to minimize noxious weed infestations and provide herbaceous forage for wildlife and livestock in support of forest plan prescriptions. For this project, the seed mix to be used also supports lynx habitat as it will provide forage for prey species.
Western Slope Environmental Resource Council	13	We informally asked Mountain Coal Company to provide us additional information about the quality of non-tributary water that would be liberated by coal mining activities and about how ground and surface water would be tested for organic compounds. MCC provided us helpful details, which we would like to see included in the EIS. RESPONSE: MCC is required to sample and analyze for inorganic, physical, and organic analytes/parameters of MCC's discharges whether mine water or surface water runoff, by the Colorado Division of Reclamation, Mining and Safety (CDRMS) and the Colorado Department of Public Health and Environment – Water Quality Control Division (CDPOH&E-WQCD). Further, MCC is required to sample and analyze the mine water discharge for biomonitoring two species, *Daphnia magna* (water flea) and *Pimephales promelas* (Fathead minnow) each quarter and meet the standards for the National Pollutant Discharge Elimination System (NPDES) through the CDRMS and CDOPH&E-WQCD. The sampling and analysis program is in

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		effect for the life-of-mine and up to ten-years after mining has ceased to coincide with the bond obligations with the CDRMS. MCC is required by the CDRMS regulations to gather one year of background or baseline data prior to MCC entering an area for coal mining. Results of water quality data are presented in the Annual Hydrologic Report which is deliverable to the DRMS annually. The FS also receives a copy. The quality of non-tributary ground water was not raised as an issue for the analysis (see Chapter 2, Issues) and does not appear to be an issue raised by WSERC at this time. Non-tributary ground-water is that ground-water which has been verified by the Colorado State Engineer's Office (SEO) to be hydraulically isolated from surface water. The West Elk Mine has such a finding from the SEO (District Court, Water Division 4, Colorado, case #06CW34) water found at the mine level has been found to be isolated from surface activities. The FS maintains that this is not an issue germane to the proposed action or alternatives.
Western Slope Environmental Resource Council	14	We also asked MCC to explain why riparian areas will only reach 80 percent cover in two years. Again, they provided us a helpful explanation, which we would like to see included in the EIS. RESPONSE: This is a GMUG Forest Plan standard for reclamation in riparian areas that requires 80 percent groundcover after the second growing season after reclamation occurs. (LRMP III-248) as stated "Drain and restore roads, pads and drill sites immediately after use is discontinued. Revegetate to 80 percent of ground cover in the first year. Provide surface protection during storm flow and snow melt runoff events." The standard allows some flexibility based on adverse climatic conditions (such as drought) and reduction in soil productivity after disturbances of the soil structure occur. Additionally, MCC has obligations to the CDRMS to adhere to the CDRMS regulations at 4.15.8 (2) which states in part: Vegetative cover and herbaceous production, species diversity, and woody plant density on the reclaimed surface shall be at least equal to the vegetative cover and herbaceous production, species diversity and woody plant density of living plants on the approved reference area or to the standards established in 4.15.7 (2)(d). In addition, the vegetation on the reclaimed area shall be of the same seasonal variety native to the area of disturbed land, or shall consist of species that support the post-mining land use. The post-mining land use in this case is linked to the Forest Plan, which is riparian habitat. The FS will specify the seed mix, revegetation efforts to meet the support of riparian area. MCC may be able to complete this in two years with the exception to the woody plant density. There are rules that require 90 percent production with 90 percent statistical confidence, within 10 years, which may require additional plantings. Any of the previously mentioned actions start the 10-year bonding liability standard over again for MCC.
Western Slope Environmental	15	Finally, MCC provided us additional information about the types of compounds using in drilling fluids and circulation additives that we would

Table 5-1
DEIS Comments and Responses

Commenter	Comment #	Comment/Response
Resource Council		like to see in the EIS. RESPONSE: MCC closely monitors the use of drilling fluids and cementing products used in drilling the MDW holes to verify that they are either naturally occurring organic or inorganic materials or biodegradable compounds. Drilling contractors are required to supply material safety data sheets (MSDS) with products to be used, to verify compliance. The majority of drilling fluids used consist of bentonite clay compounds and other industrial minerals which are naturally occurring in Wyoming, Colorado, and elsewhere. Examples of other organic compounds that might be utilized in the drilling process are crushed peanut shells, cottonseed hulls, and cedar fiber. No issue appears to have been raised with regard to drilling fluids and are therefore only included here for information as requested.
United States Department of the Interior, Office of the Secretary	1	On page 84 of the DEIS you stated that the U.S. Fish and Wildlife Service (USFWS) conducted aerial surveys for lynx on the GMUG. The USFWS has not conducted the aerial surveys you have attributed to them. The Colorado Division of Wildlife (CDOW) routinely conducts aerial radio telemetry surveys as part of their ongoing lynx reintroduction program. RESPONSE: The FEIS has been updated to correct this information.
United States Department of the Interior, Office of the Secretary	2	On page 73 of the DEIS, the document presents a brief, incomplete, documentation of the lynx listing information, and one statement describing the number of lynx released into Colorado by the CDOW. The DEIS should provide references to lynx listing documents and provide additional detail regarding the current status of lynx in the Southern Rockies Geographic Area. The current language is vague and does not include references to back up the statements referring to the status of lynx on the GMUG. RESPONSE: Language in FEIS and Final Biological Assessment is more specific to the project area with regard to lynx habitat and populations.
United States Department of the Interior, Office of the Secretary	3	Additionally, the DEIS mentions that the proposed action will occur within the Mount Gunnison Lynx Analysis Unit (LAU). The DEIS should provide a complete description of the Mount Gunnison LAU including a map of the LAU and habitat data to support a baseline description. RESPONSE: FEIS and Final Biological Assessment discuss Mount Gunnison LAU as recommended.
United States Department of the Interior, Office of the Secretary	4	On page 89 of the DEIS, there is a description of the anticipated impacts of the proposed action on lynx. We believe that this description is inadequate. The DEIS describes the number of acres of lynx habitat impacted, but there is no basis of determining what the effects will be (i.e. no baseline, see above). RESPONSE: The FEIS (Chapter 3, Wildlife) and Final Biological Assessment have been updated with the information requested. And FEIS Table 2-1 has been updated to include the requirements of the Biological Opinion for lynx on the Dry Fork Lease (see Dry Fork Lease- by-Application ROD).
United States	5	Also, the DEIS states that the lynx habitat in the project area is of "marginal

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
Department of the Interior, Office of the Secretary		quality as defined by USFWS" and provides a citation to support the statement. The statement and its supporting citation are out of context for a discussion of project level effects. Additionally, the DEIS has not provided any habitat data to support the statement. The citation provided discusses lynx habitat in a much broader context with regard to the lynx distinct population segment (within the lower 48 states). RESPONSE: The FEIS and Biological Assessment have been revised to include this information (Chapter 3, Wildlife Section).
United States Department of the Interior, Office of the Secretary	6	The DEIS seems to refer to lynx habitat in the project area as a (population) sink. Again, the DEIS does not provide any data to support this statement. RESPONSE: The FEIS and Biological Assessment have been revised to clarify this information (Chapter 3, Wildlife Section).
United States Department of the Interior, Office of the Secretary	7	The Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) (LCAS) provides guidance for conducting effects analysis for individual projects. Ruediger et al. (2000), state that lynx analysis units provide the fundamental or smallest scale with which to begin evaluation and monitoring of the effects of management actions on lynx habitat. The DEIS does mention that the project is located within the Mount Gunnison LAU, but does not provide any additional discussion regarding the existing condition of the LAU or, how habitat within the LAU will be affected by the proposed action. RESPONSE: The FEIS and Biological Assessment have been revised to clarify this information (Chapter 3, Wildlife Section).
United States Department of the Interior, Office of the Secretary	8	The DEIS design criteria contains measures to minimize negative effects of the action. One of the measures regarding new roads conflicts with guidance provided in the LCAS. The measure would place new roads "on top of ridges.., to avoid wet areas and improve road stability." (Page 23, Table 2-1) This measure conflicts with programmatic planning guideline number 5 in the Forest/Backcountry roads and trails section of the LCAS. The final ETS (FEIS) should state this deviation for lynx conservation measures and provide the appropriate analysis for the effects of the deviation. RESPONSE: Table 2-1 of both the DEIS and FEIS acknowledges this recommendation of the LCAS.
United States Department of the Interior, Office of the Secretary	9	The DEIS has concluded that foraging habitat for bald eagles will be impacted by the project, but does not state what the habitat is. The FEIS should provide a more comprehensive description of the foraging habitat for bald eagles, and how the habitat will be affected by the proposed action. RESPONSE: FEIS has been updated to reflect this comment (Chapter 3 Wildlife Section).
United States Department of the Interior, Office of the Secretary	10	The DEIS lacks sufficient information regarding the Colorado River endangered fishes. The FEIS should include an estimate of the water depletions associated with the proposed action, and should include reference to the Biological Opinion issued by the USFWS to GMUG. Additionally, the conclusion on page 89 of the effects of the proposed action, "may affect, not likely to adversely affect," is inaccurate. Because the determination has been

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		made that any water depletions might have an adverse effect on the endangered fishes, the appropriate determination in regard to the Colorado River endangered fishes is "may affect, likely to adversely affect," RESPONSE: The FEIS and Biological Assessment has revised the conclusion to "may affect, likely to adversely affect" the Colorado River endangered fish species, and references the GMUGs April 2007 Programmatic BO for Water Depletions (Chapter 3 Wildlife Section and USFWS BO# ES/GJ-6-CO-99_F_033CP062 TAILS 65413-2007-F-0119).
United States Department of the Interior, Office of the Secretary	11	On page 59 of the DEIS, you have described the presence of riparian areas and wetlands within the project area. However, the DEIS did not state whether any wetlands would be affected by the activities associated with alternative 2. Please describe the effects to wetlands, or state that the proposed action will avoid any impacts to this resource. RESPONSE: Effects to riparian areas and wetlands is addressed in the FEIS at (Chapter 3, Riparian Vegetation).
United States Department of the Interior, Office of the Secretary	12	On page 66 of the DEIS, you state that "while design criteria state riparian vegetation would be avoided wherever possible, the potential exists for some road building effects on riparian vegetation". You have described the potential impact to riparian ecosystems, but have not described the extent of the impact and did not describe where these impacts would occur. The DEIS implies that these effects will occur despite the design criteria. The FEIS should describe how and where avoidance would occur. RESPONSE: The project is designed using the concept of drilling windows and road location corridors to allow for flexibility in field fitting facilities. At project implementation, Design Criteria to avoid riparian disturbance will be followed (Table 2-1) to the maximum extent possible. Table 3-9 shows the riparian vegetation affect by roads and MDW.
United States Department of the Interior, Office of the Secretary	13	The cumulative effects of human activity and road development on wildlife within the project area under alternative 2 are described on page 91. The statement is made, "The result would be higher concentrations of wildlife in adjacent areas where there is limited activity". In some cases, the wildlife discussed in this section are territorial animals which defend an established territory, which conflicts with the DEIS statement. Please provide the appropriate scientific literature to support the statement in the FEIS. RESPONSE: FEIS has been updated to clarify this conclusion. See FEIS Chapter 3 Wildlife Section.
Delta County Board of County Commissioners (Amended comment letter):	1	DEIS states that daily project traffic will access the proposed site via the Sylvester Gulch Road and that oversized vehicles such as the drill rig and semi trucks would access from the west via Minnesota Creek Road in Delta County. Several years ago, an unfortunate set of circumstances resulted in extensive damage to a newly paved portion of Minnesota Creek road from heavy and high volume truck traffic serving mine operations. The Board would request that high volume, heavy truck traffic, e.g. gravel trucks, be required to access the site via Sylvester Gulch Road for the proposed project.

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		RESPONSE: In the EA and DN/FONSI for the Sylvester Gulch Road Construction and Long Draw Saddle Extension Upgrade (USDA, FS 2006), it was disclosed that some mine related traffic would continue to use County Road 710 (Minnesota Creek Road) and NFSR 710 to access the methane drainage project area with the drill rig. The Sylvester Gulch Road was approved and designed to handle traffic less than AASHTO standard WB-40). Therefore, it is not designed to support the type of traffic needed for the shaft construction (oversize and over-length vehicles). Further, as of the date of this FEIS, the Sylvester Gulch Road has not been completed (estimated completion July 2007). The FEIS has been revised to address the types of traffic that will need to use CR 710 and NFSR 710 as part of this project because they exceed the design criteria of the Sylvester Gulch Road. See FEIS, Chapter 3, Transportation. MCC has also developed a Maintenance Agreement with Delta County, see added letter from Delta County.
Colorado Wild, et al.	1	The analysis falls short of meeting NEPA's requirements and parts of the project would be illegal. RESPONSE: Specifics of this position statement are discussed further in subsequent Colorado Wild, et al. responses.
Colorado Wild, et al.	2	Therefore, for the reasons discussed below, the Forest Service must: (1) prepare a supplemental draft EIS that analyzes a true and complete range of reasonable alternatives; and (2) modify the proposed action. RESPONSE: For this Proposed Action, the FS is following the process for preparing an EIS consistent with CEQ regulations and FS NEPA policy. The FS prepared a DEIS that was released for public review and comment in March 2007. An FEIS was then be prepared that responds to comments raised on the DEIS analysis. A Supplemental EIS as suggested is not the appropriate document to prepare for this project and its place in the EIS process. With respect to the range of alternatives, the FS considered 9 alternatives in this analysis, three (3) of which were carried forward for detailed analysis. These alternatives collectively represent a range of reasonable alternatives (see FEIS, Chapter 2). Certain portions of the Proposed Action have been modified in response to comments received on the DEIS. See the FEIS, Chapter 2. See also responses Colorado Wild, et al. #15 -23.
Colorado Wild, et al.	3	We are particularly concerned about this project's potentially damaging impacts to the West Elk Inventoried Roadless Area (hereafter "the IRA")... The Forest Service thus should provide not only a high level of protection for these areas (as required by the Roadless Area Conservation Rule), but also should ensure that its analysis of environmental impacts to such areas as required by law is of the highest quality. The DEIS fails on both counts. RESPONSE: Effects of road construction in the West Elk IRA is disclosed in the DEIS and FEIS, Chapter 3, Inventoried Roadless Area. The authority for the FS to approve such activity is given in the FEIS Chapter 2, Proposed

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		Action, Proposed Activities in IRA.
Colorado Wild, et al.	4	We are especially concerned about this project because it appears to be precedent setting – it is one of the first decisions approving road construction in roadless areas since the Roadless Area Conservation Rule was reinstated by court order. RESPONSE: Position statement. No response required.
Colorado Wild, et al.	5	We are prepared to accept actions that will facilitate continued mining of coal in the North Fork Valley, if the mining is done safely and in compliance with all existing laws. RACR requires, however, that any mining carried out under roadless areas must be done without road construction or reconstruction inside the roadless areas, except "on lands that are under lease by the Secretary of the Interior as of January 12, 2001." RESPONSE: The Purpose and Need (FEIS, Chapter 1, Purpose and Need) for the Proposed Action is to protect public health and safety and to ensure safe and efficient production of leased coal reserves by allowing surface use on federal coal leases. The legal framework for authorizing these kinds of activities are discussed in the DEIS and FEIS, Chapter 1, Authorizing Actions. The Proposed Action is consistent with this legal framework. For clarification, the RACR (36 CFR 294.12), does not state that "any mining carried out under roadless areas must be done without road construction or reconstruction inside the roadless areas'. Rather, the RACR states that a road may not be constructed or reconstructed in IRAs of the National Forest System except as provided in 36 CFR 294.12 (b). 36 CFR 294.12 (b) lists the circumstances under which roads may be constructed, and includes (along with 6 other circumstances) when roads are "needed in conjunction with the continuation, extension, or renewal of a mineral lease on lands that are under lease by the Secretary of the Interior as of 1/12/2001 (sic) or for a new lease issued upon the expiration of an existing lease". The EIS brings forth that road construction in the West Elk IRA related to this project can occur (on the C-1362 and modifications for C-1362 and COC-56447) because it fits into the circumstances (exception) to the RACR listed above as the date of the modifications assumes the date of the parent lease according to BLM rpolicy. See also the EIS, Chapter 1, Summary Description of Proposed Actions in Inventoried Roadless Areas and Authorizing Actions – Roadless Area Conservation Rule, and Chapter 2, Description of Proposed Actions in Inventoried Roadless Areas.
Colorado Wild, et al.	6	No Exemptions Permit Road Construction on Roadless Lands under Lease 67232. Some activity proposed on all three leases involved would occur in the West Elk the IRA. DEIS at 19. Altogether, the proposed action would approve the construction of about 3.2 miles of road and numerous well pads in the IRA. DEIS at 6, 100. I. PROPOSED ROAD CONSTRUCTION ON LANDS COVERED BY LEASE 67232 WOULD VIOLATE THE LAW. Lease COC-67232 covers 1,517 acres, 620 of which are in the IRA. DEIS at 6. Under the proposed action, the Forest Service would approve the construction of 14 wells on

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		seven sites, and one mile of road, on the roadless portion of this lease. DEIS at 19. Lease 67232 was issued in March 2007. It is a new lease, i.e., not an extension, renewal, or continuation of preciously-issued lease. The issue date is well after the decision of Judge Laporte of the United States District Court of the Northern District of California which found the 2005 Roadless Rule illegal and reconfirmed the applicability of the 2001 Roadless Area Conservation Rule (hereafter "RACR"). See DEIS at 6-7.[1]. Response: The FS agrees that Judge Laporte's decision would legally exclude the road construction on this lease. Road construction on lease 67232 ("Dry Fork Lease") has been removed from the Proposed Action in the FEIS.
Colorado Wild, et al.	7	Under RACR, road construction in inventoried roadless areas is generally prohibited. 36 CFR 294.12 (2001). There are seven exceptions to this prohibition. The two that are cited as applying to the instant project (see DEIS at 20) read as follows: (1) A road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property…(7) A road is needed in conjunction with the continuation, extension, or renewal of a mineral lease on lands that are under lease by the Secretary of the Interior as of January 12, 2001 or for a new lease issued immediately upon expiration of an existing lease. Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease or upon termination or expiration of the lease, whichever is sooner. 36 CFR 294.12(b). RESPONSE: Re-iteration of language in EIS. The FS has interpreted that road construction in the IRA can be done under Exception 7 where applicable. The EIS has been revised accordingly.
Colorado Wild, et al.	8	The Forest Service claims that exception #1 applies for all the proposed activity in the IRA, because methane gas is a hazard to miners, and explosions could result in the loss of federal property (i. e., the coal resource) via explosions. Wells requiring roads in the IRA are, according to the DEIS, the only known way to vent the methane. DEIS at 20. RESPONSE: The EIS (Chapter 2, Alternatives Considered but Eliminated from Detailed Study) provides information on other ways of venting or using methane, and why they were not considered in detail. See response to comment Colorado Wild et al. #7.
Colorado Wild, et al.	9	The public health and safety exception in the 2001 RACR is narrow. By using both the word "imminent" and the word "catastrophic," and by including only examples of natural disasters (fire and flood), the Forest Service intended this exception only to apply to emergency situations that were not created by a proposed project itself. As explained in RACR's Preamble, The public health and safety exception at paragraph (b)(1) in the final rule applies only when needed to protect public health and safety in cases of an imminent threat of a

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		catastrophic event that might result in the loss of life or property. It does not constitute permission to engage in routine forest health activities, such as temporary road construction for thinning to reduce mortality due to insect and disease infestation. RESPONSE: See response to Colorado Wild, et al. #7.
Colorado Wild, et al.	10	The public health and safety exception at paragraph (b)(1) in the final rule applies only when needed to protect public health and safety in cases of an imminent threat of a catastrophic event that might result in the loss of life or property. It does not constitute permission to engage in routine forest health activities, such as temporary road construction for thinning to reduce mortality due to insect and disease infestation. 67 Fed. Reg. 3256 (Jan. 12, 2001). RESPONSE: Repeat of comment Colorado Wild et al. #9. No additional response needed.
Colorado Wild, et al.	11a	Clearly, this proposed project is not in response to an imminent threat – the threat would only arise from the proposed project itself. In other words, the "threat" would only arise as a result of the Forest Service's discretionary decision approving the expansion. Response: The Purpose and Need of the project states that the surface 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 (EIS, Chapter 1, Purpose and Need). At the point federal coal reserves are under lease and being developed, the FS does not have a discretionary decision, rather the Decision Framework is how, not if, the operations can be conducted (EIS, Chapter 1, Decision Framework). Further, the FS decision framework is bounded by the rights of the lessee which include (see EIS, Chapter 1, Purpose and Need) the 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. Further, under standard lease terms, the Lessee must 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 (USDI, BLM Form 3400-12, Coal Lease). Put one in project record. Therefore, this project also responds to the lessees obligation to conduct safe operations. Only those that road activities that fall under exception 7 are considered in the FEIS.
Colorado Wild, et	11b	Surely, the framers of the RACR did not intend that the agency could avail itself of an exception by approving a project that itself would create the need

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
al.		for the exception. RESPONSE: Position statement. No additional response needed.
Colorado Wild, et al.	11c	Additionally, since the Forest Service issued consent for lease 67232 in March, 2006 (see DEIS at 6, fn 3), there is no "imminent" action required to reduce any threat. If the methane drainage wells were not constructed, mining would still have to be done under safe conditions, as required by the coal leases in effect. See DEIS at 2, fn 1. RESPONSE: The Dry Fork Lease-By-Application (COC-67232) FEIS (3/10/2006) and Record of Decision acknowledged that surface use might occur on the lease. The Dry Fork FEIS acknowledged that methane drainage may be needed for safe and efficient recovery of coal reserves in that lease area, and therefore acknowledged that a safety threat existed. The Dry Fork LBA Record of Decision (Dry Fork ROD) acknowledged that issuance of a lease would convey rights for surface use. The Dry Fork ROD further acknowledged that if surface use would be proposed in the future, such a proposal would be evaluated on its own merits; an additional NEPA analysis would be prepared, and decisions made on those specific activities. Any proposal for surface use would need to be framed in the context of the lease stipulations identified in this ROD. Lease COC- 67232 was issued with a lease notice regarding portions of it being subject to any roadless area rules in place at the time surface operations were proposed (project file). See also response Colorado Wild 9 & 11a.
Colorado Wild, et al.	11d	Mountain Coal's ability to expand the mine and increase its economic recovery may be limited without the proposed new wells. DEIS at 2, 13. RESPONSE: The EIS acknowledges that without methane drainage wells, the currently leased federal coal reserves may not be minable (see EIS, Chapter 3, Health and Safety, Inventoried Roadless Area) and results in economic loss not only to the company, but also to the four hundred plus employees, 2 counties, and to the federal government (EIS Chapter 3, Social and Economic Resources).
Colorado Wild, et al.	11e	That, however, does not constitute the "imminent threat of [] catastrophic event" that is required if exception #1 is to apply. Therefore, the Forest Service cannot lawfully invoke exception 1 to approve road construction in the IRA. Clearly, this proposed project is not in response to an imminent threat – the threat would only arise from the proposed project itself. In other words, the "threat" would only arise as a result of the Forest Service's discretionary decision approving the expansion. RESPONSE: See response to comment Colorado Wild et al. #s 7, 11a and 11c.
Colorado Wild, et al.	12a	Nor does exception 7 apply to road construction proposed for lease 67232. The Forest Service admits that exception 7 does not apply to the 160-acre extension of lease 1362, which was issued in October, 2001, after RACR went

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		into effect. DEIS at 20. RESPONSE: Road construction in IRA for lease 67232 has been removed from the proposed action. Lease modifications assume the effective date of the parent lease under BLM (issuing agency) policy.
Colorado Wild, et al.	12b	Indeed, the RACR Preamble is very clear that roads were not to be allowed for future mineral leases: An additional optional exception was considered in detail in the FEIS as a social and economic mitigation measure and was available for selection with any alternative. This exception would have allowed road construction or reconstruction where a road is needed for prospective mineral leasing activities in inventoried roadless areas… The Department has decided not to adopt the exception for future discretionary mineral leasing as identified in the [Roadless Rule] FEIS because of the potentially significant environmental impacts that road construction could cause to inventoried roadless areas. Existing leases are not subject to the prohibitions. The Department has decided to adopt a more limited exception at 36 CFR 294.12(b)(7) to allow road construction needed in conjunction with the continuation, extension, or renewal of a mineral lease, on lands that were under lease by the Secretary of the Interior as of the date of publication of this rule in the Federal Register. Additionally, road construction needed in conjunction with a new lease may be allowed on these same lands if the lease is issued immediately upon expiration of the existing lease. The lessee would be required to start the process for issuance of a new lease prior to the expiration of the existing lease. 67 Fed. Reg. 3256 (January 12, 2001). Therefore this exception cannot possibly apply to lease 67232, which was issued in 2007, seven months after RACR was reinstated. It is clear that no exceptions to RACR's prohibition on road construction in roadless areas applies to lease 67232. Therefore, the Forest Service cannot legally approve road construction on the roadless portion of lease 67232. RESPONSE: See response to Colorado Wild et al. comment #12a.
Colorado Wild, et al.	13	The Forest Service Has Not Complied with Agency Guidance to Invoke Any Exceptions for Lease 67232. The Forest Service states that the management of IRAs is currently guided by Interim Directive 1920-2006-1. DEIS at 8. We note that the Regional Forester, in carrying out his duty under Interim Directive 1920-2006-1 to approve the purpose and need for a project in a roadless area requiring an environmental impact statement[2], did not address activity on the then-proposed lease which became lease 67232. See 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, January 18, 2007. In fact, he stated: "[n]o actions are being proposed on the IRA portion of the lease scheduled for sale." Id at 2. Therefore, no activity can be approved on roadless lands on lease 67232 unless and until the Regional Forester first approves the purpose and need that involves road construction on land covered by this lease. However, as demonstrated above, any such approval by the Regional Forester – even that invoking exception 1 – would violate the law.

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		RESPONSE: See response to Colorado Wild et al. comment #12a.
Colorado Wild, et al.	14	Modification of 160 acres each for leases 1362 and 56447 were issued in October, 2001. DEIS at 6. This was during a time when RACR was in effect, and it is currently in effect. As noted above, the DEIS admits that exception 7 does not apply to the modification of lease 1362. This exception allows minimal-impact road construction where needed for continuation, extension, or renewal of a mineral lease that was in effect at the time RACR became effective, January 12, 2001. Since exception 1 has been mistakenly applied to this lease, as discussed above in section I.A. of these comments, there are no exceptions to RACR's prohibition on road construction in the IRA in this area. Therefore, no roads can be constructed on the lands covered by the 2001 modification of lease 1362. If exception 7 does not apply to the modification of lease 1362, it does also not apply to the modification of lease 56447, as this modification was also done in October, 2001, and the entire lease is in the IRA. DEIS at 6. The only difference between the two leases is that 56447 lies entirely within an IRA, while most of 1362 does not. DEIS at 6. But exception #7 does not look to whether all of a pre-existing lease is roadless. Rather, it requires that a lease extension be limited to "lands that are under lease by the Secretary of the Interior as of January 12, 2001." Therefore, no road construction can legally occur on lands covered by the October, 2001 extension of lease 56447, either. RESPONSE: See response to Colorado Wild et al. comment 5.
Colorado Wild, et al.	15	THE DEIS FAILS TO EXAMINE A FULL RANGE OF ALTERNATIVES. The National Environmental Policy Act ("NEPA") requires that federal agencies "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 40 U.S.C. § 4332(E). This requires an agency to "[r]igorously explore and objectively evaluate all reasonable alternatives[.]" 40 C.F.R. § 1502.14(a). The consideration of alternatives is described as the "heart" of the NEPA analysis. Id. § 1502.14. However, the DEIS only examines two alternatives in detail, the proposed action and no action. It appears that there has not been any attempt to seriously consider ways to protect the IRA while still allowing some mining and methane venting. Indeed, an alternative that would not build roads or wells in the IRA was dismissed from detailed consideration because: 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 [methane drainage wells] for health and safety reasons under 2001 [Roadless Rule] 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. RESPONSE: 40 C.F.R. § 1502.14 does not define what number of alternatives is required other than a proposed action and a no action alternative and that we rigorously explore and objectively evaluate all

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		reasonable alternatives. Reasonable alternatives must meet the purpose and need and additional alternatives must present something that is not covered or already addressed. With respect to the range of alternatives, the FS considered 9 alternatives in this analysis, 3 of which were carried forward for detailed analysis. These alternatives collectively represent a range of reasonable alternatives (see FEIS, Chapter 2). Certain portions of the proposed Action have been modified in response to comments received on the DEIS. See the FEIS, Chapter 2. In addition, the No Action alternative inherently includes that activities would not occur in the IRA as does Alternative 3 - No Activity In Roadless added to the FEIS.
Colorado Wild, et al.	16	DEIS at 31. This seems to say that, because the Regional Forester says the Roadless Rule exceptions apply, there is no need to consider not entering the IRA. Even if the Regional Forester had correctly applied RACR's exceptions to the proposed project (he clearly did not do so, as discussed in sections I and II above), this would be arbitrary and capricious, and a blatant violation of NEPA's mandate to "promote efforts which will prevent or eliminate damage to the environment and biosphere" (42 U.S.C. 4321), and to "rigorously explore and objectively evaluate all reasonable alternatives (40 CFR 1502.14(a)). See also 42 U.S.C. 4332(e) (federal agencies shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources"). RESPONSE: See response to Colorado Wild et al. comment 15. Further, 42 U.S.C. 4321 Purpose fully states "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality." Federal Agencies must also consider the welfare of humans balancing human need for resources with protection of the natural environment as stated in 42 U.S.C. 4331(a) "The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use 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

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		generations of Americans. (b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may— (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; Preservation of historic, cultural, and natural heritage (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources. (c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation of the environment." The FEIS has added Alternative 3 - No Activity In Roadless. Based on these requirements, the EIS fulfills these obligations.
Colorado Wild, et al.	17	Just because the Forest Service is considering approving a more destructive alternative does not mean that the agency cannot or should not analyze a less destructive alternative that protects roadless character. RESPONSE: See response to Colorado Wild et al. comment 15 and 16. Further, roadless character, as defined, has already been altered and/or compromised in this area as documented in the EIS, Chapter 3, Inventoried Roadless Area.
Colorado Wild, et al.	18	Because of the many values of roadless areas in general – and the West Elk IRA in particular – it is entirely reasonable for the Forest Service to consider a proposal that limits road construction to areas outside the IRA. This would be so even if the RACR and implementing guidance were not in effect, because the IRA contains important roadless, wildlife, and other values. We understand that an alternative that protects roadless character would still permit Mountain Coal to continue its operations in the area for at least several years. Permitting years of continued coal mining while protecting critical roadless values would appear to be a more than reasonable compromise that is very deserving of serious consideration. RESPONSE: The Proposed Action was designed to limit to the maximum extent possible road construction in IRA (FEIS, Chapter 2, Proposed Action, Proposed Activities in IRA). Further, an alternative that described the scenario of Not Constructing Roads or MDWs in IRAs was considered, but not analyzed in detail in the DEIS. This alternative has been added to the FEIS as an alternative analyzed in detail (FEIS, Chapter 2 Alternative 3 - No Activity In Roadless). In addition, this concept is inherent in the No Action

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		alternative (FEIS, Chapter 2, No Action Alternative and Chapter 3, Inventoried Roadless Area). It is the Decisionmaker's role to weigh consequences and make approvals consistent with the purpose and need, legal framework, and decision space. According to FS knowledge of the history and current conditions of this portion of the West Elk IRA, the area retains little roadless character (see the existing condition discussion, and effects on roadless character in the EIS, Chapter 3.)
Colorado Wild, et al.	19	Before the project proceeds, the Forest Service must fully consider one or more alternatives that would not construct roads and/or well pads in the IRA. Any alternatives so developed should be issued in a supplement to the DEIS and circulated for public comment. RESPONSE: Effects to IRAs was identified as an issue to be addressed in the EIS (Chapter 1, Issues). Effects are disclosed in the DEIS and FEIS. See responses to Colorado Wild et al. comments 2, 15, 16, 17 and 18.
Colorado Wild, et al.	20	One or more alternatives that would construct and maintain the methane drainage facilities without the construction of roads in the roadless area. RESPONSE: See responses to Colorado Wild et al. comments 15, 16, 17, 18 and 19.
Colorado Wild, et al.	21	One or more alternatives that would construct and maintain the methane drainage facilities from outside the roadless area (including alternatives that contemplate postponing mining operations under roadless areas until drilling, venting, and other related technologies improve). REPSONSE: Methane drainage facilities are mapped approximate to where they are anticipated to be needed based on approved mine plans and coal resource recovery plans. Wherever possible, methane drainage wells are drilled on an angle (i.e. directionally), however the over-burden is rather shallow and there is not enough vertical distance to drill diagonally and place all MDWs outside of roadless (see EIS, Chapter 2, Proposed Action). With approved leases and mine plans, it is not within the discretion of the FS to postpone mining activities. The FEIS has been revised to include additional language about the status of other current technologies (see FEIS, Chapter 2, Alternatives Considered but Eliminated from Detailed Study). And an alternative considered in detail added considering not operating in roadless.
Colorado Wild, et al.	22	One or more alternatives, other than simple venting to the atmosphere, that would capture and remove methane from the mine workings. RESPONSE: The DEIS and FEIS address this concept in Chapter 2, Alternatives Considered but Eliminated from Detailed Study. There are several components involved with capturing and moving the gas. First, it is important to understand that the federal coal reserves and the federal gas reserves are separate mineral estates, and are leased separately. A Supreme Court case (Southern Ute Indian Tribe v. Amoco Production Company) affirmed that the separated nature of these estates. In this project area, the federal gas resource is not under lease. Without a

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		federal gas lease, it is illegal to capture and use the methane. The Forest Service is working with the BLM to convey gas leases in the area to sale. Leasing the methane (gas) would allow its capture and beneficial use. BLM provided technical information (project file) on what would be needed to capture (if it were under lease) the gas and take it to a pipeline, or use it in other ways. Their findings conclude that in order to send the gas from the methane vent wells to a pipeline for ultimate sale, a gas treatment facility would be necessary because the gas emitted from the mine does not meet basic pipeline quality. Primarily, the level of inert constituents in the gas (CO_2, N, air, others) exceeds the pipeline standard limit of 3 percent for inert constituents. Based on gas emission data from mining the B Seam at the West Elk mine, inert constituents range from 6 to 77 percent. For the purposes of this analysis, it is assumed that gas emissions from the E Seam would have a similar range of inert constituents. There would also be a need for a gas compression facility. Typically pipelines need to have gas pressures at 500 pounds per square inch (psi). In order to achieve 500 psi, the existing gas pressures would require 3 stage compression to achieve the needed level. Unlike a typical natural gas well completed in the Mesa Verde Formation in the Piceance Basin which has inherent pressures of in the 100s of psi range and do not require additional compression in early stages of operation, the MDW operate at about atmospheric pressure, or about 10 psi with an exhauster running. The MDWs would need full time wellhead or central compression to work. Although technology exists for this, there is uncertainty in how effective this technology would be given the variability of ventilation, and pressure boost needed. There are additional uncertainties regarding whether the volumes of methane being vented would warrant installation of compressors, gathering and transmission pipelines, and a gas treatment plant, since volumes vary so much with the mine operation, and are almost totally dependent upon the mine air circulation system. There are also issues related to permitting these facilities so as not to interfere with mine operations. BLM also researched using coal mine vent gas for electrical generation. There are numerous websites which show it being done, however none of them include any gas volume numbers or equipment requirement on which to base any analysis (project file).
Colorado Wild, et al.	23	Some of these alternatives are mentioned in the DEIS summary and body as "Alternatives Considered but Eliminated from Detailed Study". DEIS at 30-31. The explanations for dropping all such alternatives from analysis are inadequate, and based on assertions of facts and conditions, not justified or supported with details or analysis in the DEIS. Thus there is a need to outline and review them as full EIS alternatives. RESPONSE: 40 CFR Sec. 1502.14(a) …"for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." References/discussions have been added to the FEIS as appropriate.

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
Colorado Wild, et al.	24	We are very concerned about damage to riparian areas and possibly to water quality from the siting of well pads and access roads in wet areas. The DEIS states that there would be 33 well pads and 5.8 miles of road with 13 stream crossings in or adjacent to the water influence zone ("WIZ"). DEIS at 43. This is not acceptable. Facilities must be located in areas where damage to the riparian, aquatic, and water quality resources is the least likely, unless the impacts of constructing and operating the facilities and needed access roads would be even more damaging than siting them near the WIZ. RESPONSE: The analysis in the EIS discusses drill pad and road locations as occurring in windows and "corridors" that allows for the facilities to be field fit in a spot that minimizes disturbance. The analysis discloses the effects for the acreage associated with the whole window or corridor, when at implementation, the actual on the ground disturbance will be less. Therefore, there is some over-estimation of disturbance in particular vegetation types (which would include WIZ or riparian). The design criteria (EIS, Table 2-1) will be implemented to ensure that any field placement minimizes, to the maximum extent possible, effects not only to the riparian areas, but also to geologically instable areas which may have greater impact to riparian/wet areas by the release of sediment and increased erosion. Where activity occurs in wet areas that activity will be designed with strict adherence to FSH 2509.25 and appropriate federal and state permits will be obtained.
Colorado Wild, et al.	24	This especially true for any facilities in roadless areas. Under exception 7, any road construction or reconstruction in roadless areas 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, regulations, and laws. 36 CFR 294.12(b)(7) (2001). RESPONSE: See response immediately above. The FS is very concerned about the riparian and WIZ area for every area in this project and has many design criteria specific to this resource (EIS, Table 2-1).
Colorado Wild, et al.	26	Note that the Forest Plan requires protection of riparian areas. See Plan at III-50 and III-185 though -187. Note especially that in cases of resource conflicts, preferential consideration will be given to riparian area resources over other resources within the management unit. Forest Plan at III-173. RESPONSE: The Forest Plan provides direction Management Prescription 9A as stated, as well as, "Riparian areas are inclusions in other management areas and will be site specifically identified and mapped as part of the NEPA process or during riparian area inventories. The goals listed in this prescription apply to the riparian areas themselves and are in addition to the general directions and standards and guidelines for the MA [Management Area] in which the riparian area is located…: And "Standards and guidelines may or may not apply to ephemeral streams, seeps, springs, bogs or developed livestock water, dependent upon site specific objectives." (FP III-173) The project area is subject also to Management Area Prescriptions 5A (big game winter range) and 6B (livestock grazing).

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
Colorado Wild, et al.	27	According to the DEIS, one decision to be made for the project is whether to grant relief from lease stipulations that prohibit or limit operations on big game winter range from December 1 through April 30. DEIS at 4, 9. These lease stipulations are designed to protect wintering animals at the most difficult time of year for them. Any activity on and near winter range could cause the animals to expend more energy and/or flee to less suitable habitat, decreasing their chances for survival. The Forest Service must not waive these stipulations just so a company can achieve facility construction and the realization of profits quicker than it would otherwise be able to do. RESPONSE: The decision contemplates granting relief to the winter range timing limitation for one winter season (EIS, Chapter 1, Decision Framework). The FS has consulted with the Colorado Division of Wildlife, which has extensive knowledge of this area. In personal communication with Kurt Madariaga, CDOW, (Jan 2007) low or limited use as winter range is occurring at the shaft location. Current CDOW winter range maps show the shaft (for which the winter range relief would affect) as being exactly "on the line" for elk and outside of mule deer winter range by approximately 1 mile.
Colorado Wild, et al.	28	As we discuss above in sections I and II, we do not believe the Forest Service can legally approve any road construction on most of the areas leased within roadless areas. But if any new roads or motorized trails are constructed in roadless areas under the proposed action (for example, for access related to pre-2001 leases), they must be designed, managed, restricted, and reclaimed according to the requirements of the Roadless Area Conservation Rule of 2001. Specifically, roads constructed in roadless areas in conjunction with mineral leases: 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, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease or upon termination of expiration of the lease, whichever is sooner. RESPONSE: The FS acknowledges these requirements for road construction in IRAs. See EIS, Table 2-1.
Colorado Wild, et al.	29	RACR, 36 CFR 294.12(b)(7); emphasis added. Commendably, the DEIS has a design criterion that requires that all roads in roadless areas be obliterated upon completion of the work or expiration of the lease. DEIS at 23. There must be strict compliance with this criterion. Roads must not be converted to other uses, such as "decommissioned to ATV trails", as some previously constructed roads in roadless areas have been. See DEIS at 97. Any roads constructed or constructed in roadless areas for the project must be removed and the surface restored in a manner that prevents all post-project motor access of any sort. RESPONSE: The citation given in the comment refers to a 2002 Decision in

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		which a temporary road is to be decommissioned to a motorized trail when no longer needed for MCC's activities (USDA-FS. 2002b). The decision to maintain this one motorized trail ("Bomb Rock" area) in portions of the IRA was made by Regional Forester, Rick Cables in the Coal Methane Drainage Project Panels 16-24 Decision Notice in 2002. Under RACR (January 12, 2001) there is no prohibition from having a motorized public trail in an Inventoried Roadless Area as long at it is under 50 inches wide and managed as a trail (36 CFR 294.11). Roadless area characteristics also include the resources/features of "Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation" (36 CFR 294.11).
Colorado Wild, et al.	30	First, the DEIS fails to evaluate the impacts of the release of methane from vents. The purpose of the project is to facilitate safe recovery of coal by venting methane so it does not build up to dangerous levels inside coal mines. This means that significant amounts of methane, a "greenhouse" gas that is likely to increase global warming, would be released into the atmosphere. RESPONSE: Additional information has been added to the FEIS regarding release of methane (Chapter 3, Air Quality Section)
Colorado Wild, et al.	31	The public and decisionmakers should know, or be able to determine, how much methane would be released. The DEIS only discusses what the concentration of this gas in the "breathing zone" near to wells would be (id. at 39). It further dismisses the issue of greenhouse gas emissions as a "non-significant issue" without any explanation or justification whatsoever. DEIS at 11. It does not disclose how much would be produced per well annually, or over the life of the project. That information must be included in the FEIS. There should also be a discussion of possible methods to reduce such emissions. RESPONSE: See Rocky Mountain Clean Air Action Responses # 1, 2 & 3.
Colorado Wild, et al.	32	Second, the 75 million tons of coal that will be mined due to the Forest Service's approval of this project will be burned at U.S. power plants, further contributing to global warming. The Forest Service must analyze the impact on global warming of burning the coal supplied by the mine. RESPONSE: See Rocky Mountain Clean Air Action Responses # 7.
Colorado Wild, et al.	33	Third, it is highly likely that not only methane, but other pollutants also, will be vented out of the bore holes. Yet the DEIS assesses only the impacts of air pollutants emitted from engines by construction vehicles. See DEIS at 38-39. The Forest Service must analyze and disclose the emission of pollutants other than methane from the vents. RESPONSE: See Rocky Mountain Clean Air Action Responses #
Colorado Wild, et al.	34	CONCLUSION. Road construction on at least lease 67232, and likely on the other two leases, in roadless areas would be illegal and must not be authorized. A full range of alternatives must be analyzed, including one or more that would not require road construction in roadless areas. Well pads must not be constructed in or near riparian areas. Stipulations protecting

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		wintering big game must not be waived. The amount of methane that would be released into the atmosphere must be disclosed, along with methods of reducing the amounts released. RESPONSE: See all responses to Colorado Wild, et al.
Rocky Mountain Clean Air Action (comment received 5/9/07-after comment period, no appeal standing)	1	The DEIS contains inadequate analysis and assessment demonstrating the proposed coal gas drainage will comply with fundamental state and federal Clean Air Act requirements. Furthermore, all indications are that the coal drainage will, in fact, violate Clean Air Act requirements if allowed to proceed as proposed. RESPONSE: See subsequent Rocky Mountain Clean Air Responses.
Rocky Mountain Clean Air Action (comment received 5/9/07-after comment period, no appeal standing)	2	The USFS has also failed to analyze and assess the degree to which the proposed methane venting will affect global warming, in violation of the agency's duties under the National Environmental Policy Act ("NEPA"). Our concerns follow. RESPONSE: Additional information has been added to the FEIS regarding contribution of greenhouse gases (see Chapter 3, Air Quality)
Rocky Mountain Clean Air Action (comment received 5/9/07-after comment period, no appeal standing)	3	No Analysis of Drainage Emissions Nowhere in DEIS is there any analysis of the air pollutant emissions that will stem from the 168 coal gas drainage wells, which according to the DEIS are projected to operate over a 12-year period. This is a significant omission for several reasons. First, the DEIS notes that not just methane will be released into the air as a result of the 12-year drainage. On page 11, the DEIS states, "[V]enting of hydrocarbon gases.. .may affect air quality[.])" Hydrocarbon gases include volatile organic compounds ("VOCs") besides methane, many of which are listed hazardous air pollutants under section 112 of the Clean Air Act and most all of which are regulated as ozone precursors. See, 40 CFR § 51.100(s) and 40 CFR § 52.21(b)(1)(ii). Indeed, U.S. Geological Survey studies of coal gas in the Mesaverde Group have found that, although methane is the primary constituent, "Heavier hydrocarbon gas content ranges from 0.1 to almost 18 percent[.]."[1] This is particularly the case for coals in the Piceance Basin, which include those in the Paonia-Somerset coal field.[2] While heavier hydrocarbons in the Mesaverde Group include ethane, they also may include other alkanes like propane, pentane, and hexane, as well as other hydrocarbon groups including alkenes, aldehydes, and benzene and benzene derivatives, all of which are regulated VOCs under the Clean Air Act. See, 40 CFR § 51.100(s). The best available scientific data on the composition of Piceance Basin coal gas reasonably indicates that regulated VOCs will be vented into the air. Indeed, the DEIS neither presents nor references any information or analysis suggesting or implying otherwise. This omission is a significant error and shows the USFS has failed to adequately analyze and assess the air quality

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		impacts of the proposed coal gas drainage. Furthermore, the USFS cannot possibly claim that air quality, such as National Ambient Air Quality Standards ("NAAQS") for ozone, will be protected as a result of the proposed l2-year gas drainage, as it does on page 39 of the DEIS. All indications are that VOCs, which are ozone precursors, will spew forth from the project area for 12 years. Before a well-informed, legally compliant decision can be made, the USFS must analyze and assess the composition of the gas proposed for drainage and analyze and assess to what degree VOC emissions will actually affect ambient ozone concentrations to ensure protection of clean air. The DEIS fails to perform such an analysis and assessment. The failure to analyze and assess the VOC emissions from the proposed coal gas drainage also calls into question the USFS' s assertion that regulations governing hazardous air pollutant emissions will be followed. Most VOCs are listed as hazardous air pollutants under section 112 of the Clean Air Act and regulated as such under U.S. Environmental Protection Agency ("USEPA") regulations at 40 CFR Part 63. See, 42 USC § 4212(b). Any stationary source of air pollution releasing 10 tons per year or more of any single hazardous air pollutant, or 25 tons/year or more of any combination of hazardous air pollutants, is subject to regulation. See, 42 USC § 4212(c). With no analysis of potential hazardous air pollutant emissions, the USFS cannot possibly conclude that these Clean Air Act requirements will be met. The failure to analyze and assess the potential air pollutant emissions from the proposed coal gas drainage is also problematic in that it calls into question the USFS's assertion that the proposed 12-year gas drainage is not subject to Colorado reporting and permitting requirements. Under Colorado federally approved state implementation plan ("SIP"), any stationary source of air pollution that emits 2 tons/year or more of VOCs must submit an Air Pollutant Emission Notice. See, 5 CCR 1001-5, Part A, Section II.D.1.a. Further, any stationary source of air pollution that emits 10 tons/year or more of any criteria air pollutant is subject construction permitting requirements. See, 5 CCR 1001-5, Part B, Section II.D.1.c.(iii)(B). On top of that, any stationary source of air pollution that emits 250 tons/year or more of any criteria air pollutant must obtain a Prevention of Significant Deterioration ("PSD") permit and any source that emits 100 tons/year or more of any criteria air pollutant must obtain an operating permit. See, 5 CCR 1001-5, Part D, Section LA.1 and 5 CCR 1001-5, Part D, Section II.A.1. Once again, the failure of the USFS to analyze and assess the amount of regulated air pollution, namely VOCs, that will be released by the 168 wells that will be operating over a 12-year period clearly shows the USFS has failed to ensure compliance with Colorado air quality regulations, contrary to the agency's assertion on page 39 of the DEIS. Indeed, the 168 wells will constitute a single stationary source, which is defined under Colorado regulations at 5 CCR 1001-5, Part A, Section I.B.41 as: Any building, structure, facility, or installation, or any combination thereof, belonging to the same industrial grouping, that emits or may emit any air

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		pollutant subject to regulation under the Federal Act, that is located on one or more contiguous or adjacent properties and that is owned or operated by the same person or by persons under common control. The proposed 168 coal gas drainage wells which will spew pollution for a 12 year period clearly constitute a "building, structure, facility, or installation, or any combination thereof," clearly belong to the same industrial grouping, clearly will emit air pollutants regulated under the Clean Air Act, and are clearly located on one or more contiguous or adjacent properties that are owned and operated by the same persons or persons under common control. The failure to analyze and assess the type and amount of regulated air pollutants that will be released from the drainage wells clearly indicates the USFS has failed to ensure compliance with the Clean Air Act and the Colorado SIP. Finally, the failure to analyze and assess the coal gas emissions from the proposed drainage simply violates NEPA's "hard look" requirement. As explained, the USFS has failed to adequately analyze and assess the air quality impacts of the proposed coal gas drainage, thereby failing to ensure compliance with applicable clean air laws and regulations. The DEIS is therefore insufficient under NEPA. RESPONSE: It is estimated that only 6 to 8 methane drainage wells will be operating at any given time during the span of the project using mobile exhausters for a duration, at any given well, estimated at less than 3 years. This, according to Colorado permitting standards, is therefore not a stationary source (as it is mobile) subject to the stationary source list which applies to certain categories of facilities none of which include “coal mines”. In fact, methane drainage has been occurring for approximately 6 years at the West Elk Mine in quantities nearly double the estimated value for this coal seam under the same Colorado air permit where the regulated emissions apply only to fugitive dust under Regulation 1 (5 CCR 1001-3). Additional information on MCC’s permitting is provided in the FEIS (Chapter 3 Air Quality Section). USGS reference used by Rocky Mountain Clean Air Action applies to “coal bed gas” also known as coalbed methane which involves directly drilling into unworked coal and coal measures strata to release the methane adsorbed to the coal. The methane referred to in this document is “coal mine methane” which gas is released due to the relaxation of pressure and fracturing of the strata during coal mining activity. However, additional identified compounds (VOCs) were added to air quality analysis (Chapter 3, Air Quality) which already included a discussion of VOCs from MDW vents and from vehicular emissions. There was no claim in the DEIS that “NAAQS” for “ozone” would be “protected”. The EIS states ozone is a “criteria pollutant” and that “ambient air quality standards must not be exceeded in areas where the general public has access” and “would not exceed any established air quality standards” (DEIS/FEIS, Chapter 3, Air Quality Section).
Rocky Mountain	4	West Elk Mine Permit Concerns

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
Clean Air Action (comment received 5/9/07-after comment period, no appeal standing)		The DEIS erroneously claims that a modification or revision of the existing construction permit for the West Elk Mine will not be required due to the proposed 12-year, 168 well coal gas drainage project. The USFS claims on page 38 of the DEIS that, "Activities under the proposed action are not anticipated to require a modification of existing or application for new permits." This does not appear to be true. The proposed coal gas drainage wells constitute stationary sources that that are interrelated with the operation of the West Elk Mine and are owned and operated by the same mining company. Further, the best available scientific information strongly indicates that VOCs, a regulated pollutant, will be released by the proposed coal gas drainage wells over a 12 year period. Together with operations at the mine, the proposed coal gas drainage wells constitute a single stationary source under the Colorado SIP at 5 CCR 1001-5, Part A, Section I.B.41. Before the wells can be constructed, the air permit for the West Elk Mine must be amended or revised to include any and all required emission limitations and standards related to the construction and operation of the 168 coal gas drainage wells.[3] RESPONSE: See Rocky Mountain Clean Air Action response #3. MCC deals directly with the State for its air quality permits. The Forest Service does not impose on the State any assertions for implementation of the Clean Air Act or the State's authorities as delegated by EPA. The State (DRMS) during its review of MCC's proposal has not indicated any change to the air permit is required at this time.
Rocky Mountain Clean Air Action (comment received 5/9/07-after comment period, no appeal standing)	5	Global Warming Impacts The DEIS is entirely silent on the impacts of the proposed methane releases in terms of their contribution to global warming. This is yet another significant omission and calls into question the adequacy of the USFS' s analysis under NEPA. "NEPA requires that the federal agency consider every significant aspect of the environmental impact of a proposed action. . . [and] inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Earth Island v. United States Forest Service,* 351 F.3d 1291, 1300 (9th Cir. 2003). "In order to accomplish this, NEPA imposes procedural requirements designed to force agencies to take a 'hard look' at environmental consequences." *Id.* "The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a 'hard look' by the agency, and thereby to permit informed public comment on proposed action." *Lands Council v. United States Forest Service,* 395 F.3d 1019, 1027 (9th Cir. 2004) *citing Muckleshoot Indian Tribe* v. *United States Forest Service,* 177 F.3d 800,809-810 (9th Cir. 1999). RESPONSE: Additional information has been added to the FEIS regarding contribution of greenhouse gases (see Chapter 3, Air Quality).
Rocky Mountain Clean Air Action (comment received 5/9/07-	6	0verview of Global Warming The enhanced greenhouse effect, or global warming from anthropogenic greenhouse gas pollution, is as well understood as any phenomenon in the planetary sciences. The Intergovernmental Panel on Climate Change (IPCC)

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
after comment period, no appeal standing)		has most recently released Climate Change 2007: The Physical Science Basis Summary for Policymakers, which summarizes many of the major findings.[4] Some of the science and policy implications are discussed briefly below. Scientists have demonstrated that anthropogenic greenhouse gas emissions have altered the energy balance of the earth by *0.85 + 0.15* watts per square meter (Hansen et al. 2005); due to the lag time in the climate system, this energy imbalance commits the earth to additional warming of .6°C (1° F) of warming that is already "in the pipeline," even absent additional greenhouse gas emissions.[5] Leading scientists are now able to tell us, with a high degree of certainty, that additional warming of more than 2.0- 3.00 C (3.8-2.7° F) above year 2000 levels will constitute "dangerous climate change," with particular reference to sea level rise and species extinction. The "tripwire" between keeping warming above 2000 levels to less than 1.0°C (1.8° F) and between experiencing warming of more than 2.0- 3.00C (3.8-5.4° F) above 2000 levels depends on a very small amount of anthropogenic greenhouse gas emissions because warming of more than 1.00C (1.80 F) above 2000 levels will likely result in climate feedbacks that will result in 2.0 to 3.0°C additional warming even without substantial additional greenhouse gas emissions. Furthermore, scientists are able to describe the likely atmospheric greenhouse gas level "ceiling" that must not be exceeded in order to prevent additional warming of more than 1°C (1.8° F) above year 2000 levels; they tell us the ceiling is approximately 450-475 ppm of carbon dioxide, depending upon levels of other greenhouse gases, such as methane and nitrous oxide.[6] In order to stay within the ceiling, emissions must follow what has become known as the "alternative," rather than the "business as usual," greenhouse gas emissions scenario. In the business as usual scenario, carbon dioxide emissions continue to grow at about 2% per year, and other greenhouse gases such as methane and nitrous oxide also continue to increase. In the alternative scenario, by contrast, carbon dioxide emissions decline moderately between now and 2050, and much more steeply after 2050, so that atmospheric carbon dioxide never exceeds 475 parts per million. The alternative scenario should limit global warming to less than an additional 1° C in this century.[7] Unfortunately, society so far has not followed the alternative scenario. Instead, carbon dioxide emissions have continued to increase by 2% per year since 2000. If this growth continues for just ten more years, the 35 % increase in emissions between 2000 and 2015 will make it unlikely we can achieve the alternative scenario.[8] Just ten more years on current greenhouse gas emissions trajectories will essentially commit us to climate disaster. Dr. James E. Hansen, Director of the NASA Goddard Institute for Space Studies, and NASA's top climate scientist, has stated: "In my opinion there is no significant doubt (probability > 99%) that. . . additional global warming of 2° C would push the earth beyond the tipping point and cause dramatic climate impacts including eventual sea level rise of at least several meters, extermination of a substantial fraction of the animal and plant species on the planet, and major regional

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		climate disruptions."[9] In order to avoid truly unacceptable consequences of global warming, we must stop the growth of greenhouse gas emissions, and, in relatively short order, begin reducing them. Achieving the reductions necessary to keep post-2000 global warming within 1° C will be extremely challenging. In June 2005, the National Academies of Science of major nations around the world (including Brazil, Canada, China, France, Germany, India, Italy, Japan, Russian, the United Kingdom and the United States) signed a joint statement regarding climate change. It said, in part: "The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action. . . Action taken now to reduce significantly the build-up of greenhouse gases in the atmosphere will lessen the magnitude and rate of climate change. A lack of full scientific certainty about some aspects of climate change is not a reason for delaying an immediate response that will, at a reasonable cost, prevent dangerous anthropogenic interference with the climate system." Global warming represents the most significant and pervasive threat to the future of biodiversity worldwide, affecting both terrestrial and marine species from the tropics to the poles. Peer reviewed studies have concluded that 35 percent of species could be committed to extinction by the year 2050 if current emissions trajectories continue and that these extinctions could be significantly reduced if greenhouse gas emissions fall.[10] Entire cultures and ways of life around the globe, including in the Arctic, are at risk from global warming. Many Arctic peoples, such as the Inuit, who rely upon hunting for their primary food supply, are suffering from these changes, as well as from a reduction in weather predictability and travel safety, and face "serious challenges to human health and food security, and possibly even the survival of some cultures." Some communities and industrial facilities in coastal zones are already being forced to relocate due to severe coastal erosion as rising sea level and a reduction in sea ice allow higher waves and storm surges to reach the shore.[11] The impacts to biological diversity go hand-in-hand with the impacts to human society. The World Health Organization estimates that as of the year 2000, 154,000 lives are already lost annually due to global warming.[12] In the Harvard Medical School publication *Climate Change Futures: Health, Ecological, and Economic Dimensions,* experts predict a number of profound consequences for human health if worldwide greenhouse gas emissions continue on current trajectories. Predictions include an increase in diseases such as malaria, West Nile Virus, and Lyme disease, as well as an increase in pollen production, allergies, and allergic diseases such as asthma.[13] Deaths from factors like dehydration and heat stroke associated with more frequent heat waves are projected to triple in many urban centers in the U.S. "With the likelihood of [extreme heat waves] projected to increase 100-fold over the next four decades, it is difficult to avoid the conclusion that potentially dangerous anthropogenic interference with the climate system is already underway. . . by the end of this century, 2003 [in which between 22,000 and 35,000 Europeans died in heat waves] would be classed as an

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		unusually cold summer." Damage to humans and infrastructure from floods is also predicted to increase.[14] Scientists have long predicted increasing weather variability and heightened intensity of storms like hurricanes due to increasing ocean temperatures. Extreme weather events have in fact increased, with catastrophic results, both in loss of lives and in economic costs. Global weather related losses from *extreme* events have increased dramatically since the 1950s, measured in 2004 U.S. dollars. "While no one event is diagnostic of climate change, the relentless pace of unusually severe weather since 2001- prolonged droughts, heat waves of extraordinary intensity, violent windstorms and more frequent '100 year' floods - is descriptive of a changing climate."[15] One of the most troubling recent findings is that the IPCC projection for sea level rise is almost certainly a significant underestimate. Melting of the Greenland ice sheet has accelerated far beyond what scientists predicted even just a few years ago, with melting in 2004 occurring at 10 times the rates observed in 2000.[16] Sea level rise in line with past underestimates would still inundate substantial areas of the coast and have far-reaching consequences. Yet just 2-3° C of additional warming would likely cause sea level to rise by at least 18 feet (6 m) within a century, and would flood vast areas and displace millions of people. In sum, the costs of global warming in terms of human life, biological richness, and money, will be astronomical. The DEIS must be revised to include a meaningful discussion of the 168 coal gas drainage wells' cumulative impacts in terms of global warming. RESPONSE: The Forest Service does not dispute assertions that greenhouse gases contribute to climate change. However, the magnitude of climate change on a national or global scale is outside the scope of this document. CEQ regulations are clear on the level of analysis required when information is incomplete or unavailable. The FEIS, Chapter 3, Air Quality further discusses this situation with respect to climate change.
Rocky Mountain Clean Air Action (comment received 5/9/07- after comment period, no appeal standing)		The contribution of coal mine methane gas to global warming The DEIS at page 11 identifies methane emissions in terms of global warming as a "nonsignificant" issue. This claim is not supported in light of the methane emissions and the projected impacts of global warming, as discussed above. Furthermore, given that the DEIS presents no analysis and assessment of projected methane emissions from the 168 proposed coal gas drainage wells that will operate for 12 years, the USFS has no basis upon which to conclude that methane emissions are a non-significant issue. Other agencies, in fact, identify methane emissions from coal mining as a significant issue. The Department of Energy, for example, has stated: The release of methane into the atmosphere, either through natural seeps, ventilation during mining, or via other means, has environmental consequences. Methane is a potent greenhouse gas, with 21 times the global warming potential of carbon dioxide. In fact, coal mining accounts for about

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		10% of U.S. methane emissions.[17] The Department of Energy reported that in 2003, coal mine methane emissions amounted for nearly 2.9 million metric tons in the United States, or the equivalent of 60.9 million metric tons of carbon dioxide.[18] In fact, the Department of Energy has even analyzed the global warming impacts of coal mine methane in Environmental Impact Statements required under NEPA in the context of authorizing new coal fired power plants.[19] Furthermore, the U.S. Environmental Protection Agency has stated: After removing coal mine methane from a mine, some companies use it as fuel, but most simply emit it to the atmosphere. Because methane is a greenhouse gas, this contributes to global warming. In fact, methane significantly contributes to global warming because it is approximately 21 times more potent (as a greenhouse gas) than carbon dioxide.[20] In light of the Department of Energy's finding that methane emissions have "environmental consequences," as well as the U.S. Environmental Protection Agency's recognition that methane "significantly contributes to global warming," it is unclear how the USFS could possibly conclude methane emissions are a "non-significant issue." At the least, there is no explanation and no analysis supporting the USFS's rationale and decision to ignore global warming as a significant environmental impact, in violation of NEPA. RESPONSE: As far as this project is concerned, global warming is outside the scope. The Forest Service does not measure global warming, nor does it dispute that methane is a greenhouse gas with 21 times the global warming potential of carbon dioxide and may contribute to climate change. Quantities of estimated methane release have been added to the FEIS (Chapter 3, Air Quality Section).

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
Rocky Mountain Clean Air Action (comment received 5/9/07- after comment period, no appeal standing)	7	NEP A and Global Warming NEPA requires project analyses to be of high quality, and requires agencies to insure the professional integrity, including scientific integrity" of those analyses. 40 CFR § 1502.24. Additionally, agencies must take a "hard look" at their actions. *Muckleshoot Indian Tribe* v. *United States Forest Serv.,* 177 F.3d 800,814 (9th Cir. 1999) (per curiam) (quoting *Robertson* v. *Methow Valley Citizens Council,* 490 U.S. 332, 350,104 L. Ed. 2d 351,109 S. Ct. 1835 (1989)) internal quotation marks omitted). The USFS is also required to "describe the environment of the areas to be affected or created by the alternatives under consideration." 40 CFR § 1502.15. The establishment of the baseline conditions of the affected environment is a practical requirement of the NEPA process. *Half Moon Bay Fisherman's Marketing Ass'n* v. *Carlucci,* 857 F.2d 505, 510 (9th Cir. 1988). In that case, the Ninth Circuit stated that "without establishing. . . baseline conditions. . . there is simply no way to determine what effect [an action] will have on the environment, and consequently, no way to comply with NEPA." The DEIS has failed to take a hard look at the effects of the project and to accurately describe the baseline conditions with regard to atmospheric greenhouse gas concentrations, global warming, and other issues. NEPA requires environmental impact statements to "insure the scientific integrity" of their analyses, to contain "accurate scientific analysis," and to "provide full and fair discussion of significant environmental impacts." 40 C.F.R. § 1502.24, §1500.1(B), §1502.1. Global warming is one of the greatest challenges our civilization faces. It threatens to transform everything about our landscape, and to alter much in nature such as the timing of the rains and the modulations of the seasons-even the ocean currents may be altered. Moreover, global climate change impacts are occurring more rapidly than scientists anticipated even just a few years ago. A review of hundreds of research studies contends that animal and plant species have begun dying off or changing sooner than predicted because of global warming.[21] These fast-moving adaptations have come as a surprise even to biologists and ecologists because they are occurring so rapidly. At least 70 species of frogs, mostly mountain-dwellers have gone extinct at least in part because of climate change, the analysis says. It also reports that between 100 and 200 other cold dependent animal species, such as penguins and polar bears, are in deep trouble. "We are finally seeing species going extinct," said University of Texas biologist Camille Parmesan, author of the study. "Now we've got the evidence. It's here. It's real. This is not just biologists' intuition. It's what's happening." Parmesan reports seeing trends of animal populations moving northward if they can, of species attempting to adapt to climate change, of plants blooming earlier, and of an increase in pests and parasites. The rate of publication of articles relating to the biological responses to global warming increases each year.[22] Approximately 40 percent of 866 papers published between 1899 and January 2006 dealing with climate change

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		impacts on species were published since January, 2003. This highlights the importance of utilizing current research to meet NEPA's scientific integrity requirement.[23] In this case, though, the USFS has not used *any* research and has instead summarily dismissed the global warming impacts related to the methane drainage as a non-significant issue. The USFS has failed to take a hard look at both the affected environment and the environmental effects surrounding this project. We are further concerned that the USFS has not addressed the cumulative global warming impacts that will occur as a result of future coal burning. Coal from the mine is produced to fuel coal burning power plants, which will in turn release harmful carbon dioxide and further contribute to global warming. This connected action must be addressed by the USFS to ensure the agency takes a "hard look" at the cumulative impacts of the proposed project. RESPONSE: 40 CFR §1502.24 fully states" Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. An agency may place discussion of methodology in an appendix." There are no studies which could show definitively what effect this project, or any similar project, would have on global warming and the Forest Service would be lacking in expertise to assert such conclusions. MCC voluntarily reports its emissions of methane vented to EPA, as methane as is not currently regulated (no regulations or standards exists). The Forest Service, additionally, does not maintain or collect baseline data on a global scale for climate change and atmospheric gasses which is required to make any sort of conclusions. Further, 40 C.F.R. § 1502.1 states "It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." The Forest Service believes that climate change, while it is a global issue, cannot be measured in terms of effects specific to this proposal, and is therefore a non-significant issue in terms of this analysis. Levels of methane anticipated to be released from this project have been disclosed in the FEIS (Chapter 3, Air Quality). No alternatives have come to light based on this discussion of climate change, that would alter the proposed action or the purpose and need behind it, nor is this project establishing policy regarding methane reporting or establishing any standards, regulations or precedents. Likewise, the effects on global warming of burning of coal, mined by MCC, which is shipped to various places and combined with other coal reserves in other states and regions, can not be discussed more specifically than the effect of the methane drainage as discussed above due to a lack of scientific studies documenting the correlation between the amounts of CO_2 likely to be emitted by burning the coal which could be safely mined due to this project and global

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		warming.
US EPA	1	EPA understands and certainly supports the need to vent methane from the mine to address important mine safety concerns. We recommend, however, that the final EIS identify the magnitude of the emissions and discuss alternatives to allowing the methane resource to be vented directly to the atmosphere. Specifically, we recommend that the final EIS describe the range of alternative technologies available for capturing the methane and the potential economic and environmental benefits associated with capturing and utilizing a portion of the methane emissions. REPOSNSE: The FEIS includes this information in Chapter 3, Air Quality and in Chapter 2, Alternatives Considered but Eliminated from Detailed Study.
US EPA	2	The draft EIS does not present information on the amount of methane that is expected to be released from the proposed action, This is of particular concern because, based on information reported to EPA by the MCC, the West Elk Mine releases large quantities of methane to the atmosphere For example MCC reported to EPA that in 2005, the West Elk Mine vented approximately 8.2 billion cubic feet of methane. Approximately one-half of the methane from the West Elk Mine was drained from borehole drainage wells and the other half released in diluted concentrations hi mine ventilation. We recommend that the final EIS for this project include this. information.[1] REPONSE: The FEIS includes this information in Chapter 3, Air Quality. MCC, however, indicated that the 8.2 billion cubic feet EPA identified was not reported to EPA. MCC believes that this estimated value came from preliminary estimates while working with EPA's CMOP program and not from any physical reporting. MCC reports its methane production (including that specifically emitting from MDWs) on a quarterly basis to the BLM under a confidentiality agreement. This official number from the B Seam is what the Forest Service and BLM have used to estimate methane releases from the E Seam.
US EPA	3	As indicated on EPA's website, methane is a greenhouse gas that remains in the atmosphere for approximately 9-15 years and is over 20 times more effective in trapping heat in the atmosphere than carbon dioxide (CO_2) over a 100-year period. Methane's relatively short atmospheric lifetime, coupled with its potency as a greenhouse gas, makes it a candidate for mitigating global warming over the near-term (i.e., next 25 years or so); Methane is emitted from a variety of natural and human influenced sources. In the U.S. underground coal mines are the largest source of coal mine methane (CMM) emissions accounting for about 75 percent of all CMM emissions. Air emitted from mine ventilation shafts is the largest source of underground emissions. For more information, please see EPA's methane web site … EPA supports energy conservation as an important pollution prevention measure, and notes that the Council on Environmental Quality's (CEQ's) memorandum on energy conservation encourages federal agencies to incorporate pollution prevention principles, techniques, and mechanisms into

Table 5-1 DEIS Comments and Responses		
Commenter	**Comment #**	**Comment/Response**
		their planning and decision-making processes and to evaluate and report those efforts, as appropriate, in documents prepared pursuant to NEPA. Moreover, EPA's Coal bed Methane Outreach Program, which began in 1994, is a voluntary program through which the U.S. coal industry has captured and used 308 billion cubic feet (Bcf) of coal mine methane. The 10 active mines in the U.S. with methane capture projects operating in 2002 used 44 billion cubic feet of methane, which offset almost 18 million metric tons of carbon dioxide emissions. In turn, this provided enough energy to heat 638,000 homes. To date such efforts are being accomplished in underground coal mines in Alabama, Virginia, West Virginia and Pennsylvania. Indeed, the portion of the West Elk Mine's methane released from the drainage wells would be sufficient to heat several thousand homes, and has a value of approximately $15 to $25 million dollars annually. Given the project's release of significant quantities of methane, there is an important economic and environmental opportunity here to capture and utilize the methane resource. RESPONSE: MCC is a member of EPA's CMOP program; however, since the Federal gas reserve (methane) is not under lease, it is illegal for it to be used for these beneficial purposes until leased (see FEIS, Chapter 2, Alternatives Considered but Eliminated from Detailed Study).
US EPA	4	Given the potentially significant amount of methane that will be released from the project, we recommend that the final EIS analyze measures for capturing all or a part of the methane to be vented from the mine. While EPA understands that there is no lease in place that would allow the methane encountered as a by-product of the mining to be captured and put to beneficial (i.e., profitable) use, the lack of a lease should not preclude evaluation of measures to capture and reuse this resource. CEQ's regulations direct an agency to analyze reasonable alternatives not within the jurisdiction of the lead agency. Methane capture and reuse is a reasonable alternative to the proposal of venting the methane to the atmosphere, and thus, we recommend that it be analyzed. REPSONSE: See EPA response #3. Leasing of the gas resource and its reduction in the methane is not being analyzed at this time. EPA's suggestion has been considered in Chapter 2, Alternatives Considered but Eliminated from Detailed Study.

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* Heritage resource reports are not publicly available documents. Information presented here is a digest from COMPASS Online Data Base.

ACRONYMS

µg	microns
AMSL	Above mean sea level
AUM	Animal Unit Month
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
CR	County Road
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 Well
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
NRCS	Natural Resource Conservation Service
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
RUP	Road Use Permit
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
STATSGO	State Soil Geographic Data Base
SUA	Special Use Authorization
TDS	Total Dissolved Solids
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
VQO	Visual Quality Objective
WIZ	Water Influence Zone

INDEX